



GOVERNMENT OF KERALA

# PERSPECTIVE PLAN 2030 - KERALA

Volume I

## Encouraging Entrepreneurship in Production Sectors

Kerala State Planning Board  
National Council of Applied Economic Research

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## Foreword



**Sri. Oommen Chandy**  
Chief Minister of Kerala

Kerala Perspective Plan 2030 is a perception of the future, which reveals and points to something new, beyond what is already available and accessible. The goal of the Perspective Plan is to improve the quality of life of the people of Kerala to the level of Nordic countries (Sweden, Denmark, Norway and Finland), by 2030. These countries have achieved high material, human, social and ecological development and a highly regarded balance of all aspects of development. In order to get there, we need a framework that defines clearly where we are today, what challenges we face, where we want to be by 2030 and how to get there. Perspective Plan for a State/region means creating a set of alternative long term development strategies and integrated implementation approaches, for reaching the goal of future development.

Our future is about the people. This plan has been prepared after considerable consultations with various expert groups and citizens. The expected change would be to transform Kerala into a healthy and knowledge based economy, in which people enjoy high standards of living, a good quality of life and have access to quality education, health and other vital services.

The Vision of Perspective Plan 2030 is the creation of a diversified, knowledge economy with a resource-based industrial sector, competitiveness and productivity in agriculture, placing great emphasis on skills development. In addition, the Plan will promote competitiveness in all sectors, in terms of product quality and differentiation.

As required by this perspective, the State will operate a totally integrated, amalgamated, flexible and high quality education and training system, which prepares Kerala's learners to take advantage of a rapidly changing global environment, including developments in science and technology. This, in turn, would contribute to the economic and social development of the people of Kerala. Arising from the overall capacity building investments, Kerala will be transformed into a knowledge-based society, and changes in production and information technology will revolutionalize all aspects of the manufacturing process.

Perspective Plan 2030 is expected to reduce disparities and move the State significantly up the scale of human development, to be ranked on par with the developed countries in the world. There will thus be a pervasive atmosphere of tolerance in matters relating to culture, religious practices, political preference and differences in social background. The plan will facilitate equity in access to social services and facilities, as well as access to productive resources such as land, labour and capital. Kerala will be a just, moral, tolerant and safe society

with legislative, economic and social structures in place to eliminate marginalisation and ensure equity between women and men, the diverse and ethnic groups, and people of different ages, interests and abilities and harmony and peace in society.

The major challenge of this Perspective Plan is for all of us (Government, private sector, civil society, as well as individuals) to make a determined effort to concentrate on resolving, not just addressing, very important State level problems. This document: Perspective Plan 2030, presents a clear view of the major problems faced by the State and how these problems can be effectively resolved by deploying-to the fullest extent-our human and natural resources.

Kerala's future will also depend largely on the people themselves; much will depend on our ability and willingness to respond with innovation and commitment to new challenges. The immediate challenge we face as a State, now that we have a Perspective Plan document that defines our state's future development possibilities, is to ensure that the Perspective Plan is translated into reality. As a step in that direction, implementation strategies will be developed and human and financial resources will be mobilized. The programmes of Perspective Plan 2030 have specific targets and periodically, through the State Development Plans, we will evaluate the programme's performance. The success of the Perspective Plan depends on commitment not only of successive governments at the State level and local body level but also on the support we receive from the Union Government in achieving the goals. By the year 2030, with all of us working together, we should be the most developed state in India enjoying prosperity, interpersonal harmony and peace.



(Oommen Chandy)

## Preface



**Sri. K.M. Chandrasekhar**  
Vice Chairman, State Planning Board

Perspective Plan is a plan for a fairly long period, say 15 or 20 years, less detailed and less concrete than plans actually implemented scheme wise. The purpose of a perspective plan is to set a 'perspective' for the short term plans. The short term plans, so worked out, would be such as to lead to certain long term results. Thus it is neither a fully worked out plan nor just a theoretical exercise, but a framework within which concrete short term plans can be fitted.

Kerala Perspective Plan 2030 presents a clear view of where we are, where we want to go from here, and over what time frame. It is a vision that will take Kerala from the present into the future; a vision that will guide us to make deliberate efforts to improve the quality of life of our people. Creation of a knowledge-based economy is central to this Perspective Plan. It is designed as a broad, unifying vision which would serve to guide the State's five-year development plans and, at the same time, provide direction to government departments, the private sector, NGOs, civil societal and local Government authorities. Therefore, Kerala Perspective Plan 2030 will create policy synergies, which will effectively link long-term perspectives to short-term planning. The plan will be implemented through the next four Five Year Plans.

Unless and until there is commensurate increase in productive capacity, maintaining growth rates above 8 per cent may prove to be difficult to sustain in the long run. There is relatively high personal and regional inequality in Kerala. The State faces several problems: an aging population, rapidly increasing urbanisation and increasing pressures on natural resources, especially land and water. In a highly competitive business scenario, there is need to improve the quality of growth in terms of productive capacity, structural transformation and the quality of human development. Strategic planning is an essential first step to place a region on an upward trajectory.

One of the major principles upon which our Perspective Plan 2030 is based is 'partnership'. Partnership is recognised as a major prerequisite for the achievement of dynamic, efficient and sustainable development in the State. This involves partnership between government, communities and civil society; partnership between different branches of government, with the private sector (the business community), banks and financial institutions, nongovernmental organisations, community-based organisations and the international community; partnership between urban and rural societies and, ultimately, between all members of Kerala society. While the principle of sustainable development is the cornerstone on which the strategies for realizing the objectives of perspective Plan 2030, the driving force among the complex agents of our development comprises the sectors Tourism, Information Technology,

Education, Science and Technology, Health, Sustainable Agriculture, Energy, Social Justice, Gender Equality.

In support of the objectives of Perspective Plan 2030, capacity building will be pursued with the utmost vigour by both the private and public sectors to facilitate the implementation of the Plan. The capacity building process (including institution restructuring and building, and human resource development) will continue to be promoted by the existence of a suitable, economic resources and opportunities, and social norms which are conducive to sustained development. In order to realise the objectives of capacity building in Perspective Plan 2030, human resource information management systems will be strengthened; the ultimate objective is to balance supply and demand in the labour market and in this way achieve full employment in the economy. With determined effort to address macro economic imbalances, and to achieve effective implementation of the strategies and action plans suggested in this four volume document, there are strong possibilities of bringing our State on par with the status of developed countries by the year 2030.

Acknowledgements are necessary in full measure of those who helped us in the task of preparation of Perspective Plan 2030 in the State to suggest suitable framework for both long term and short term plans. We are thankful to the National Council of Applied Economic Research (NCAER), New Delhi and its officials, particularly, Dr. Shekhar Shah, (Director General), Dr. Aradhna Aggarwal (Coordinator of the team) and Dr. Bornali Bhandari (Fellow) for carrying out this task in consultation with various stakeholders and submitting the report in time. We are most grateful to the Chief Minister, Ministers and MLAs for their valuable guidance. We are obliged to the Government Secretaries, Heads of Departments, officials of line departments and experts involved in preparation of this document. Our sincere thanks to the general public and students who have offered valuable suggestions and comments on the draft report.

I would like to place on record the valuable inputs and contributions provided in shaping the document by the Members and Member Secretary of State Planning Board, Dr. D. Narayana, (Consultant, State Planning Board), Division Chiefs of State Planning Board and officials of Perspective Planning Division who have coordinated this initiative.

I am sure that Kerala Perspective Plan 2030 would serve as a blue print for the development of Kerala through shorter term Annual and Five Year Plans. We look forward to support and assistance from the Government of India to convert this Perspective Plan into reality.

  
( K.M. Chandrasekhar)

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## Acronyms

ACA	African Cashew Alliance
ADAK	Agency for Development of Aquaculture, Kerala
ADS	Area Development Society
AH&LA	American Hotel & Lodging Association
AHW	Animal Health Workers
APMC Act	Agricultural Produce Marketing (Regulation) Act, 1966
ARPU	Average Revenue Per User
ASER	Annual Status of Education Report
BDS	Business Development Services
BE	Biennium ending
CAGR	Compound annual growth rate
CAPEX	Kerala State Cashew Workers Apex Co-operative Society
CCRI	Central Coir Research Institute
CDE	Career Development Events
CDS	Community Development Society
CDS	Centre for Development Studies
CEPC	Cashew Export Promotion Council of India
CEPI	Comprehensive Environment Pollution Index
CIBA	Central Institute of Brackish water Aquaculture
CICT	Central Institute of Coir Technology
CMD	Centre for Management Development
CMFRI	Central Marine Fisheries Research Institute
CNSL	cashew nut shell liquid
COIRFED	Kerala State Coir Co-operative Marketing Federation
CP	Cleaner production
CPA	critically polluted areas
CPR	Common property resources
CRZ	Coastal Regulation Zone
CSP	Congress Socialist Party
CWRDM	Centre for Water Resources Development and Management
DAP	Di-ammonium Phosphate
DCCB	District Central Co-operative Banks
DGCIS	Directorate General of Commercial Intelligence and Statistics
DIC	Directorate of Industries and Commerce

DIET	District Institutes of Education and Training
DIPP	Department of Industrial Policy and Promotion
DMC	Destination Management Councils
DTPC	District Tourism Promotion Council
EIP	Eco-industrial parks
ETP	Effluent Treatment Plants
F.A.C.T	Fertilisers and Chemicals Travancore
FATTC	Frontier Agricultural Technology Training Centres
FEE	foreign exchange earnings
F-MIS	Fish Market Intelligence System
FOMIL	Foam Mattings (India) Ltd
FTAK	Fair Trade Alliance Kerala
GAP	Good Agricultural Practices
GCA	Gross Cropped Area
GDI	Gender-related Development Index
GHI	Global Hunger Index
GMP	Good Manufacturing Practice
GSDP	Gross State Domestic product
GSM	Global System for Mobile Communications
GVA	Gross Value Added
HI	Head-count Index
HACCP	Hazard Analysis Critical Control Point
HANTEX	Kerala State Handloom Weavers Co-operative Society
HDI	Human Development Index
HORTICORP	Kerala State Horticultural Products Development Corporation
HTFFC	High-tech Farming Facilitation Centres
HTL	High Tide Line
HV	Handloom Villages
IBLI	Index-based livestock insurance
ICAR	Indian Council of Agricultural Research
ICDP	Intensive Cattle Development Project
ICT	Information and communications technology
IH&RA	International Hotel & Restaurant Association
IHMCT	Institute of Hotel Management and Catering Technology
IIITM-K	Indian Institute of Information Technology and Management-Kerala
ILRI	International Livestock Research Institute
IMG	Institute of Management in Government
INCOIS	Indian National Centre for Ocean Information Services
INKEL	Infrastructure Kerala Ltd.
IO	Input-Output

ISDP	Industrial State Domestic Product
ISO	International Organisation for Standardisation
ISPK	Indo- Swiss Project Kerala
JBC	Jiban Bima Corporation
KADA	Kalady Area Development Authority
KAM	Knowledge Assessment Methodology
KAMP	Kerala Agricultural Market Project
KAU	Kerala Agricultural University
K-bip	Kerala Bureau of Industrial Promotion
KCC	Kisan Credit Cards
KDoA	Kerala Department of Agriculture
KERAFED	Kerala Kerakarshaka Sahakarana Federation
KFC	Kerala Finance Corporation
KFRI	Kerala Forest Research Institute
KGGL	Kerala Gail Gas Limited
KINFRA	Kerala Industrial Infrastructure Development Corporation
KITCO	Kerala Industrial and Technical Consultancy
KITTS	Kerala Institute for Travel and Tourism Studies
KMBR	Kerala Municipal Building Rules
KMS	Kerala Migration Survey
KSCARDB	Kerala State Co-operative Agricultural and Rural Development
KSCC	Kerala State Coir Corporation Ltd
KSCDC	Kerala State Cashew Development Corporation
KSCZMA	Kerala State Coastal Zone Management Authority
KSHDC	Kerala State Handloom Development Corporation Ltd
KSIDC	Kerala State Industrial Development Corporation
KSITIL	Kerala State IT Infrastructure Limited
KSMTF	Kerala Swathanthra Matsya Thozhilali Federation
KSPDC	Kerala State Poultry Development Corporation
KUFOS	Kerala University of Fisheries and Ocean Studies
KVASU	Kerala Veterinary and Animal Sciences University
KVS	Key Village Scheme
KWA	Kerala Water Authority
LSG's	Local Self Governments
MARKETFED	Kerala State Co-operative Marketing Federation
MGPS	Mill Gate Price Scheme
MMS	Multimedia Messaging Service
MOP	Muriate of Potash;
MPCE	Monthly Per Capita Expenditure
MPI	Multidimensional Poverty Index

MRP	Mixed Recall period
MSL	Mean Sea Level
MSME	Micro, Small and Medium Enterprises
MSSRF	M.S. Swaminathan Research Foundation
MU	Million Units
MW	Megawatts
NCDC	National Co-operative Development Corporation
NCRMI	National Coir Research and Management Institute
NeGP	National e-Governance plan
NFDB	National Fisheries Development Board
NHDC	National Handloom Development Corporation
NHG	Neighbourhood Groups
NIAM	National Institute of Agricultural Marketing
NIFT	National Institute of Fashion Technology
NIMZ	National Investment and Manufacturing Zone
NMCC	National Manufacturing Competitiveness Council
NPC	Nominal Protection Coefficient
NSS	Nair Service Society
NSSO	National Sample Survey Organization
OSU	Oregon State University
OTOP	One Town One Product
PACS	Primary Agricultural Credit Societies
PATA	Pacific Asia Travel Association
PG	Poverty gap index
PIM	Participatory Irrigation Management
PPP	Public Private Partnership
RCA	Revealed Comparative Advantage
RFID	Radio Frequency Identification
RRB	Regional Rural Banks
RT	Responsible Tourism
SCB	State Co-operative Banks
SCB	Swinging cow brush
SFURTI	Scheme of Fund for Regeneration of Traditional Industries
SHG	Self Help Groups
SIDBI	Small Industries Development Bank of India
SIDCO	Small Industries Development Corporation
SIFFS	South Indian Federation of Fishermen Societies
SMS	Short Messaging Service
SNDP	Sree Narayana Dharma Paripalana Yogam
SPARK	Service and Payroll Administrative Common Service Centres

SPF	Specific Pathogen Free
SPG	Squared poverty gap index
SSDG	State Service Delivery Gateway
SSI	Small-scale Industries
ST	Sustainable Tourism
STC	Spice Tourism Project
STEM	Science, Technology, Engineering and Mathematics
SWAN	State Wide Area Network
TE	Triennium Ending
TFP	Total factor productivity
TRAI	Telecom Regulatory Authority of India
TSA	Tourism Satellite Accounts
UNEP	United Nations Environment Programme
UNWTO	The World Tourism Organisation
URP	Uniform Recall period
VDE	Village Development Executive
VFPCK	Vegetable and Fruit Promotion Council Keralam
VKC	Village Knowledge Centres
VOP	Value of Product
VRC	Village Resource Centres
WSC	Weavers' Service Centres
WTO	World Trade Organisation
WTTC	World Travel and Tourism Council
WUA	Water Users' Associations



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## Towards a Globally Competitive Kerala

### An Innovator Lagging Behind?

Historically, Kerala was an innovator. It chartered a path somewhat different from that followed by other Indian states and many countries. Kerala's approach put human development at its centre — it emphasised education and health; upheld gender parity; and channelled public funds to schools, hospitals and infrastructure. Individual resources too were directed into areas such as private expenditure on health and education as well as to build health and educational institutions. The results of these policies and investments are there for everyone to see. Global recognition came, with Kerala celebrated as one of the few cases of 'good health at low cost' and, more generally, 'high human development at low per capita income'. The State stood alongside Cuba, Costa Rica and Sri Lanka on these parameters.

The high human development, however, had two dark spots: the 'outliers' who missed the larger gains in human development and the regional inequalities, which were not entirely independent of the 'outliers'. It also could not take growth to a new level. Hence, a new development model more responsive to local needs, which also responded to the voices of the poor and marginalised on the one hand and faced the challenges of growth on the other, had to be invented. An opportunity came Kerala's way in 1992 with the 73rd and 74th amendments to the Constitution of India and the consequent instituting of the third tier of government. Kerala took the lead in devolving the three Fs — funds, functions and functionaries — to the local governments. No other Indian state has thought it necessary to devolve over one-third of plan funds to local bodies and give them the freedom to experiment with local planning.

The enactment of the 73rd and 74th constitutional amendments ushered in a new era of decentralised democratic governance in Kerala. By giving a legal status to the rural (panchayats) and urban (municipalities) local bodies it intended to enable them to function as effective democratic self-government institutions. This ensured people's participation in local level planning and enabled them to be part of the development process. The effective functioning of local governments was, however, subject to the devolution of larger funds to them. Kerala has done this since 1996, the results of which are being taken note of.

Kerala has also made creditable progress in the reduction of poverty and the provision of public services through decentralisation. The Multi-Dimensional Poverty Index (MPI) constructed in terms of lack of access to education, health and other basic services has shown a remarkable reduction in the recent past in the State. For instance, the Adjusted Headcount Ratio for Kerala, which shows the percentage deprivation in terms of the MPI indicators, was 0.136 in 1999, the third lowest in India, and fell to the lowest at 0.038 by 2006 (Alkire and Seth, 2013<sup>1</sup>). The Multi-Dimensional Headcount Ratio too has performed very well. This is especially noteworthy for a state like Kerala, where deprivation levels were comparatively low by the 1990s, as it is generally difficult to bring it down further. The Population Census 2011 confirms the findings of Alkire and Seth as Kerala is reported to have the largest proportion of households with latrines and *pucca* houses. Access to basic services, the levels of which took over 40 years to reach, could be reached in less than half the time. These

\*General Introduction is common to all volumes

achievements are largely attributable to the experience of the past two decades of decentralisation ensuring local planning and people's participation.

Kerala has continued with its human development achievements. Its local governments have strived to provide access to basic services to all and the State has reached income levels above the national average. While the quality of infrastructure and the quality of nutrition supplements in anganwadis and schools have shown an improvement, it is doubtful whether the quality of education has got much better. The infrastructure in primary healthcare centres and hospitals has improved, but a worrying public health situation persists. Kerala's growth rate has continued to move above the national average, but it is nowhere near the top; there are many states doing just as well if not better. Agriculture, where local governments have made many interventions, has slipped into negative growth in recent years. Even sectors where Kerala had the lead seem to have lost out: One of the first techno-parks was established in Kerala, but neither the State's exports nor its companies are visible at the very top. Companies based in some other states in India have gained a global reputation through high value addition, with marketing and effective branding. Unfortunately Kerala-based companies have yet to be recognised as major players in any field.

Kerala is part of a globalised world in which rapid change is a constant. In such a setting, the State's growth hinges on ensuring that it is competitive, accessible, liveable and safe. In order to achieve this, Kerala needs to foster an economic environment that helps businesses succeed, simultaneously holding on to the gains in human development and decentralised democratic governance. As the experiences of some of the world's leading nations show, a free, open and innovation-embracing economy can lay the foundation for thriving businesses, markets and investors, which, in turn, will create an impetus for development.

The US is still on top because it embraces innovation, helping promising businesses flourish irrespective of their size. Similarly, Germany is an industrial powerhouse because of its higher education and training sectors and infrastructure; its training and career track programmes are the envy of the world. Likewise, Finland's competitiveness stems from its top ranking position on parameters such as innovation, higher education and training institutions, health and primary education. Singapore is among the best in the world as it ranks high on infrastructure, financial market development, health, primary education and institutions. All these countries are great places for doing business, and that spurs growth.

The imperative for Kerala, therefore, is to create an international business climate, clearly prioritise investments and link spatial development and infrastructure. The State needs to work towards this goal alongside the central government and local governments, spelling out clearly defined responsibilities, simple rules and selective government involvement and by creating freedom of choice for individuals and companies. This new approach will require an overhaul of the State's policies and programmes. Kerala Perspective Plan 2030 (KPP 2030) seeks to set out the contours of such an approach.

## Need for a Policy Change

A thriving private sector with new firms entering the market contributes to a growing economy. Governments play an important role by setting clear rules that create and support a dynamic ecosystem for firms. Without good rules, entrepreneurs have a hard time starting and building small and medium-size firms that are the engines of growth.

The World Bank's 'Ease of Doing Business' reports provide a snapshot of business environments across the world, including the bureaucratic and legal hurdles that entrepreneurs need to overcome to start a business. So where does India (and Kerala within the country) stand on creating an enabling environment for firms to start business?

The 11<sup>th</sup> edition of the report, released in 2014, ranks India at 134 of 189 countries in ease of doing business. In areas such as starting a business, dealing with construction permits, getting electricity, paying taxes, trading across borders, enforcing contracts and receiving insolvency, India is ranked between 111 and 179. On the ease of registering property, India is somewhere near the halfway mark. It is only on parameters such as getting bank credit and protecting investors (both more of a central government domain) that India is ranked high, at 28 and 34 respectively.

While all the states and cities in India have similar legal and institutional frameworks, local regulations and the implementation of national laws vary. And these variations are not small. The report found that, "... it is easiest to start and operate businesses in Ludhiana, Hyderabad and Bhubaneswar. Starting a business is fastest in Mumbai and Noida, at 30 days, while it takes 41 days in Kochi." The report found that among the 17 Indian cities considered, Kochi ranks 16<sup>th</sup> overall. Kochi's does poorly on starting a business (16), dealing with construction permits (15), paying taxes (14) and receiving insolvency (10). Therefore, it seems the economic environment for doing business is not very conducive in Kerala.<sup>2</sup>

Over the past few years, The Institute for Competitiveness, India has regularly published 'State Competitiveness reports', a 'Manufacturing Competitiveness Index' and a 'City Liveability Index'. The Manufacturing Competitiveness Index is constructed based on four inter-related factors — company operations and strategy, state business environment, social infrastructure and political institutions and macroeconomic indicators. In the index for 2014 Kerala is ranked 'medium' along with Chhattisgarh, Madhya Pradesh, Uttar Pradesh and others, way below the 'medium and strong' category (Uttarakhand, Karnataka and Andhra Pradesh) and 'strong' category (Punjab, Haryana, Tamil Nadu, Gujarat and Maharashtra). Kerala's score at 58.30 is only about six or seven points above the lowest scoring Meghalaya (51.47) and Bihar (52.35), while Maharashtra scores highest at 67.07.<sup>3</sup>

Similarly, the Liveability Index 2013 computed for 50 Indian cities puts Thiruvananthapuram at 19, Kozhikode at 21 and Kochi at 24. The cities are ranked on the basis of demographics, education, health and medical standards, safety, housing conditions, socio-cultural and political environment and economic environment, and 20 constituent sub-pillars. Surprisingly, all three cities of Kerala are not only ranked low, but have also slipped in their rankings from 2010: Thiruvananthapuram from 16, Kochi from 12 and Kozhikode from 15. This suggests that over the past three years, other cities have been improving their liveability standards relative to these three cities in Kerala.<sup>4</sup>

The 'India Public Policy Report 2014' goes beyond the ease of doing business and competitiveness and liveability indices and assesses public policy effectiveness in the broad area of well being. The policy effectiveness index presented in the report is a composite of four component indices — livelihood opportunity index, social opportunity index, rule of law index and physical infrastructure development index. The component indices reflect livelihood opportunities, socially meaningful life, security of life and rule of law and amenities for a sustained improvement in living standards. The indices have been estimated for four points of time, 1981, 1991, 2001 and 2011. The analysis at the state level shows that Kerala's rank, which was 18 in 1981, after showing a slight improvement by 1991 (rank 16) has dropped to 20 in 2001 and 21 in 2011. Kerala seems to be doing well on gender equality, reducing infant mortality rate and raising school education. But in terms of crime, inequality in consumption, proportion of underweight children and access to electricity, water and sanitation, the State's performance is poor.

Similarly, Kerala does rather poorly on factors such as the time taken to obtain construction permits, get electricity connections, pay taxes and other similar services required to run a competitive businesses; the delays involved are among the longest in India. The State's manufacturing competitiveness is poor because of a weak business environment, unhelpful social infrastructure

and political institutions; it does not appear to provide sufficient livelihood and social opportunities. Overall, it seems that Kerala does not provide a conducive environment for starting a business. This possibly explains why few businesses are started, and grow, in Kerala.

## What Trajectory to Take?

Encouraging, sustaining and enhancing growth will require decisive action by the State's leaders in order to boost its competitiveness and improve its future economic outlook. Reforms and the right set of investments to enhance competitiveness are crucial for the economic transformations that can lead to sustained higher growth and development over the long term. It is, therefore, imperative that competitiveness — the set of institutions, policies and factors that determine a country's level of productivity — features high on the economic reform agenda.

A competitive economic environment is built on eight pillars, of which the first is the institutional environment determined by the legal and administrative framework within which individuals, firms and governments interact to generate wealth. The quality of institutions has a strong bearing on competitiveness and growth. The role of institutions goes beyond the legal framework. Government attitudes toward markets and freedoms and the efficiency of its operations are also very important. Excessive bureaucracy and red tape, overregulation, corruption, lack of transparency and trustworthiness and the inability to provide appropriate services can considerably slow the process of economic development.

An equally important factor in the institutional environment that determines investor interest is the credibility of the government. A government that promises, but fails to deliver will not attract as much interest as a government that offers an answer after careful examination of a proposal and sticks to its decision with firmness, regardless of opposition from pressure groups. A recurring and persisting gap between promises and delivery will quickly lead to the loss of all credibility of the government among entrepreneurs, adversely affecting the business environment.

The second pillar is infrastructure. It is critical for ensuring the effective functioning of the economy as it is an important factor in determining the location of economic activity and the kinds of activities or sectors that can develop within a region. Well-developed infrastructure reduces the effect of distances, lowers costs and reduces inequalities in a variety of ways. Effective modes of transport — quality roads, railway, ports and air transport — enable entrepreneurs to get their goods and services to market in a secure and timely manner and facilitates the movement of workers to the most suitable jobs. The quality of electricity and telecommunications too play an important role.

The third pillar of a competitive economic environment is health and primary education. A healthy workforce is vital to a region's competitiveness and productivity, not to mention the State's well being. Workers who are ill cannot function to their potential and will be less productive. Poor health leads to significant costs for businesses, as sick workers are often absent or operate at lower levels of efficiency. Catastrophic health expenditure could also greatly reduce savings and investment. This pillar takes into account the quantity and quality of the basic education received by the population, as basic education increases the efficiency of each individual worker. Often, workers who have received little formal education can carry out only simple manual tasks and find it much more difficult to adapt to more advanced production processes and techniques, thereby constraining productivity growth.

The fourth pillar is quality higher education and training, which is crucial for economies that want to move up the value chain, beyond simple production processes and products. Today's globalising economy requires countries to nurture pools of well educated workers, who are able to perform complex tasks and adapt rapidly to their changing environment and the evolving needs of the production system. Higher education is also crucial for sustaining a knowledge economy by providing a continuous supply of personnel for centres of higher learning.

The fifth pillar is labour market efficiency. The efficiency and flexibility of the labour market is critical to ensure that workers are allocated to their most effective use in the economy and provided with incentives to give their best effort in their jobs. Labour markets must, therefore, have the flexibility to shift workers from one economic activity to another rapidly and at low cost, and to allow for wage fluctuations without much social disruption. Efficient labour markets must also ensure clear, strong incentives for employees along with efforts to promote meritocracy in the workplace, and must create gender equity in the business environment.

Development of the financial sector is the sixth pillar of a competitive economic environment as it allocates the resources saved by citizens, as well as those entering the economy from abroad, to their most productive uses. It channels resources to entrepreneurial or investment projects with the highest expected rates of return rather than to the politically connected. A thorough and proper assessment of risk is, therefore, a key ingredient of a sound financial market. Therefore, economies require sophisticated financial markets that can make capital available for private sector investment from such sources.

The seventh pillar is technological readiness, which is the agility with which an economy adopts existing technology to enhance the productivity of its industries. It also includes a specific emphasis on its capacity to fully leverage information and communication technology (ICT) in daily activities and production processes to increase efficiency and enable innovation for competitiveness. ICT has evolved into the 'general purpose technology' of the era, given its critical spillovers to other economic sectors and its role as industry-wide enabling infrastructure. Therefore, ICT access and usage are key enablers of a region's overall technological readiness.

The eighth pillar, innovation, can emerge from new technological and non-technological knowledge. Non-technological innovation is closely related to the know-how, skills and working conditions that are embedded in organisations. In the long run, sustained gains in productivity depend on innovation, which is a strong source of market power that entrepreneurs compete with existing firms to build. The introduction of innovation is responsible for both the progress and instabilities of the capitalist economic system. Entrepreneurs positioned at the top of the knowledge economy excel at ideating and taking these ideas to the market. Ideation requires powerful higher education initiatives provided by dynamic centres of learning and university-industry linkages. The creative arts and broader humanities too can drive, produce, apply and diffuse innovation in different, but equally useful ways compared to the science and technology sector. Therefore, a broad platform that embraces both science and technology and the arts and humanities needs to be built: That is the fount of knowledge creation. Innovation is also not just about coming up with new products — it is also about doing things differently. For this to happen, the entire innovation ecosystem, which consists of a set of closely intertwined and reinforcing factors, is critical.

Local governance (increasingly urban governance, as the State is urbanising rapidly) too has an important role to play in sustainable competitiveness. Globalisation and state devolution establish the contemporary context of urban governance. Economic globalisation has made cities more vulnerable to the ebbs and flows of the international economy, compelling them to compete for business investment. Cities have to become competitive to be successful. Cities such as New York, London and Paris, which have adjusted to the 'new economy' that emphasises corporate and financial services, high technology, higher education and tourism and entertainment services, are advantageously placed to attract mobile capital and skilled workers. If cities have to work towards such a goal, then more administrative authority and functional responsibility should be transferred from the higher to the lower levels of government.

Economic globalisation involving mobile capital investments, the emergence of world wide economic sectors and large movements of domestic labour has changed the context of urban governance. In an

increasingly competitive world, urban governance has been forced to transform from welfarist models into economic development models where city governments, both elected members and officials, have to become more entrepreneurial. Globalisation demands that pro-growth and environmental sustainability concerns be balanced. The mode and manner of governing has to change from hierarchism and bureaucracy to self-organising networks. The general consensus is that positive benefits are to be had from cities taking an entrepreneurial stance towards economic development. Urban entrepreneurialism could take advantage of the resource base, location or physical and social infrastructure created through public and private investments. Direct interventions to stimulate the application of new technology, the creation of new products or the provision of venture capital to new enterprises may also be significant. International competitiveness also depends on the qualities, quantities and costs of local labour supply. Labour of the right quality, even though expensive, can be a powerful magnet for new economic development.

Sustainable competitiveness is the keystone of rapid economic growth in a globalising era. Throughout the second half of the 20th century, increasing productivity and economic growth went hand in hand with better and improving living conditions. But it does not seem to hold true any longer. The relationship between economic competitiveness and social and environmental sustainability has become tenuous. The need to consider sustainability along with competitiveness has become all the more relevant. The World Economic Forum puts it as competitiveness adjusted by two additional pillars: The **social sustainability pillar**, *“the set of institutions, policies and factors that enable all members of society to experience the best possible health, participation and security; and to maximise their potential to contribute to and benefit from the economic prosperity of the country in which they live”* and the **environmental sustainability pillar** which measures *“the institutions, policies and factors that ensure an efficient management of resources to enable prosperity for present and future generations.”*<sup>5</sup>

In 1987 the Brundtland Commission defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” This initial concept, which mainly focused on the environmental aspects of development, has evolved significantly over time and today it is widely accepted that sustainability also includes economic and social dimensions. But the complex relationship between competitiveness and sustainability is poorly understood. Although environmental limitations to growth are important, recent studies have shown that the state of the environment tends to worsen during the initial stages of industrialisation, but then improves as income increases — a concept known as the Environmental Kuznets Curve. But it cannot be assumed that environmental sustainability will be automatically achieved at a certain income level. In order to preserve future generations’ ability to benefit from nature’s resources and services and increase standards of living, policies and measures that ensure an efficient use of natural resources as well as the adoption of clean industrial processes need to be in place. The efficient use of natural resources includes both managing exhaustible raw materials and using renewable resources within their regenerative capacity in order to minimise production costs, ensure the legacy of future generations and reduce pollution.

Environmental degradation can impact the way ecosystems work and reduce biodiversity. Biodiversity losses caused by deforestation or significant land use changes increase the vulnerability of terrestrial and aquatic ecosystems. Biodiversity is also the key driver of economic growth because it provides the basis for many innovations in pharmaceuticals and cosmetic products. Also, investing in the greening of tourism can reduce the cost of energy, water and waste and enhance the value of biodiversity. And overall, opinions are moving towards the belief that ‘green’ growth leads to higher energy and resource efficiency.

The concept of social sustainability is not widely accepted, but human rights, equity and social justice are its recurring themes. While the relationship between social sustainability and development is

hazy, the sense is that an unbalanced social model can undermine the stability of the growth process for both current and future generations. If economic benefits are perceived to be unequally distributed within a society, discontent could erupt, undermining the growth process. Thus, the growth process needs to be inclusive, which is a prerequisite for social cohesion. Social exclusion, apart from being non-democratic, could have a negative impact on competitiveness. Lack of access to basic necessities, gender discrimination, polarisation and lack of social security could be serious problems.

Social sustainability and environmental sustainability are interrelated. Institutions that set clear rules on managing the environment increase the quality of life and provide better opportunities to the whole community. Well managed environmental systems may also translate into equitable income flows. Environmental degradation, on the other hand, could seriously affect the health of the population, especially the underprivileged segments, while pressures on water and land could aggravate social instability. That demography, poverty and environmental sustainability are intricately related is well known.

Combining the ideas of competitiveness and sustainability, sustainable competitiveness may be defined as “the set of institutions, policies and factors that make a nation remain productive over the longer term while ensuring social and environmental sustainability,” (Schwab, 2013: 61<sup>6</sup>). **It is a combination of competitiveness or high quality growth, an equitable society and sustainable environment that creates the ideal conditions for life.**

Kerala wishes to be one such society by 2030, and that requires developing policies that balance economic prosperity with social inclusion and environmental stewardship. KPP 2030 explores the current status of Kerala on these dimensions and offers strategies to take the State towards sustainable competitiveness.

## Vision in terms of Measurable Indicators

In order to assess progress and facilitate meaningful discussions on a vision for Kerala 2030, a series of indicators have been identified. These include economic prosperity, quality of life, equitable society and environmental sustainability.

### Economic prosperity

- To achieve a compound annual growth rate of 7.5 per cent in GSDP per capita for the next 20 years.
- Increase per capita income from the current US\$4,763 (in terms of purchasing power parity of 2005<sup>7</sup>) to US\$19,000 by 2030, and then to US\$36,000 by 2040.
- Achieve sectoral growth rates of:
  - √ 2 per cent minimum growth in agriculture
  - √ 9 per cent in manufacturing
  - √ 9 per cent in construction
  - √ 7.5 per cent in communication
  - √ 10 per cent in the education and health sectors

### Quality of life

- Increase the share of the education and health sectors in GSDP to 15 per cent from the current 11 per cent by 2030.
- Increase the enrolment ratio in higher education to 48 per cent by 2030.
- Create health security for all.

- Move Kerala to the highest category of the UNDP human development index.
- Achieve high standards of living with a focus on:
  - ✓ The growth of smart urban and rural areas.
  - ✓ Transforming Kochi into a global city to take it onto A.T. Kearney's Global Cities Index.

## Equitable society

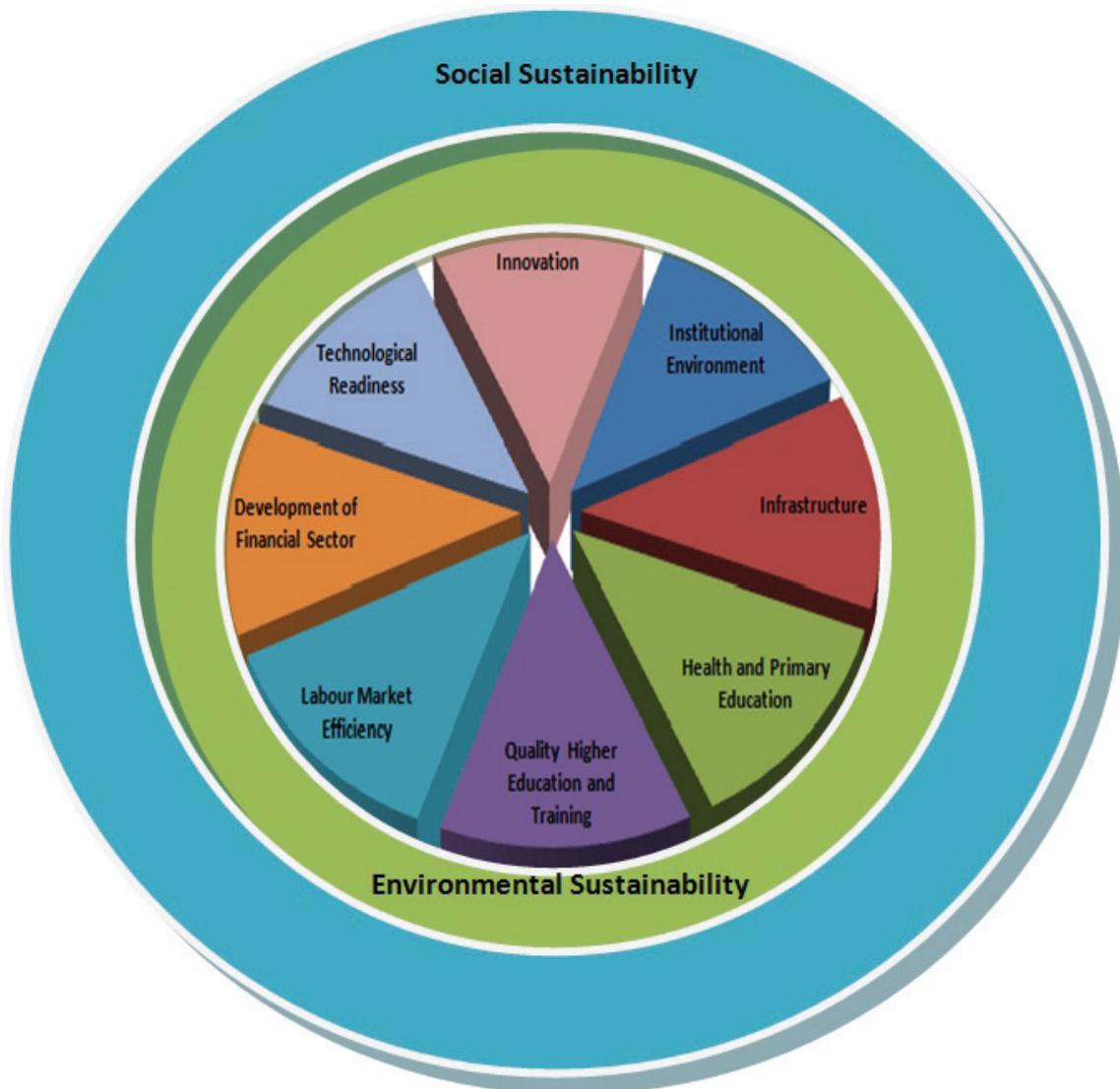
- Reduction in:
  - ✓ Unemployment rate from 9.9 per cent in 2011–12 to 2 per cent in 2031 (reduce the female unemployment rate from 26.2 per cent to 5 per cent).
  - ✓ Gini coefficient of economic inequality from around 45 per cent in 2009–10 to 23 per cent in 2031.
  - ✓ Poverty rate from 7.1 per cent in 2011–12 to 1 per cent in 2031.
- Maintaining a culturally diverse, safe and just society

## Environmental sustainability

- Upgrade ecosystems, biodiversity and resources through sustainable production systems and consumption.
- Protect wetlands.
- Conserve the World Heritage biodiversity of the Western Ghats.
- Increase energy efficiency to save 10 per cent of Kerala's energy and water consumption by 2030.
- Recycle between 60 and 75 per cent of waste generated depending on the type of waste.
- Identify and maximise the use of sustainable resources.

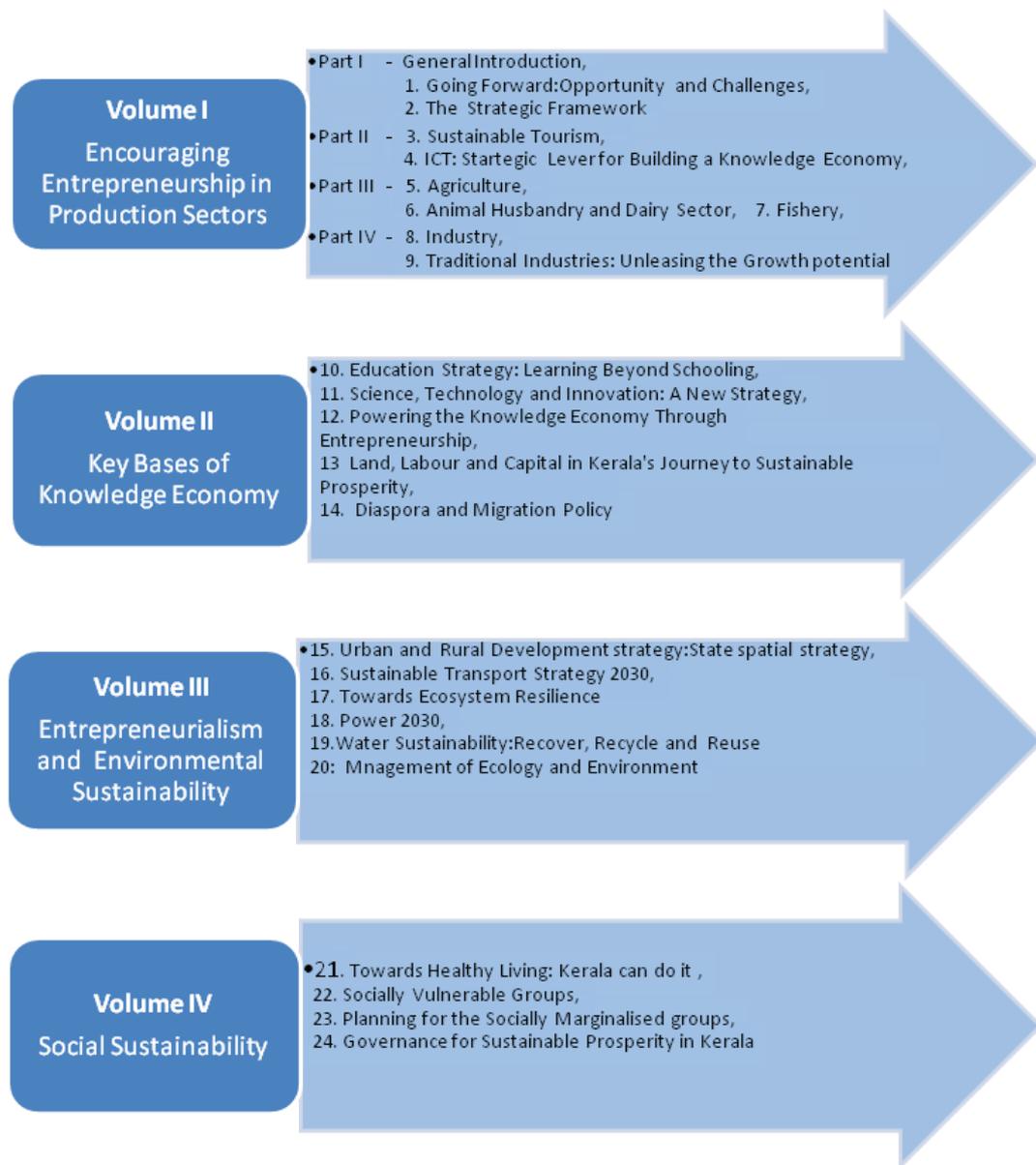
## Organisation of the Perspective Plan

The framework for the development of the Kerala Perspective Plan 2030 has been conceived in terms of innovation-embracing entrepreneurs at the centre of the economy, with eight pillars of institutional elements, infrastructure, health and primary education built on the foundational elements of environmental sustainability and social sustainability (See Figure 1). The driving force of the economy is envisioned as the stream of entrepreneurs in all sectors of the economy, embracing innovation, pushing for new technology and raising productivity to be at the forefront of the global economy. An economy can only be as dynamic as the entrepreneurs and enterprises of the state, as emphatically put by Lazonick (2011<sup>8</sup>) comparing the development experience of industrial Great Britain and post-war Japan with the technology boom in Silicon Valley. As argued by him, the creation and growth of indigenous enterprises was the necessary ingredient for lasting development. While investment in education and foreign direct investment may make important contributions to growth, these are insufficient without entrepreneurial activity within the domestic economy (See Chapter 12 in Volume II for an elaboration of the theme).



**Figure 1. Framework of Kerala Perspective Plan 2030**

The approach of KPP 2030 is to build on Kerala's achievements, discuss the challenges faced by the State in a globalising economy and think up strategies to achieve the goals. That is why KPP is organised in four volumes, which elaborate on four interconnected themes that together constitute its central tenet of balancing economic prosperity, social inclusion and environmental stewardship (See Figure 2 for the diagrammatic representation). Volume I begins with an analysis of the growth of the economy, identifies growth drivers and dynamism of enterprises in different sectors and then goes on to discuss strategies needed to spur entrepreneurial initiative. Seven material production sectors are taken up for detailed analysis to ascertain the nature of entrepreneurial activity, the evolution of the policy environment and the challenges faced by them in each of the sectors. Volume II takes up the eight pillars of entrepreneurial activity, except some, such as health, that are more foundational and are taken up in the social sustainability volume (Volume IV) and some such as infrastructure that go into the environmental sustainability volume (Volume III). Thus, each volume has its own merit and adds to overall value.



**Figure 2. Organisation of Kerala Perspective Plan 2030**

**Volume I begins with a short introduction and continues in four parts.** Part 1 contains Chapters 1 and 2, that discuss the opportunities and challenges, and the strategic framework required for the economy to move forward. Part 2 contains two chapters, one on tourism and the other on ICT, the two sectors that offer great opportunities in a globalising economy. Unconstrained by the market and receiving lots of government support, the two sectors, however, show contrasting performances in Kerala. Tourism zoomed ahead, establishing the Kerala brand across the world and setting benchmarks for other Indian states. ICT on the other hand, despite early advantages, lagged behind and is finding it challenging to make its presence felt in a very competitive market. Part 3 on agriculture, livestock and fisheries analyses these ailing sectors with some sparks of success. Part 4 on industry, including traditional industry, draws attention to the constraints and the major steps needed to take the sector out of decline. Comparing and contrasting the growth experience of the different sectors lays bare the fact that innovation and entrepreneurship go side by side in dynamic sectors such as

tourism and subsectors such as cardamom or natural rubber cultivation. Other sectors lack the two and languish. The centrality of innovative entrepreneurs for growth dynamism of the economy is well brought out.

**Volume II is on the Key Bases of the Knowledge Economy.** Education, innovation and entrepreneurship are among the factors that foster competitiveness. By responding to the needs of labour markets, educational systems help economies avoid skills gaps and ensure that adequately trained human capital is available. Kerala's education sector, a key base of the knowledge economy, has to be transformed to raise the skill levels of those who pass through it and enter the labour force, as well as of those who enter institutions of higher learning. In short, it needs to become a knowledge-creator of excellence.

Education in the form of dynamic centres of higher learning also supports the growth of entrepreneurship and a culture of ideas and innovation. Entrepreneurs are at the pinnacle of the knowledge economy, creating new products, services, technology or production methods.

Similarly, the creative arts, and the broader humanities stream, can drive, produce, apply and diffuse innovation in different, but equally useful ways compared to the science and technology sector. Consequently, a much broader platform that embraces both science and technology and the arts and humanities needs to be conceived. The ever expanding cycle of innovation is transformed into economic progress when capital and labour shift from failing technologies to those at the cutting edge. These movements of factors of production are greatly affected by factor rigidities, so the move from the sphere of ideas to the market can be greatly eased by loosening the factor rigidities. Institutions, therefore, have to be designed to ease the rigidities of the land, labour and capital markets.

The diaspora too can play an active role in the growth of the knowledge economy by making use of its global exposure to ideas, markets and institutions. This exposure can be then brought home to Kerala in various ways. Transitioning to a knowledge economy, thus, calls for an inclusive strategy that brings together education, science and technology, higher learning, entrepreneurship, land and labour rigidities and the diaspora.

**Volume III is on Environmental Sustainability.** The fact that economic growth requires extra inputs of natural resources can be attributed to increased urbanisation and changing consumption patterns. Urbanisation leads to substantial use of raw materials for building urban infrastructure such as water supply and sewage systems, roads, buildings and so on. Similarly, rising incomes change consumption patterns, raising the demand for a number of goods, the production of which requires many natural resources. For Kerala, these are issues to consider, as the depletion of natural resources will affect the Western Ghats, wetlands and coastal regions.

The State also faces new challenges in the context of the Kasturirangan Report and related notifications. Many parts of Kerala come under its purview, thus introducing limitations on economic activity in several regions of the State. At the same time, the notifications are also an opportunity for the State to channelise reverse migration from the hills to its urban centres more systematically, while using areas falling within the Western Ghats for forest regeneration and preservation.

Likewise, the environmental sustainability of Kerala's urban areas has to be in sync with the distinctive patterns of urbanisation in the State. For instance, overall population growth in the State is low and is concentrated in a few urban agglomerations. These urban centres need to have sustainable power, water, sanitation and transportation systems of international standards. Likewise, they need proper green spaces, while the Ramsar sites located around them have to be preserved and the coastal zones have to be conserved.

**Volume IV is on Social Sustainability.** Social sustainability is achieved when the economy has a fair and equitable health and social security system. It has two parts: one, preserve and protect the health of the population, and two, protect and support the vulnerable — the aged, disabled, disadvantaged and marginalised. The first requires investments in health, which has forward links to economic growth and productivity. Financing, architecture and governance of health of the population to reduce the IMR, CMR, MMR and infectious and lifestyle disease burden is its goal. The burden of lifestyle diseases is aggravated by smoking, consumption of high calorie processed food and consumption of alcohol. Injuries from traffic accidents form an additional burden. Financial protection against catastrophic health expenditure is also part of the healthcare system. The social sustainability pillar of KPP 2030 intends to reduce the difference between Kerala and the developed countries on parameters such as infectious, maternal and child mortality outcomes and lifestyle diseases.

The principle underlying the social security system is solidarity. This is solidarity between various social groups, especially between the employed and unemployed, the young and the old, the healthy and the ill and so on. Social solidarity evolved from simple insurance against social risks to a guarantee of subsistence security. The charter of the socially insured is basically to protect the population through a set of rules to be respected by all social security institutions; the automatic adaptation of social benefits to the evolution of the consumer price index; and electronic governance of social security institutions by reducing the number of forms, reducing the number of times information is asked for and reduction in the time needed for filling forms through the increased use of ICT. By 2030, Kerala's social security system will be comparable to that in any of the Nordic countries.

Governance systems too form the base of social sustainability. It is often said, "A common problem for many governments is that they use yesterday's institutions to meet tomorrow's problems." These are blunt instruments, which have to be replaced. Kerala has already made some progress with decentralisation initiatives following the 73rd and 74th amendments to the Constitution. Local governments are participatory, with their gram/ward sabhas. The aim is to go further with participatory budgeting and transparent project formulation and implementation so that the efficiency of public spending can be enhanced. But other government institutions are archaic and call out for a complete overhaul.

The local government system in Kerala may be characterised as welfarist. The bulk of the funds that flow from the central and state governments go towards meeting social security and welfare activities. This will have to change because urbanisation is taking place at a rapid pace and in an increasingly competitive world, urban governments have to become more entrepreneurial.

Kerala will have to balance the welfarist and pro-growth or urban entrepreneurialism models of governance. Sustainable competitiveness calls for a system of urban governance that creates conditions for higher local economic growth. As the source of such growth is knowledge-intensive business, urban governance should be building a favourable image of the city to attract investment. Urban entrepreneurialism needs to take advantage of the local resource base, location or physical and social infrastructure to push for sustainable competitiveness. Urban governments will, therefore, need to explore all the options before them, with some leveraging their status as tourism or entertainment centres and others growing as centres of higher education or finance. This requires the institutional structure of local government-state government interaction to move in the direction of promoting urban entrepreneurialism, with the state government creating appropriate incentives to facilitate the process.

## Some Limitations

Perspective plans such as KPP 2030 detail a vision of where a community wishes to be in 20 or so years. Any vision is a projection, a visualisation of something that does not exist today; it combines

what exists with what is possible. The possibilities generated by the imagination are born out of what exists, which in turn is the result of the past that is our history and the evolution of the economy and society to the present. While imagination remains in the realm of the mind, creativity is its result and tangible creation.

This requires a depth of understanding that is multi-layered, with the past and present serving as a continuum as well as a spur to further evolution. Such deep understanding is the result of observation, analysis and introspection. In other words it stems from a critical analysis of the reality around, an analysis that draws from research studies and experience. This is essential if visualisation is to be kept within realistic limits.

This is broadly the perspective with which this document needs to be viewed. Therefore, KPP 2030 can only be as rich as the critical analysis of different sectors that were available during its preparation. Kerala is fortunate to have detailed studies on a number of sectors such as health, education, social vulnerability, governance and marginalisation and so on. Equally, there are few comprehensive studies on a number of sectors such as urbanisation, transportation, the environment and so on. The integral link between the idea of future and the present may be perceived as strong for some sectors and weak for others in the document, depending on availability of data and baseline scenarios. While an effort has been made through various rounds of stakeholder consultations and insightful study of relevant documents and best practices around the world, gaps do remain.

It is possible that some of these issues have been pointed out by experts during the workshops held to review the draft document. But the absence of adequate studies could be a serious challenge to bridging the gap between the reality that is Kerala's society and economy today and a vision of the future. This, therefore, needs to be viewed as a stimulus for further studies rather than a rigid document.

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## Encouraging Entrepreneurship in Production Sectors

Sustainable competitiveness of an economy is founded on a stream of innovation in various sectors of the economy and society. The ability to embrace innovation is the hallmark of sustainable competitiveness. The pivotal crucible for innovation is the entrepreneurial activity of deploying new ideas or inventions within the marketplace. Richard Cantillon identified entrepreneurship as the willingness of individuals to carry out forms of arbitrage involving the financial risk of a new venture. Entrepreneurship is crucial in driving the process of selecting innovations and creating diversity of knowledge. It has been acknowledged as the key driving force for the incredible growth miracle of various developed countries.

Recent research has shown that small business has to be seen more than ever as a vehicle for entrepreneurship, contributing not only to employment but also to social and political stability. Rather, it contributes in terms of innovative and competitive power. New evidence suggests that entrepreneurship is a vital determinant of economic growth. “Confronted with rising concerns about unemployment, jobs, growth and international competitiveness in global markets, policymakers have responded to this new evidence with a new mandate to promote the creation of new businesses, i.e., entrepreneurship.”<sup>1</sup>

Volume I is an account of the material production sectors of Kerala’s economy and seeks to identify activities and sectors that have been attractive to entrepreneurs. Entry of a large number of entrepreneurs leads to growth dynamism; lack of entry or low entry will certainly lead to a languishing economy. Analysis of the macro economy of Kerala (in Chapters 1 and 2) suggests that growth needs to be sustained and stepped up if the State is to be ranked among the high growth states of India. A careful analysis of the production sectors (Tourism in Chapter 3, ICT in Chapter 4, Industry in Chapter 8 and Traditional Industries in Chapter 9) suggests that the growth drivers of recent years are confined to tourism and construction and not sectors such as ICT or high-tech industry. The declining agriculture sector of the State, covered in Chapters 5 to 7 (Agriculture, Livestock and Fishery respectively), shows few signs of an innovative spark or entrepreneurial zeal. The analysis of the different sectors suggests that lack of policy initiatives, poor infrastructure and inadequate financial incentives can explain only part of the problem. The major issue is the relatively small number of entrepreneurs venturing into the productive sectors.

There are many ways in which the level of entrepreneurship can be influenced. Different factors and forces shape the entrepreneurial experience across countries and time periods. The level of entrepreneurship in a particular country can be explained by making a distinction between the supply side and demand side. The demand side of entrepreneurship, representing opportunities, is influenced by the diversity of consumer demand creating more room for entrepreneurs, as well as an industrial structure influenced by technological advances and government regulation. The supply side is dominated by demographic composition, cultural and institutional environment.

The demand for entrepreneurship is determined by a combination of factors, globalisation and the stage of technological development. These factors influence the industrial structure and market demand, leading to opportunities for entrepreneurship. All these are highly interrelated and

generally apply to all countries. Further, contemporary technological developments, such as the application of information technology, seem to favour small-scale production through cheaper capital goods, decreasing minimum efficient scales of production and better access to information and communication devices. The shift towards the services sector in the economy has also offered new opportunities for small-scale production.

As regards the supply of entrepreneurs, population density and urbanisation play a role. Urban areas with high population density owing to market proximity and business infrastructure can boost entrepreneurial activity. The existence of research centres and universities can offer an educated workforce and access to innovative products and processes. “When markets in a country are large and when people can easily organise firms and keep their profits, many talented people become entrepreneurs. ... In many other countries talented people do not become entrepreneurs, but join the government, bureaucracy, any organised religion and other rent-seeking activities because these sectors offer the highest prices,” (Murphy et al., 1991: p.505).<sup>2</sup>

When talented people become entrepreneurs, they improve the technology in the line of business they pursue, productivity and incomes grow and the economy prospers through wealth creation. “The occupational choices of individuals are made on the basis of their risk-reward profile of entrepreneurship versus that of other types of employment, i.e., wage employment or unemployment. At the aggregate level these occupational choices materialise as entry and exit rates of entrepreneurship,” (Audretsch et al., 2002, p.21).

Occupational choice, defined as the process of weighing the risks and rewards of different types of employment, takes into account both environmental factors (opportunities) and individual characteristics (resources, ability, personality and preferences). The risk-reward profile of self-employment versus other types of employment encompasses the valuation of expected relative rewards and risks. The better the prospects of entrepreneurial income compared to the income from wage-employment, the more seriously will people consider entrepreneurship as a career.

Baumol's seminal work (1990)<sup>3</sup> contributed to the literature by showing that institutions determine not only the level, but also the type of entrepreneurship. Individuals put their entrepreneurial talent to use in activities that are productive, unproductive or destructive. The institutional setup or the rules of the game dictate relative return and, hence, the allocation across these activities. Part of the reason for the shortage of entrepreneurs in Kerala's material productive sectors is the better compensation in government and religion. The social environment is conducive for talent to move towards rent-seeking activities. This has to undergo a drastic change if Kerala society is to produce a stream of entrepreneurs. Volume I analyses the growth experience of the material production sectors and shows that public policy has largely taken sectoral approaches and deployed resources to address the problems of the different sectors.

The opening chapter of Volume I titled **Going Forward: Opportunity and Challenges** begins with a discussion of the unique economic and social history of Kerala, which has influenced its economic growth path over the past 150 years. At the time of Independence, Kerala had higher life expectancy and literacy rates than the rest of India. Kerala's economic growth post-Independence can be divided into two phases: (a) the years between 1956 and 1987, which were marked by low growth at 1.12 per cent per annum; and (b) a turnaround in 1986–87 with the economy growing at 5.2 per cent till 2002–03, with growth accelerating to above 8 per cent since then. Kerala's high growth is mainly driven by construction, transport, storage and communication, trade, hotels and restaurants, real estate ownership, business, legal services and other communication services. The four factors that drive domestic demand are remittances, tourism, government welfare expenditure and the welfare role of social organisations. However, these factors are vulnerable to external and internal dynamics. Unless and until there is a commensurate increase in productive capacity, maintaining growth rates

above 8 per cent may prove to be difficult in the long run. In the face of a grim business scenario, there is a need to improve the quality of growth in terms of productive capacity, structural transformation and the quality of human development. Strategic planning is, therefore, an essential first step to place the region on the growth path.

Chapter 2, called **The Strategic Framework**, sets out Kerala's vision 2030 as a prosperous, knowledge-driven and competitive economy, which optimises the use of resources and reduces environmental impact while ensuring high living standards for all. The mission to achieve sustainable prosperity rests on four pillars — economic, human, social and environmental. To attain quality growth, benchmarking will be the central instrument for monitoring and improving the performance of the economy. Overall, Kerala will be benchmarked against the Nordic countries. Education and health, Kerala's traditional strengths, will be the driving force of the new development strategy. Therefore, upgrading the quality of education and health to international standards, developing knowledge nodes within the State, promoting knowledge creation and diffusion are some key directions. The higher education system will develop learners, while simultaneously creating, disseminating and diffusing knowledge. Education and health will be inter-linked with all other sectors such as agriculture, industry, tourism and so on. Development of infrastructure is a crucial element and ICT is the lynchpin of a knowledge economy. Private investment and entrepreneurship will be encouraged. However, the State has to strengthen institutions, improve governance and address factor market rigidities to create enabling conditions for the new development strategy. A robust monitoring and evaluation system that promotes transparency and accountability and facilitates regular tracking of physical and financial performance of the plan will be created.

The chapter on **Sustainable Tourism** (Chapter 3) clearly enunciates what the entrepreneurial class can deliver when the policy is clear and the government committed to it. In promoting tourism, Kerala has emerged as one of the best performers among the Indian states. The focus has been on foreign tourists and their number has shown a rapid increase with the growing brand image of the State as 'God's Own Country'. Although the State is rich in natural and cultural heritage, till the mid-1980s tourism was not thought of as an activity with great economic potential. A small beginning was made with the beaches of Kovalam. In successive steps, the beaches along the State's 590-kilometre coastline, the wildernesses of the Western Ghats, the backwaters, its rejuvenation system and the cultural and trading heritage of the region have all been turned into tourism resources. In recent years, mirroring the global trend of sustainable tourism, the emphasis has been on Responsible Tourism, with the focus on sustainability — environmental, economic and socio-cultural. Kerala has no doubt chosen the right path, but sustainable tourism has to be built on carrying capacity defined as "the maximum number of people that may visit a tourist destination at the same time, without causing destruction of the physical, economic, socio-cultural environment and an unacceptable decrease in the quality of visitors' satisfaction," (WTO 1981). Such an approach calls for the diversification of tourism sites geographically and through the seasons and the State, as a whole, has to talk the language of sustainable tourism.

Chapter 4 titled **ICT: A Strategic Lever for Building a Knowledge Economy** discusses Kerala's achievements and the steps needed to transform the State into an ICT powerhouse. Kerala has one of the highest tele-densities in the country and the highest proportion of population with the knowledge needed to use computers. The number of e-services and m-services available in Kerala is mind boggling, but its impact on stakeholders is yet to be ascertained. The creation of IT infrastructure has topped Kerala's development agenda for several years. The Technopark in Thiruvananthapuram was one of the first in the country and among the largest in India, and such parks are coming up all over the State. The government has been making efforts to woo private companies in the IT sector with limited success. Kerala tops the Human Development Index in India measured in terms of educational and health attainments. Despite these advantages and its relatively early start, Kerala seems to have lost out due to the absence of a growth environment for ICT. KPP 2030 proposes to

transform the State into a knowledge economy with ICT as its lynchpin. Digital technology will be used to drive productivity, create new growth opportunities across the whole economy, innovatively converge with other sectors and catapult Kerala into the league of major knowledge economies.

Chapter 5, **Institutions and Innovations for Sustainable Agricultural Growth**, argues the need for a paradigm shift from subsistence farming to knowledge-intensive, competitive farming. The focus will be on increasing competitiveness and productivity in agriculture in order to raise the incomes and well being of stakeholders and bring long-term prosperity. Land zoning is key to this sector, with paddy fields being protected as they are mostly low-lying wetlands. Other measures include forming producer companies, adopting the latest technology and implementing integrated farming techniques. In order to facilitate productive use of labour, labour institutions will have to undertake appropriate alterations.

Chapter 6, **Animal Husbandry and Dairy Sector : Livestock for Better Lives**, discusses the livestock economy of the State. Kerala is home to a range of livestock species, raised both in backyards and commercial farms. Cattle, buffaloes, goats, pigs, ducks and fowl, rabbits and so on are the main livestock categories raised for milk and meat. A sustainable livestock strategy for the State will target reducing the environmental footprint of farms, while improving the production of milk, meat and eggs; farm profitability; and the well being of the people and animals involved. Kerala's livestock strategy will adopt or adapt sustainable practices and technology, while working within the integrated farming framework. Simultaneously, enhanced branding and marketing campaigns will be created to promote Kerala's produce.

Chapter 7, **Fishery: Building a Sustainable Future**, examines Kerala's comparative advantage in fishing due to its long coastline and the presence of rich inland water bodies. However, while fish production has stagnated in Kerala, consumption both within and outside India is increasing. Further, the fishing industry in the State provides employment to 11.52 lakh people, including many women. The strategy for the sector hinges on sustainable fishing and establishing a fishing ecosystem. The effort has to be on increasing productivity without damaging the environment. This can be achieved by adopting and adapting new technology, new harbour management techniques, improving infrastructure through measures such as building cold storages and cold storage networks, establishing hygienic retail markets and increased use of ICT in fishing. Alongside, fisher folk need to be educated in modern, environment-friendly fishing techniques. The social aspects of the strategy for the fisheries sector include encouraging women entrepreneurs and risk mitigation by providing insurance through both traditional and non-traditional routes.

Chapter 8 on **Industry** points out that Kerala suffers from low industrial growth and that the share of manufacturing in industry is low. Within manufacturing, unregistered manufacturing forms a disproportionately large part. The path forward is based on the idea of sustainable industrialisation that balances economic prosperity, environmental stewardship and social sustainability. Kerala will create a sustainable business environment and prioritise knowledge-intensive activities and diversify the industrial structure. It will adopt clean production systems to mainstream environment. A cluster development approach is recommended for the State, with the 'one town, one industry' and 'one village, one product' model. While paying special attention to small and medium industries, Kerala can seek to leverage its unique location by promoting logistics hubs. Innovation, skill development and entrepreneurship for sustainable development are to be encouraged. Enforcement of a social security system and strict compliance with decent working conditions is necessary for inclusive development, with every activity benchmarked against international standards.

Chapter 9, **Traditional Industries: Unleashing the Growth Potential** outlines how these industries occupy an important position in Kerala's economy. The vision is to transform these industries into modern, high value-added ones. For instance, modernisation is essential for the development of the

cashew industry. Part of India's national heritage, the handloom industry will be a niche sector. It will be promoted with the primary objective of preserving and protecting the craft from the threat posed by power looms, fully automatic looms and similar technology. Coir, another of Kerala's traditional industries, has many inherent advantages, but has not yet achieved its real potential for want of an integrated approach. Continuous efforts must, therefore, be made to develop new sources of income through product diversification and improved product quality, with an emphasis on market-oriented technology.

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# GOING FORWARD: OPPORTUNITY AND CHALLENGES





## Going Forward : Opportunity and Challenges

Kerala's economic growth over the past 150 years has been influenced by its unique economic and social history. Since the late 18th century, social movements have significantly influenced Kerala's social capital, reinforcing its tradition of 'public action'. Similarly, at the time of Independence, Kerala had higher life expectancy and literacy rates than the rest of India. The State's economic growth is divided into two phases. The years between 1956 and 1987 were marked by economic stagnation, with growth at 1.12 per cent. There was a turnaround in 1986–87 and the economy grew at 5.2 per cent till 2002–03. Since then, the State's economy has accelerated, growing at above 8 per cent. Data from the 1970s onwards shows that Kerala's growth is mainly driven by construction, transport, storage and communication, trade, hotels and restaurants, real estate ownership, business and legal services and other services. These have low tradability and are mainly driven by domestic demand. The four factors that drive domestic demand are: remittances, tourism, government welfare expenditure and the welfare role of social organisations. However, these factors are vulnerable to external and internal dynamics. Unless there is a commensurate increase in productive capacity, maintaining growth rates above 8 per cent may be difficult in the long run. Further, Kerala is caught in a trap of low productivity of Gross State Domestic Product and employment. There is also relatively high personal and regional inequality in Kerala. In addition, the State faces rapidly increasing urbanisation, an aging population and increasing pressures on natural resources, especially land and water. In the face of a grim business scenario, there is a need to improve the quality of growth in terms of productive capacity, structural transformation and the quality of human development. Strategic planning is, therefore, an essential first step to place the region on an upward trajectory.

In Kerala, following the recommendations of the Administrative Reform Committee, Kerala Panchayat Bill and District Council Bill were placed in the Assembly in 1958 and 59 respectively. But these bills could not be enacted into Law. Later on in 1960 Kerala Panchayat Act was framed. Based on the Act elections were held in 1963 and 922 village Panchayats came in to existence in 1964. In 1979 the State enacted the Kerala District Administration Act. In 1990 elections were held to District Councils in Kerala and the District Councils came in to existence in February 1991. But the districts councils were dissolved later on. It was at this point that the Historic 73rd and 74th Amendment came in to existence. Now Kerala is the torchbearer not only among Indian states but also internationally, for the way in which it has devolved powers and resources to local governments and the methods and processes it has followed in implementing decentralization.

### 1.1 Unique Features of Kerala

Historically, physically and culturally Kerala is one of the most distinctive states in India. It is endowed with rich human, social and environment capital, which present enormous opportunities for its policymakers. It has had a unique pattern of development, which is as much an outcome of its geography as of its history. Over the past two-plus decades (1987–88 to 2009–10), Kerala has grown at an impressive rate of over 6.3 per cent. Not only did economic growth soar, but the poverty rate also fell from over 65 per cent to less than 15 per cent during this period. Today, Kerala is one

of the most eligible aspirants to achieving developed economy status among India's states. A brief overview of its geography and history is critical to understanding the specific factors that lie behind both its impressive growth record and the emerging development challenges Kerala faces.

## 1.1.1 Distinct Geography

1.1.1.1 With a total area of 38,863 square kilometres, Kerala is a relatively small Indian state. It is situated on India's south west coast, flanked by the Arabian Sea on the west and the Western Ghats mountain range on the east. The State varies in width from 35 to 120 km, with a coastline that extends for 590 km from north to south. It is, thus, a narrow strip of land that forms 1.2 per cent of India's total land area. However, it accounts for 2.8 per cent of India's population, making it the ninth most densely populated state in the country (859 people per sq km).<sup>1</sup>

1.1.1.2 Kerala is positioned at the intersection of different climatic and geomorphologic features. The topography and physical characteristics change distinctly from east to west, starting with the hills to the east, sloping down to the coast, which is covered by coconut groves. As a result, the State is divided into three distinct regions that run longitudinally from east to west — hills and valleys (highlands), midlands and coastal lowlands.

- a) **Highlands:** Nearly 48 per cent (18,700 square kilometres) of the State lies at altitudes exceeding above mean sea level (MSL).<sup>2</sup> The highlands zone is wet and relatively cool and has large forest tracts. With a total recorded forest area of 11,300 square kilometres, which is 29 per cent of the State's total area,<sup>3</sup> Kerala has rich biodiversity. In fact, the Kerala stretch of the Western Ghats is one of the world's 34 biodiversity hotspots. The State possesses 95 per cent of the flowering plants in the Western Ghats and has 90 per cent of its vertebrate fauna. Of the total recorded forest area, over 98 per cent is reserved, with 13 sanctuaries and two national parks. Kerala's 44 rivers are fed by the monsoon, and all but three of them originate in the Western Ghats.
- b) **Midlands:** The midlands are made up of a lateritic plateau. The area consists of dissected peneplains, with numerous floodplains, terraces, valley fills and colluviums. In some places this geographical region borders the sea without the intervening coastal plains.<sup>4</sup> It constitutes 41.8 per cent (16,200 square kilometres)<sup>5</sup> of the territory and is situated at an altitude between 7.6 and 76 meters above MSL.
- c) **Coastal lowlands:** Land along the coast is low lying, alluvial and fertile. Beach dunes, ancient beach ridges, barrier flats, coastal alluvial plains, flood plains, river terraces, marshes and lagoons form this area.<sup>6</sup> It is the most densely populated among the three regions. The lowlands represent only about 10.2 per cent (3,980 square kilometres) of the entire territory.<sup>7</sup> As a result, settlement conditions and establishment of economic activities is rather difficult.

1.1.1.3 Other characteristic physical features of Kerala include the backwaters and wetlands.

- **Backwaters:** Kerala's backwaters are a unique ecosystem where lagoons, lakes, canals, estuaries and deltas of several rivers meet the Arabian Sea. The backwaters of Kerala are made up of over 900 km of interconnected waterways, rivers, lakes and inlets.<sup>8</sup>
- **Wetlands:** The State has 160,590 hectares (ha) of wetlands (4.13 per cent of its area<sup>9</sup>). There are a total of 4,354 wetlands of which 2,592 are mainly tanks with an area less than 2.25 ha each.<sup>10</sup> The remaining 1,762 wetlands are divided into two types — inland and coastal. There are 1,593 inland wetlands with a total area of 117,100 ha. A majority of the inland wetlands are natural (1,115 with a total area of 88,500 ha). Man-made inland wetlands mostly consist

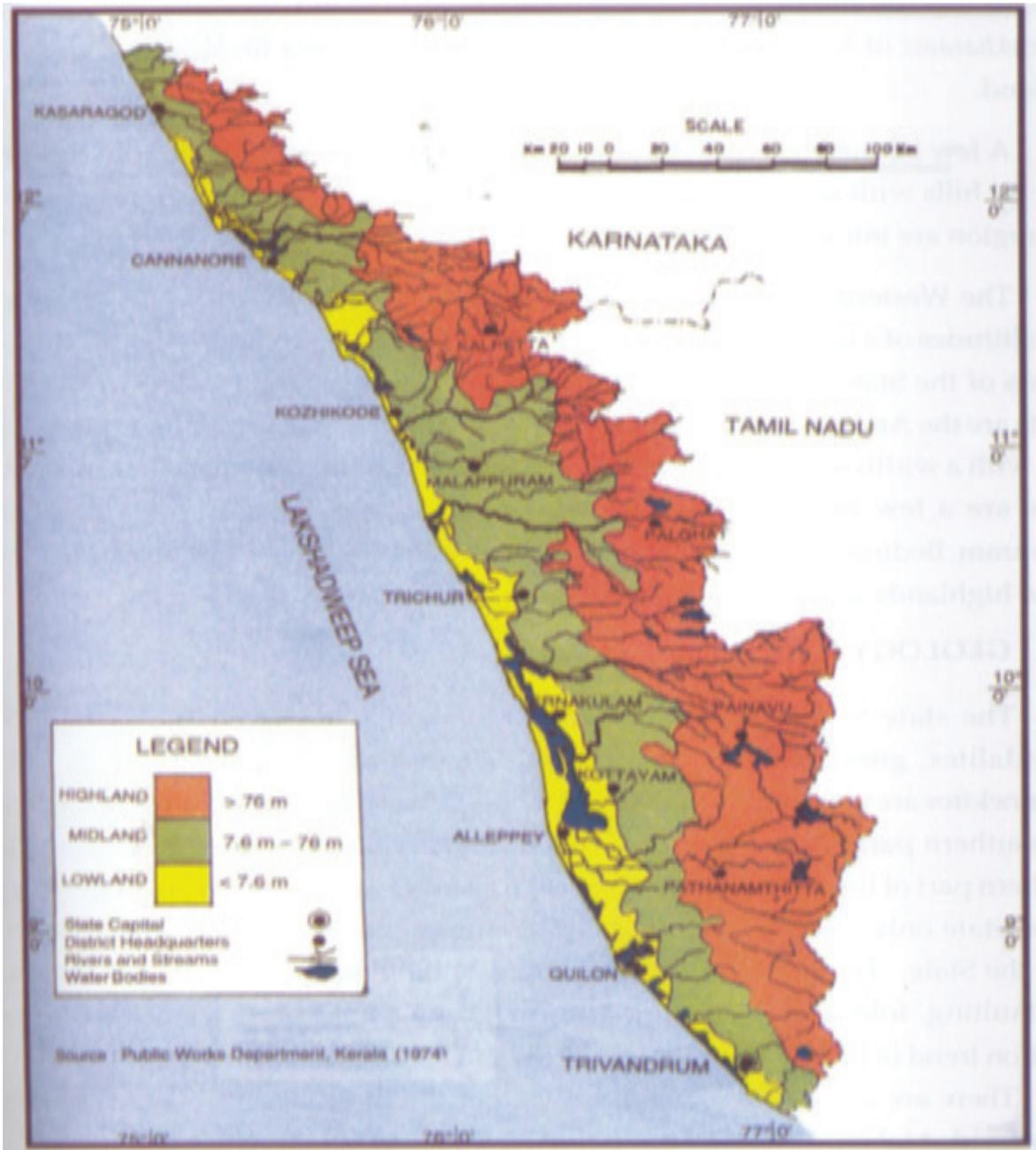
of reservoirs/barrages (39 with a combined area of 26,200 ha) and the rest are tanks/ponds (439 with a total area of 2,400 ha). Kerala has 169 natural coastal wetlands with a total area of 40,900 ha. Wetlands support a wide array of flora and fauna and perform many ecological, climatic and societal functions.

1.1.1.4 These natural conditions have a direct bearing on settlement patterns, the specific structure of land use, agriculture and water resources of Kerala. They also pose unique challenges.

1.1.1.5 Kerala shares its borders with Karnataka in the north and Tamil Nadu in the south and the east. However, it remains almost isolated from the bordering states by the Western Ghats. There are only two major gaps (Palakkad and Shencottah gaps) in the long chain of hills that separate it from Tamil Nadu. Kerala's 590 km coastline has exposed it to maritime influences, enabling trade and cultural relations with the outside world. Across centuries, contact with the Arab and European worlds through the trade in pepper and spices not only influenced Kerala's economy, but also its society, culture and regional consciousness. Merchants from West Asia and Southern Europe established coastal posts and settlements in Kerala. These developed into centres of trade between Kerala and the Arab world, North Africa and the Roman Empire.

1.1.1.6 Arabs, Jews and Christians first came to Kerala as traders. Many of them settled in the State, making it a unique instance of communities from three of the world's major religions — Hinduism, Islam and Christianity — living peacefully within one region. Today, the three communities are widely distributed and live in harmony though there are some areas of religious concentration. After Punjab, Kerala is the only other major Indian state (excluding the smaller states and those in the North East) where only 54.5 per cent of the population is Hindu as per the 2011 Census. The non-Hindu population is mostly divided between Christians (19.0 per cent) and Muslims (24.7 per cent).

Figure 1.1: Physical Map of Kerala



Source: [destinationkerala.wordpress.com](http://destinationkerala.wordpress.com)

## 1.1.2 Unique historical developments

1.1.2.1 In 1498 AD, the Portuguese explorer Vasco da Gama landed in Calicut (Kozhikode), marking the beginning of European colonisation in the region. The Portuguese were followed by the Dutch and the British. By appropriating the region's economic surplus and establishing social and economic control over Kerala, these European powers initiated extensive economic, political and social interventions. These interventions in turn altered the social and economic institutions of Kerala. In terms of economic impact, growth in trade increased the production of spices and other cash crops

that, in turn, generated more trade, trading and cultural contacts. The Europeans introduced many of Kerala's plantation crops from their other colonies in Africa and South America. They started growing some of these crops in vast tracts of forest land and in hilly areas. This shaped the plantation-based agricultural production patterns of the State. Along with cultivation, agro-processing industries such as coir and cashew also expanded, and continue to occupy an important space in Kerala's economy. Colonial intervention also produced degenerative and regenerative social forces, which eventually altered agrarian relations and social institutions of the time. All these changes had far reaching effects on shaping Kerala's economy and society.

1.1.2.2 The developments of the late 19th and 20th centuries also made a significant contribution to influencing Kerala's economic growth patterns. Kerala witnessed an intellectual revolution or renaissance during this period, which changed religious, cultural, social, ideological beliefs, and institutions, in the State. The renaissance was not accidental — it was the culmination of a movement for change that had formed and developed over the previous century. The social practices and religious beliefs of 19th century Kerala were ridden with acute inequalities of caste, power, status and material privileges. While the rest of India was no exception to this, the severity of the caste system was acute in Kerala. It was not merely untouchability that was practised; the principles of 'un-approachability' and 'un-seeability' were also observed. This meant that people from the upper castes did not allow those from the lower castes to approach or even see them. The caste system that stratified communities had direct connections to the economic structure. In Kerala's agrarian society, land was the most important measure of wealth, source of power and prestige. The landowners never tilled land directly; it was cultivated by tenants and labour who were socially subservient to the landowners. Their subservience was expressed through numerous social practices, which were translated into a highly rigid caste system and caste-based institutions. In the context of abundant arable land and a low labour to land ratio, it was profitable for landowners to bind the cultivating classes to land and impose a strict code of behaviour so that they could not rise above their ascribed position in life. Its severity was thus directly linked to the land to labour ratio.<sup>11</sup>

1.1.2.3 The land relations in Malabar were tense and there were many revolts against the landlords in that region right from the 19th century. William Logan (1951) described the land relations in Malabar in his *Malabar Manual*. The Rebellion of 1921 extended as a reaction against the oppressive British crackdown on the Khilafat Movement in Malabar. The British tried to suppress the movement and the protesters were packed into a goods wagon and were sent to prison in Coimbatore. This resulted in the Wagon Tragedy.

1.1.2.4 By the end of the 18th century, virtually the whole of Kerala came under British control. The new systems of administration established by the British in India started influencing the three political units, Travancore, Cochin and Malabar. Britishers directly ruled only over Malabar. The other parts of present day Kerala — Travancore and Cochin — were ruled by native rulers with British direction. These rulers adopted progressive social policies in education and public health, especially for the elite and the upper castes who had specific roles assigned to them by the colonial rulers. These measures were part of the process of extending colonial control. However, the traditional systems were disrupted when, in the early 19th century, the British Parliament permitted European missionaries to enter the country. In their attempts to access indigenous society, Christian missionaries played an important role in promoting education and health among the masses during a major part of the 19th century.

1.1.2.5 It is significant that the Christian missionaries introduced Malayalam as the medium of instruction in their primary schools. As a result, Malayalam became a powerful vehicle for social reform and patriotism. Despite upper caste opposition, the missionary efforts were given the support of state power in Travancore and Cochin, mostly under colonial pressure. The introduction of modern western education created a realisation among the lower castes that their emancipation was possible through consolidated and collective action along caste/religious lines. The result was the rise of socio-religious movements such as the Malayali Memorial and Ezhava Memorial at the end of the 19th century and the formation of the Sree Narayana Dharma Paripalana Yogam (SNDP) and the Nair

Service Society (NSS) at the beginning of the 20th century, with a heavy emphasis on education as a force to liberate these communities from social evils. Dalits, who were excluded from mainstream social organisations, also asserted themselves under the leadership of Ayyankali. History, thus, indicates that people were united on caste lines to strive for social and political rights that they had been denied for ages. This laid the foundation for public action in Kerala.

1.1.2.6 Public action is a bottom up process through which communities lay claim to public goods such as education and health. This social transformation process in Kerala was further strengthened by the rise of political parties in the State after the First World War. The Indian National Congress became active in the State and Kerala joined the rest of India in the independence struggle led by Mahatma Gandhi. In the 1930s, radicals in the Congress formed a separate organisation called the Congress Socialist Party (CSP). In 1939, the CSP was transformed into the Communist party. Within a few years the party was able to mobilise Kerala's workers and peasants on a large scale.

1.1.2.7 These social movements and civic participation have had a strong impact on social equality, social network ties, social cohesiveness, political vibrancy and Malayali sub nationalism, which, in turn, started the tradition of 'public action'. Evidence suggests that Keralites are more politically conscious and active compared to people from other parts of the country. In the National Election Surveys of 1967, 1996 and 2004 Malayalis reported significantly higher levels of political interest than people from other parts of India.

## 1.2 The Economic Growth Trajectory of Kerala

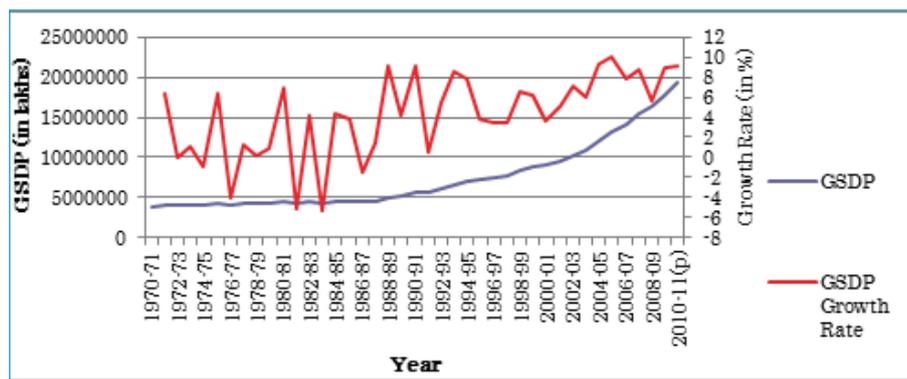
1.2.1 Kerala was formed in 1956 by merging the Travancore-Cochin region with the Malabar region. Economic analysis of a 55-year period from Kerala's formation to 2010–11, indicates that the State's economic growth trajectory is divided into two phases: 1956–87 and 1987 to the present. Figure 1.2 illustrates annual growth rates in Kerala's Gross State Domestic Product (GSDP) from 1970–71 to 2010–11. The selection of this series is guided by the availability of comparable data — the series with 2004–05 as a base is uniformly available from 1970–71 onwards. As depicted in Figure 1.2, two distinct phases of growth are clearly discernible. These are:

- The phase of economic stagnation: 1970–71 to 1986–87.
- The phase of rapid economic growth: 1987 to the present.

1.2.2 Statistical tests employed<sup>12</sup> to examine what, if any, breaks have been there in Kerala's growth confirm that a significant break in the State's growth trajectory occurred in the late 1980s. Evidence, however, also suggests<sup>13</sup> that the GSDP of Kerala did not grow impressively between 1956–57 and 1970–71. The first 30 years of Kerala's existence as a State were thus characterised by low growth.

Figure 1.2

Annual Growth Rates of GSDP, Kerala: 1970–71 to 2010–11 (2004-05 prices)



Sub-phase: Year	Phase 1	Phase II	
	1970–71 to 1986–87	II.1: 1987–88 to 2001–02	II.2: 2002–03 to 2009–10*
Mean of GSDP growth rate	1.1	5.2	8.0
Standard Deviation of GSDP growth rate**	4	2.7	1.6
Coefficient of Variation of GSDP growth rate***	351.6	50.4	20.3

Notes: \*Since the 2010–11 figure is provisional, it is dropped from calculations here.

\*\*Standard Deviation measures how much variation exists from the average value.

\*\*\*The coefficient of variation is the Standard Deviation divided by the average and multiplied by 100.

Source: Computations by NCAER

### 1.2.3 Low Growth: 1956–1987

1.2.3.1 A long-term analysis of growth shows that between 1970–71 and 1980–81 Kerala's GSDP grew at a mere 1.3 per cent per annum. The economy witnessed a real decline in the 1970s in both agriculture and industry. This was despite the fact that the economy had started receiving significant remittances from the mid 1970s. The moderate growth that took place was due to growth in the tertiary sector. Between 1980–81 and 1986–87 the growth rate fell further to 0.04 per cent even though India's GDP grew at 4.71 per cent in the same period. Over the period from 1970–71 to 1986–87, the economy grew at a mere 1.1 per cent per annum. It is significant that per capita income actually declined at the average annual rate of 0.5 per cent over this period, from Rs 17,995 in 1970–71 to Rs 16,321 in 1986–87 (at 2004–05 prices).

1.2.3.2 The growth of Kerala's economy has been a subject of intense debate among development economists. It is not intended to fully capture the debate here.<sup>14</sup> In general, economic stagnation is said to have its genesis in the welfare-oriented policy regime adopted by successive governments. This in turn was the expression of the public action politics initiated in response to historical developments, which was further reinforced by the socio-political developments that took place after the State's formation in 1956. As a result of continuous social struggle and educational accomplishments, a culture of public action for various issues took root in the State; an ethos that continues today. Public action politics in the State has served as a powerful impetus for governments, of whatever political hue, to prioritise the social sector. It has become common for successive governments to respond to popular demands by adopting an extensive welfare-oriented policy regime. Kerala thus emerged as a strong welfare state. It succeeded in making impressive strides in health, education and creating human and social capital through these welfare-oriented policy interventions, achieving the highest human development index among Indian states (which will be discussed later). Additionally, evidence indicates that many of its social indicators are on par with those in the developed world (see chapters on Education and Health for details).

1.2.3.3 One of the State's most notable achievements during this period was its success in implementing land reforms, a measure that led to drastic changes in the political, economic and social outlook. Different types of landowner-tenant relationships existed in Travancore-Cochin and Malabar at the time of Kerala's formation. Landless farmers and those who were evicted from their land were eager to get their grievances redressed, and the clamour for change started gathering strength. In response to public action for land reforms, the government that came to power in 1957 introduced the Land Reforms Bill in the Legislative Assembly. The Agrarian Relations Bill introduced in 1958 was passed with minor amendments, and additional land reform laws were passed in 1960, 1963, 1964, 1969 and 1970. The objective was to put an end to the feudal system and ensure the rights of tenants to the land. The 1970s and 1980s witnessed state-wide agitations by peasants and other stakeholders, which played a major role in the implementation of the law. Evidence suggests

that land reforms engineered poverty reduction in rural areas by creating an asset base for the rural poor. This led to enhanced investment in human development by the poor, particularly in education and health. This, in turn, enabled them to respond to the emigration opportunities in various West Asian countries and thereby generate an inflow of remittances, which played an important role in shaping Kerala's economic growth trajectory from the late 1980s (as discussed later).

1.2.3.4 Thus, the combination of top-down state policies and bottom-up social activism generated remarkable social gains in Kerala over the years, even during the phase of so called 'economic stagnation'. From the perspective of labour also, Kerala's record in achieving a measure of human dignity and social progress is remarkable, especially when viewed in an all-India context. The emergence of trade unions as a strong labour institution and the overall social progress led to a remarkable increase in wages, decline in the incidence of child labour (around 1 per cent against 8 per cent for India as a whole), social acceptance of certain work norms such as eight-hour work days, breaks during working hours and formal labour relations as opposed to patron-client relationships.

1.2.3.5 However, the human and social development achievements did not translate into actual productive growth. Creation of productive capacities requires investment in productive assets. Private investment in the State was not forthcoming, essentially due to unfavourable public opinion and highly market interventionist government policies. The domestic capitalist class was already small and not fully formed, and in the absence of grooming efforts it became further marginalised in the system. It is also argued<sup>15</sup> that the presence of unions relegated the government to the number two position in the power structure. And the bargaining power of private investors was marginal at best. In the agricultural sector, fragmentation of land, primarily due to land reforms, did away with the emergence of agrarian capital. The plantation sector retained a capitalist class, but most of them were small-scale capitalists. While private investors were marginalised in the system, creation of an elaborate welfare regime impeded the ability of the government to undertake investment programmes. But in the absence of a large capitalist class, the government emerged as the biggest entrepreneur in the State and the owner of the largest number of public undertakings among all states in India. But this investment was too small to give a major push to productive asset creation in Kerala. The result was a high level of unemployment, especially among educated and technically qualified people. A high level of educational and health accomplishments without commensurate economic growth and employment opportunities led to migration in search of employment. Initially, a significant part of this migration was to other parts of India. Later, as a result of the oil boom in the Gulf region in the mid-1970s, labour from Kerala migrated to those countries. Educational achievements and the historical trade and cultural contacts with the Arabs made it easier for Keralites to respond to emerging employment opportunities in the Arab world. Migration succeeded in keeping the unemployment pressures low, but did not have a large impact on Kerala's economy in terms of growth. Remittances were not enough to make a significant impact on the economy, partly due to a highly regulated foreign exchange regime at the Centre.

1.2.3.6 The fact that a relatively poor region like Kerala, which displays almost all the signs of chronic economic underdevelopment, could achieve a high physical quality of life for its people without the corresponding gains in economic growth appeared a big paradox to development thinkers worldwide and was termed the 'Kerala model of growth'. But this lopsided growth model caused a vicious cycle of low revenue, low investment, low development and a low resource base. Low revenue generation led to tremendous pressures on fiscal management. Over the years, the fiscal crises of the State gathered momentum and came to a critical level in 1987. By the late 1980s, the State's economy was generally pictured as being 'on the brink of disaster'. This lowered its capacity to generate enough revenue to finance and maintain its social sector expenditure. This, in turn, stymied further progress in human development too (discussed later in this chapter).

## 1.2.4 Economic turnaround: 1986–87 onwards

1.2.4.1 Growth did not remain elusive. In the late 1980s, a remarkable turnaround in Kerala's economic growth took place. The average annual growth rate, which had been around 1 per cent from 1970–1 to 1986–87, jumped to over 6 per cent between 1987 and 2011. A statistical analysis of endogenous break points in the GSDP shows that two distinct periods of growth can be identified within this phase itself. These are:

- Moderate growth phase: 1987–88 to 2001–02.
- Accelerated growth phase: 2002–03 to the present.

1.2.4.2 The GSDP grew at an average annual rate of 5.2 per cent (with standard deviation, SD=2.6) over the first period. Since 2002–03 it accelerated to 8 per cent (SD=1.6) signalling that growth is not only higher, but also more sustained in the latter period

1.2.4.3 Overall, Kerala has grown at an average annual rate of 6.3 per cent, that is 0.7 per cent above the all-India average, between 1987–88 and 2010–11. In the 1970s, Kerala's per capita GSDP was 65 per cent higher than the national per capita average (at 2004–05 prices). It was just 17 per cent above the national per capita average by 1987, which obviously shows that the national economy grew at a faster rate than the State's economy. This trend has been reversed since then, and the ratio has again climbed to 135 per cent of the national per capita income in 2009–10 indicating a turnaround in the State's growth performance relative to the national economy (Figure 1.3).

**Figure 1.3**  
**Per Capita Income of Kerala as a Percentage of National Per capita Income:**  
**1970–71 to 2009–10**



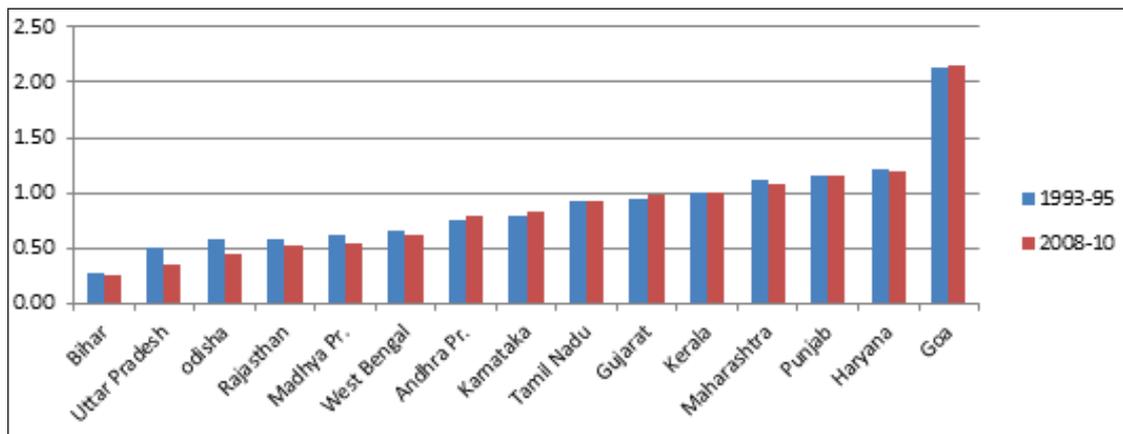
Note: Values at 2004-05 prices

Source: Computations by NCAER

1.2.4.4 Kerala's GSDP per capita was Rs 17,951 in 1970–71 at 2004–05 prices; it declined to Rs 16,321 in 1986–87. But thereafter, it increased sharply to Rs 30,071 in 2001–02 and then went up to Rs 57,791 in 2009–10.

1.2.4.5 Kerala's economic performance during the last decade outshone that of other Indian states as well. Figure 1.4 presents the per capita income index of the top 15 states (including Kerala) with Kerala's per capita income as the base (=100). The results are recorded for two periods — 1992-3 to 1994-95 and 2007-08 to 2009-10. It shows that the State's relative position has remained stable at fifth place in terms of per capita income over the period after liberalisation. The income index exceeds 100 only for four states: Maharashtra, Punjab, Haryana and Goa. But more important, it shows that the index value has declined in the latter period for all states except Andhra Pradesh, Karnataka, Gujarat and Goa. This means that these were the only states that performed better than Kerala during the 2007–08 to 2009–10 period. Kerala not only outperformed the bottom six states — Bihar, Uttar Pradesh, Odisha, Madhya Pradesh, Rajasthan and West Bengal, it also seems to have done better than the top three states, Maharashtra, Punjab and Haryana.

**Figure 1.4**  
**Per Capita Income Index by State: 1993–95 and 2008–10**  
**(Kerala Per capita income=100)**



Source: Computations by NCAER

## 1.3 What Drives Growth In Kerala?

1.3.1 Table 1.1 presents a breakdown of Kerala's GSDP growth rates into sectoral contributions. It shows that growth in Kerala is driven by different sectors during different sub-periods. Industry along with transport, storage, trade and hotels played an important role from 1971 to 1986. During the 1987-2001 period, agriculture, transport, storage, trade and hotels, real estate and business services were important. The last decade saw construction, transport, storage and communication, trade, hotels and restaurants, real estate ownership, business and legal services and other (community) services coming on top to boost growth. In fact, during the accelerated growth phase of the last decade (2002–11), over 77 per cent of the growth came from these sectors. Remittances, tourism and welfare expenditure were the drivers of growth in these sectors during the past decade.

**Table 1.1**  
**Sectoral Contribution to GSDP Growth Rates by Sub-period: 1971–2011 (%)**

Industry of Origin /Year		1971–86	1987–2001	2002–2011	
<b>Agriculture</b>		-58.7	14.5	0.4	
<b>Total Industry</b>		39.1	22.9	20.6	
Industry	Manufacturing	Total Manufacturing	17.7	9.2	7.6
		Registered Manufacturing	8.2	4.0	3.0
		Un-registered Manufacturing	9.5	5.2	4.6
	Electricity, Gas and Water Supply		3.6	3.5	-0.1
	Construction		17.8	9.8	12.5
Services	<b>Total Services</b>		119.5	62.5	79.0
	Transport, Storage & Communication	Total	18.7	11.6	23.8
		Communication	1.7	2.6	14.1
	Trade, Hotels & Restaurants		19.6	20.2	16.8
	Banking & Insurance		9.5	7.3	9.1
	Real estate ownership, Business and Legal		25.5	10.9	13.0
	Public Administration		14.9	3.8	5.2
	Other Services		31.3	8.7	11.1
<b>Gross Domestic Product</b>		100.0	100.0	100.0	

Note: Based on values at 2004-05 prices

Source: Computations by NCAER

1.3.2 In the late 1980s, when the process of deregulation started at the Centre, there was a phenomenal growth in remittances to Kerala. This was essentially due to the discontinuation of the fixed exchange rate regime and deregulation of foreign exchange controls. The growth patterns of remittances are documented in Chapter 20. It is important to note here that between 1991 and 2011 remittances grew at a trend growth rate of 16.7 per cent.<sup>16</sup> The share of remittances in Kerala's GSDP increased steadily from 12 per cent in 1991 to 21 per cent in 2011. The inflow of remittances was larger than the GSDP contribution of the entire agriculture and industry sectors and some of the services sub sectors. Average annual remittances per household were as high as Rs 63,315 in 2011; in 2008, the figure was Rs 57,227. By raising disposable incomes in Kerala, the windfall gains from the growth in remittances have had a substantial effect on direct consumption. There is sufficient evidence to show that remittances led to a sharp rise in consumption. National Sample Survey (NSS) data shows that Kerala, which was ranked eighth among the Indian states in terms of per capita consumer expenditure in 1972–1973 (27th round), rose to the third position in 1983 (38th round) and to the second position in 1993–1994 (50th round), and in 1999–2000 (55th round) displaced Punjab to reach the top position.<sup>17</sup> Remittance-induced effects on consumption were reinforced by the release of pent-up demand in the economy in the post-reform period. This means that effective demand was building up in Kerala even during the restrictive regime, but a number of consumer goods and services were not available due to import restrictions. The acceleration and intensification of economic reforms contributed to removing these supply constraints by allowing unrestricted trade. This led to a surge in the real estate, transport and communication, trade and tourism sectors.

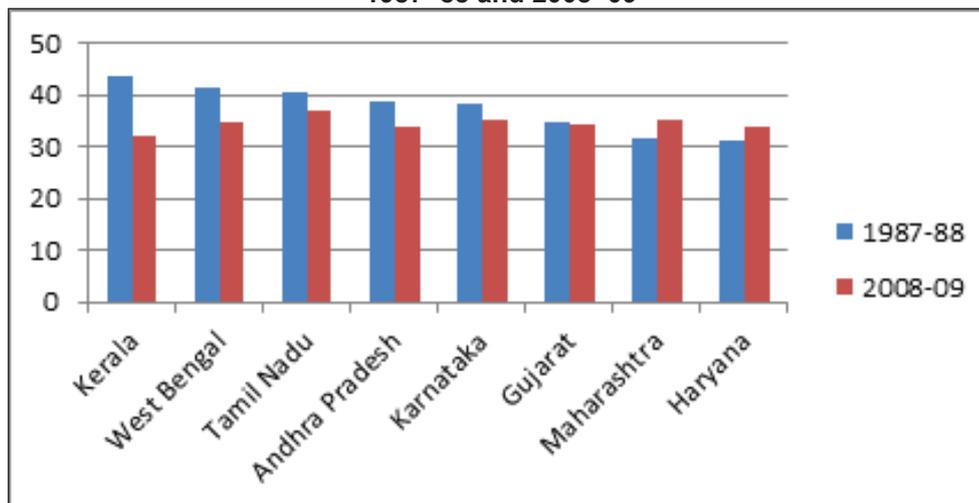
1.3.3 Remittances have also had direct and indirect effects on reducing unemployment. A study by the Centre for Development Studies (CDS)<sup>18</sup> shows that in 2003 emigration contributed to a direct reduction in the unemployment rate by about 2.2 percentage points. According to its estimates, with the extent of migration that took place, the actual unemployment rate was only 19.2 per cent. Had there been no migration, the unemployment rate in Kerala would have been 21.4 per 100 in the labour force.

1.3.4 Finally, remittances sent by migrants had direct and indirect poverty-reducing effects by contributing to increased consumption on the one hand and education and health on the other.

1.3.5 Tourism has a long history in Kerala, but until the mid 1980s it was not seriously considered as a source of growth. It was in 1986 that tourism was given the status of an industry. Since then, tourism receipts have been on the rise (See the chapter on Tourism for details). The combined effects of forward and backward linkages of the growth in tourism, trade and transport have resulted in the growth of hotels and restaurants. In 2009–10, a NCAER study based on the Tourism Satellite Accounts found the contribution of tourism to GSDP to be 9.5 per cent.

1.3.6 Kerala was the top performer in per capita allocation of social sector expenditure until the early 1990s (Figure 1.5). Even in 1986–87, when it was facing serious fiscal challenges, the share of social welfare in total government expenditure was as high as 43.5 per cent<sup>19</sup> and it was ranked among the highest by an Indian state. In the 1990s, the State started sliding in terms of ranking with Tamil Nadu and other states surpassing Kerala in terms of social expenditure. However, it still maintains its position among the top five states.

**Figure 1.5**  
**Social Services Expenditure as a Percentage of Total Expenditure:**  
**1987–88 and 2008–09**



Source: Chakraborty, P. et al. 2010. *Financing Human Development in Kerala: Issues and Challenges*, Report submitted to the State Planning Board, Kerala.

1.3.7 Theoretically, an increase in spending on goods and services should affect investment positively by driving up prices and, in turn, increasing returns on investment. In economics this is known as the 'spending effect'. Further, remittances should have a direct positive impact on productive investment by relaxing liquidity constraints and making funds available for investment. But, neither of these effects could be operationalised in Kerala. Different theories have been offered to explain this phenomenon. Some believe that it was due to the State's investor-unfriendly image. This can be attributed a great deal to the unfavourable image of labour created during the early phase of Kerala's

development when the presence of powerful unions, their spread to both the unorganised and organised sectors, their multiplicity, rivalries and the political patronage they received discouraged private investors from taking a risk.<sup>20</sup> Investment is path-dependent and reactive; there is a tendency for investment to concentrate to reap location-bound effects. Kerala being a latecomer needed a big push to start attracting investments. Indeed, over the last two decades, the Kerala government has taken several initiatives to accelerate private investment. However, these efforts have been only partially successful.

1.3.8 By injecting autonomous demand, remittances boost growth but are also instrumental in dampening growth by creating a Dutch Disease or Resource Curse-like situation in Kerala<sup>21</sup> by generating labour scarcity and pushing up wages. The outward migration of labour from the State led to labour shortages in many sectors, raising wages. Rising wages eroded the competitiveness of the State's economic sectors. The wage-rise effect could have been offset by the consumption effect. But it did not happen in the tradable sectors (goods and tradable service sectors) because these sectors are exposed to competition from outside in an open economy, which did not allow domestic prices to increase. Not only has the goods sector (industry and agriculture) suffered, but the tradable service sector has also remained small. Further, in a land scarce region, growing remittances raised the demand for land for construction. As a result, land prices have gone up steeply, further affecting investment activities adversely. Thus, the Dutch Disease (Resource Curse)-like situation created by remittances adversely affected the growth of high productivity tradable sectors in the State.

1.3.9 Clearly, the 'Kerala model of growth' that resulted in economic stagnation in the first 30 years of the State's existence generated typical economic forces that led to consumption-driven growth from the late 1980s, with no commensurate increase in productive capacities, structural transformation and competitiveness in the State. Will Kerala be able to sustain this performance over the next two decades? Much depends on how the global environment evolves and on the structural forces that are at work within Kerala. But it is certain that growth trends will be different over the next 20 years when compared to the past 25 years. This is because there are major fault lines in the growth process, which will significantly affect the State's future trajectory. The following sections discuss the challenges that the current course of growth pose for Kerala's economy. These are:

- Growth challenges
- Socio-economic challenges
- Human development challenges
- Social challenges
- Environment-related challenges

## 1.4 Growth Challenges

### 1.4.1 Growth drivers are vulnerable

1.4.1.1 In 2010, Kerala's per capita GSDP (in 2005 PPP dollars) was about \$4,763. By the World Bank's standard classification of countries by income group, Kerala is in the lower middle income category. If, during the next 30 years, Kerala's GSDP can grow at the rate at which it has been growing over the past 20 years, by 2040 it will catch up with the per capita income of today's developed countries. However, sustaining such a growth rate over three decades is not easy. Evidence suggests that most countries that move into the middle income category after several years of high growth get stuck in this category and find it difficult to catch up with the high income countries. In 2010, 30 out of the 38 lower middle income countries had been in this income group for over 28 years. They were unable to attain an average annual per capita income growth rate of 4.7 per cent to reach even the upper middle income threshold. Upon reaching a certain level of per capita income, their growth slowed down. Kerala will also find it difficult to sustain the pace and pattern of growth of the past 25 years, because the consumption drivers of the economy are vulnerable to internal and external dynamics.

1.4.1.2 Tourism, another growth driver, is also vulnerable to economic crises and disasters, both natural and manmade. The recent economic and financial downturn that affected the tourism industry in 2007 has drawn substantial attention to the role that crisis events play in tourism. The scope and magnitude of these impacts has been severe. The World Tourism Organisation (UNWTO) in a recent publication (2010) estimated that international tourist arrivals fell by 4 per cent in 2009, and that many destinations in the world reported negative growth. There have also been concerns about the carrying capacity of tourist destinations.

1.4.1.3 Finally, government expenditure on welfare cannot be sustained unless the resource base is widened by increasing productive capacity in the State. As mentioned earlier, large fiscal deficits have already forced the State to reduce social expenditure. Apparently, once consumption stimuli slow down, economic growth will also taper off.

## 1.4.2 Quality of growth is vulnerable

1.4.2.1 Consumption-driven growth cannot be sustained in the long run unless there is a commensurate increase in productive capacity. Once consumption growth decelerates due to weakening consumption, the growth drivers will also slow down, pulling down the growth rate. The State's policymakers have realised this. To avoid this scenario, in 2001–02 the government introduced several reforms to promote private investment and attract non-resident Keralites. But the inflow of investment remains too small to make a perceptible impact. Inter-state competition for investors has intensified. The problems posed by the scarcity of land, weak physical infrastructure, a looming energy crisis and perception of possible labour unrest remain to be addressed.

1.4.2.2 Kerala is a power deficit state.<sup>22</sup> For four consecutive years from 2007–08 to 2011–12, the demand for power exceeded supply, with the gap increasing. The State produces 78 per cent of its total installed capacity in terms of megawatts (MW). However, the total installed capacity (MW) including state, central and private sector sources is less than the maximum demand in the system. The situation is worse when viewed in generation terms of million units (MU). Total internal generation is less than 50 per cent of the total available energy. Most of the generation (96.5 per cent) is from the hydel sector. Uncertain weather patterns that affect the monsoon and environmental restrictions have led to insufficient hydel power production, which has effectively made Kerala into an energy deficit state. In addition, the uncertainties affecting India's energy sector such as the availability of coal or gas as fuel affect Kerala too. As do further restrictions on laying evacuation lines, which reduce access to energy. The State's investment in renewable energy sources is relatively low, thereby severely affecting the availability of alternative sources of power.

1.4.2.3 In terms of physical infrastructure, Kerala is blessed with five transport options — roads, railways, air, inland waterways and the sea. However, the road transport network carries the burden of moving passengers and freight. Although Kerala has one of the longest road networks in India, most of it is due to the rural road network. The primary and secondary road network, which carries a majority of the traffic, is significantly smaller and land acquisition challenges have hampered its growth. Further, the absence of adequate public transport means that travellers increasingly use private modes of transport, adding to the burden on the road network.

1.4.2.4 Similarly, due to the high density of population and the increasing investment and speculation in land in the State, property prices have shot up. This has created a scarcity of land for productive activities. Land acquisition is a major challenge for the government due to rising land prices and public action pressures. An increase in consumption with no commensurate increase in productive capacities is a major fault-line in Kerala's growth story.

1.4.2.5 An essential insight of development economics is that economic growth is intrinsically linked to changes in the structure of production. While some sectors add little value and have low

productivity, other sectors are dynamic. The latter are characterised by technological progress, capital accumulation and economies of scale. Economic development requires continuously upgrading resource allocation from low productivity to high productivity sectors. However, Kerala's economic turnaround was not driven by structural transformation and an increase in competitiveness. There are two stages of structural transformation. The first stage of growth is characterised by a shift from primary to non-primary sectors. As shown in Table 1.2, the sectoral composition of the three broad sectors — primary, secondary and tertiary — indicates that Kerala has undergone the first stage of the transition from primary to non-primary sectors.

**Table 1.2**  
**Composition of Kerala's GSDP: 1971–2011 (%)**

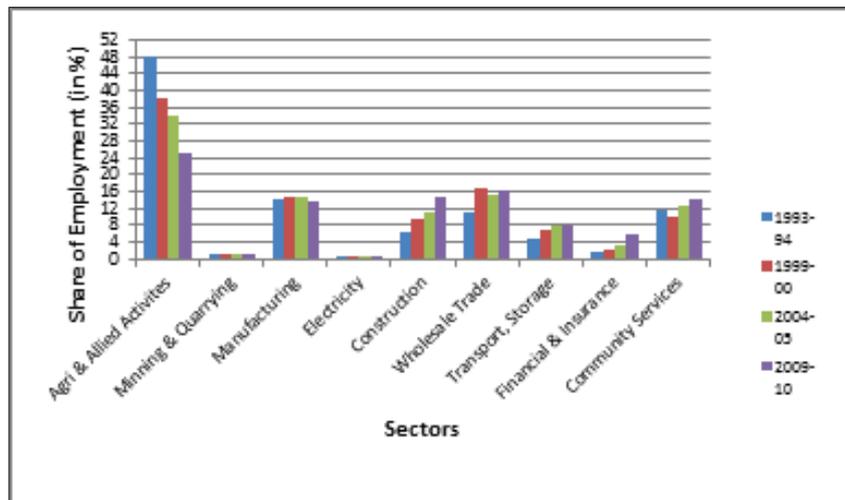
Industry of Origin /Year		1971–1986	1987–2001	2002–2010	2010–2011
Primary: Agriculture		38.08	25.36	14.94	10.59
Secondary: Industry	Total Industry	16.20	20.44	21.78	20.60
	Total Manufacturing	7.55	9.82	8.38	8.28
	Registered Manufacturing	3.27	4.79	3.75	3.69
	Un-registered Manufacturing	4.28	5.03	4.63	4.59
	Electricity, Gas and Water supply	0.82	1.20	1.62	1.05
	Construction	7.57	8.96	11.38	10.80
	Total Services	45.72	54.2	63.28	68.80
Tertiary: Services	Transport, Storage & Communication	2.93	6.09	11.47	15.73
	Communication	0.24	0.69	4.03	7.53
	Trade, Hotels and Restaurants	20.85	20.89	20.41	18.95
	Banking and Insurance	0.93	3.14	6.05	7.22
	Real estate ownership, Business, Legal	9.92	10.56	11.64	12.19
	Public administration	1.62	3.30	4.13	4.36
	Other services	9.47	10.21	9.59	10.36
	Gross Domestic Product	100.00	100.00	100.00	100.00

Source: Computation based on data from Department of Economic & Statistics, Kerala

1.4.2.6 The second stage of structural transformation is characterised by intra-sectoral restructuring from low to high value-added activities. An intra-sectoral analysis of Kerala's GSDP indicates that the challenge is to bring about the transition within sectors, from low to high value-added, dynamic sub-sectors. It reveals that within the secondary sector, there has been a decline in the share of manufacturing and infrastructure while that of construction has grown. Kerala's construction boom is driven mainly by low value-adding residential construction. More worrisome is that even within manufacturing, the share of low value-adding unregistered manufacturing increased relative to the high value-adding registered manufacturing sector. Within services, hotels and restaurants, public administration, education, health and community services account for 46 per cent of the GSDP. In the category of 'real estate ownership, business and legal services' it is the former that is the dominant contributor, though the latter are considered dynamic, high productivity sectors. This suggests that growth has not been accompanied by the required structural transformations in terms of GSDP. The economy seems to be trapped in low value-adding activities.

1.4.2.7 The distribution of the workforce by sectors indicates that the share of agriculture has indeed declined continuously and the share of the non-primary sector has risen (Figure 1.6).<sup>23</sup> As a matter of fact, Kerala has been able to achieve a much higher release of the labour force from agriculture compared to the country as a whole. In Kerala, 26 per cent of the workforce remains in the primary sector contributing 14 per cent of the GSDP, while at the national level 53 per cent of the workforce is still in agriculture (2009–10). However, two things must be observed. First, the share of agriculture in employment is still rather high. Second, the entire workforce shed by the agricultural sector has been absorbed by the construction and tertiary sectors due to a weak manufacturing sector where the share of employment remains stagnant. Around 45 per cent of the workforce is absorbed in the services sector, contributing 69 per cent of the GSDP. At the national level, 25 per cent of the workforce contributes nearly 60 per cent of GDP in the services sector. This clearly implies that the services sector in Kerala is dominated by low value-adding services compared to the national average. It is worrisome that manufacturing's share of employment declined from 14.3 per cent in the early 1990s to 13.8 per cent in 2009–10.

**Figure 1.6**  
**Structural Change in Employment: 1993–94 to 2009–10**



Source: Computations by NCAER

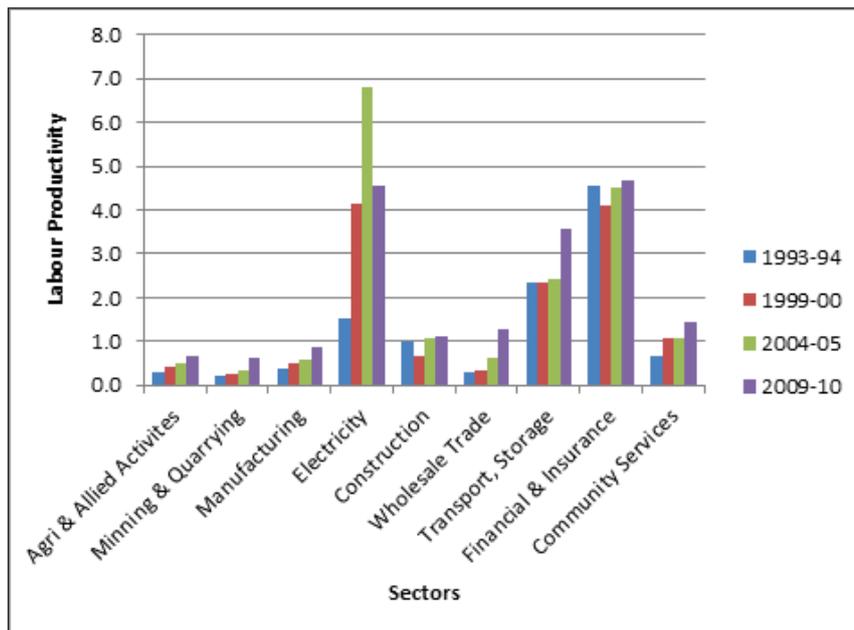
1.4.2.8 The lack of capacity building in dynamic high value-adding sectors manifests itself in the increasing share of employment in the unorganised sector. Data provided in the State Economic Review shows that in 2000, 12.5 lakh people were employed in the organised sector, which decreased to 11.02 lakh in 2005 and then to 11 lakh in 2010. Within the organised sector, public sector employment is more when compared to the private sector. For instance, in 2010 out of 11 lakh people employed in the organised sector, 6.08 lakh (55 per cent) were in the public sector. Similarly, within the public sector 43 and 10 per cent were state government and central government employees respectively and the rest were in quasi-state and quasi-central institutions. In the organised sector, the highest levels of employment are in community, social and personal services (44 per cent) followed by the manufacturing sector (22 per cent).

1.4.2.9 The predominance of low value-adding, low productivity sectors in the economy is evident through Figure 1.7 that presents labour productivity growth and patterns by sector. Labour productivity is calculated by dividing sectoral GSDP by employment from the NSS sources. It shows that there is almost a convergence of productivity levels across sectors at very low levels, with the exception of only three sectors — electricity; real estate, business and legal services; and transport, storage and communication. Average productivity is rather high in these sectors. While ‘transport, storage and

communication' is expected to have high productivity, in the electricity sector it may simply indicate that the share of labour in this capital-intensive sector is quite low. In 'real estate, business and legal services', it could be due to rising real estate prices in the State, as real estate activities dominate this sector. Clearly, the economy is stuck in low productivity cycles due to the lack of intra-sectoral structural change, as discussed above.

1.4.2.10 Not only is productivity rather low across a majority of the sectors, but the growth in productivity from the early 1990s is also low. Clearly, the workforce released from agriculture has ended up in activities that do not lead to an appreciable increase in productivity, adversely affecting the economy's future growth potential.

**Figure 1.7**  
**Labour Productivity by Sectors: 1993–94 to 2009–10 (Rs lakh per worker)**



Source: Computations by NCAER

1.4.2.11 Despite the development of human capital that has taken place over the past several years, the State is yet to become known for knowledge-intensive service-oriented products and services. While the national economy is driven by skill-intensive, tradable and high value-added services such as software, communication and financial services, Kerala, which is at the top in terms of education, is dependent on stagnant, non-tradable service sectors for its growth. Given the fact that low value-adding and essentially non-tradable activities drive the State's economy, the possibility of leveraging positive external growth drivers to develop other sectors seems limited. The increasing integration of the global economy challenges existing economic structures dominated by low value-adding activities, forcing developing economies to search for new activities in which they can excel and confront the competition. Specialisation in low value traditional activities is no longer a viable option for an economy. The main challenge for Kerala is to move up the value chain and become more specialised in knowledge-intensive, high value-added activities. Structural transformation from low to high value-adding activities raises economy-wide labour productivity. Under diminishing marginal products, it will also bring about convergence in economy-wide labour productivities at high levels. The business as usual scenario is thus grim and may lead to a diminished economic future through erosion of the potential for growth.

### 1.4.3 Future growth prospects: The business as usual scenario looks grim

1.4.3.1 The next 20 years may see major changes in Kerala's economy. As discussed above, owing to vulnerabilities in the quality of growth and growth drivers, it may falter substantially if appropriate corrective measures are not taken to change the course of growth. It is observed that over the past 10 years, GSDP in agriculture has grown at only 0.5 per cent and GSDP in manufacturing at 5.7 per cent per year. On the other hand, the services sector grew rapidly with communication growing spectacularly at 29 per cent per annum and banking and insurance at 12.6 per cent per year. The construction sector also grew rapidly at 9.8 per cent per year. The spectacular growth rates in these three sub-sectors have been demand driven and can be attributed to exceptional factors as discussed earlier. These factors, such as growth in remittances and tourism, are unlikely to continue in the future if there is no course correction. It is expected that these sectors will slow down gradually and assume the trend growth rates seen at the national level. Presented below are three sets of growth projections in Table 1.3 based on three alternative assumptions (For detailed calculations please see Appendix A1.1).<sup>24</sup>

- Growth in the banking and communication sectors slows down
- Growth in the banking, communication and construction sectors slows down
- Growth in remittances slows down

1.4.3.2 Scenario 1 - Growth in the banking and communication sectors slows down: It is assumed that the growth rate in the communication and banking sector will gradually slow down from the current 20 per cent to 5 per cent and 10 per cent to 4 per cent respectively, over the next 20 years. It may be observed that the result is an overall loss in GDP growth of around 3 to 4 percentage points. The overall growth rates in Kerala are expected to fall to 5.1 per cent in 2012–16, and later this growth rate could reach a new low of 4.6 per cent in 2027–31.

**Table 1.3**  
**Projection of Growth Rate of GDP in Kerala: 2012–2031**

Year	2012–16	2017–21	2022–26	2027–31
Scenario 1	5.1	4.8	4.5	4.6
Scenario 2	4.6	4.1	3.6	3.8
Scenario 3	4.4	3.8	3.3	3.3

Source: NCAER

1.4.3.3 Scenario 2 - Growth slows down in the banking, communication and construction sectors: This growth scenario for Kerala is even more grim than what is projected in Scenario 1 because other sectors are also likely to be affected by the slow down in the main driving sectors. In Scenario 2, it is projected that growth rates of the construction sector will also slow down along with those of banking and communication. This can bring Kerala's economy further down, to a growth rate between 3 and 4 per cent.

1.4.3.4 Scenario 3 - Growth in remittances slows down: It is assumed that the annual growth rate in remittances falls from 7 to 3 per cent in 2012–16, and then further to 2 per cent in 2017–21, 1 per cent in 2022–26 and zero per cent growth in 2027–31 due to crises, following policy changes, in West Asia. This will bring Kerala to the dismal growth experience of the 1970s and early 1980s, with a growth rate of 3.3 per cent, which will have serious implications for unemployment and standards of living.

1.4.3.5 Thus, if Kerala continues on the business as usual path, the scenario for 2030 looks grim.

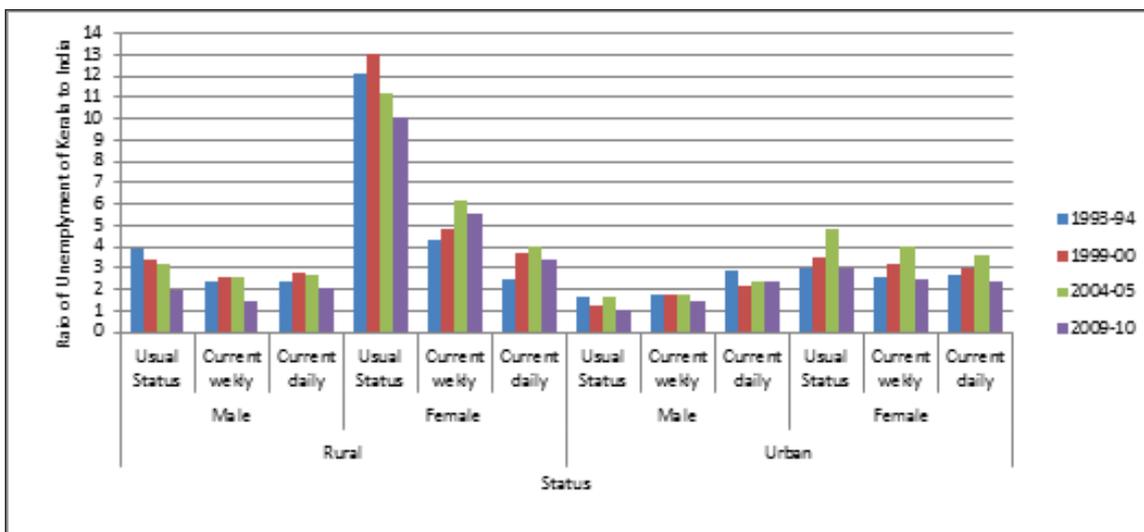
## 1.5 Socio-economic Challenges

### 1.5.1 Unemployment

#### 1.5.1.1 High unemployment rates:

- a) While the economy has recovered from the slow growth of the late 1980s, the situation seems to offer little hope for the unemployed as employment growth is dismal and unemployment rates remain high and all pervasive. Defined as a proportion of the number unemployed to the total labour force (15–60), the unemployment rate is measured in terms of usual status, weekly status and daily status (see Appendix A1.2 for definitions). While usual activity status implies regular unemployment, both weekly and daily status represent seasonal/temporary unemployment. Figure 1.8 shows the unemployment rate of Kerala vis-à-vis the national average by location and sex. In all three categories, unemployment in Kerala is found to be generally three to five times greater than the all India average. Female unemployment, particularly in rural areas, is worrisome in Kerala. The usual status unemployment rate amongst rural females is 12–13 times higher than the national average.
- b) Compared to the situation in the early 1990s, the long-term unemployment rates have come down (usual Status), especially in rural areas, but there is little improvement in the short term (weekly status) or seasonal rates (daily) of unemployment.

**Figure 1.8**  
**Unemployment Rate by Type: 1993–94 to 2009–10 (%)**



Source: Computations by NCAER

- c) An inter-state comparison presented in Table 1.4 indicates that Kerala recorded the highest urban unemployment among 13 major Indian states. It also recorded the second highest unemployment rate in rural areas after Goa in 2004–05, and in 2009–10 it moved to the top. While it did register a sharp decline in unemployment rates over the two periods, its relative ranking worsened.

**Table 1.4**  
**Unemployment Rate per thousand: 2004-05 and 2009-10**

State	Rural		Urban	
	2004-05	2009-10	2004-05	2009-10
Andhra Pradesh	7	12	36	31
Goa	111	47	87	41
Gujarat	5	8	24	18
Haryana	22	18	40	25
Karnataka	7	5	28	27
Kerala	107	75	156	73
Madhya Pradesh	5	7	28	29
Maharashtra	10	6	36	32
Orissa	50	30	134	42
Punjab	38	26	50	48
Rajasthan	7	4	29	22
Tamil Nadu	12	15	35	32
Uttar Pradesh	6	10	33	29
West Bengal	25	19	62	40

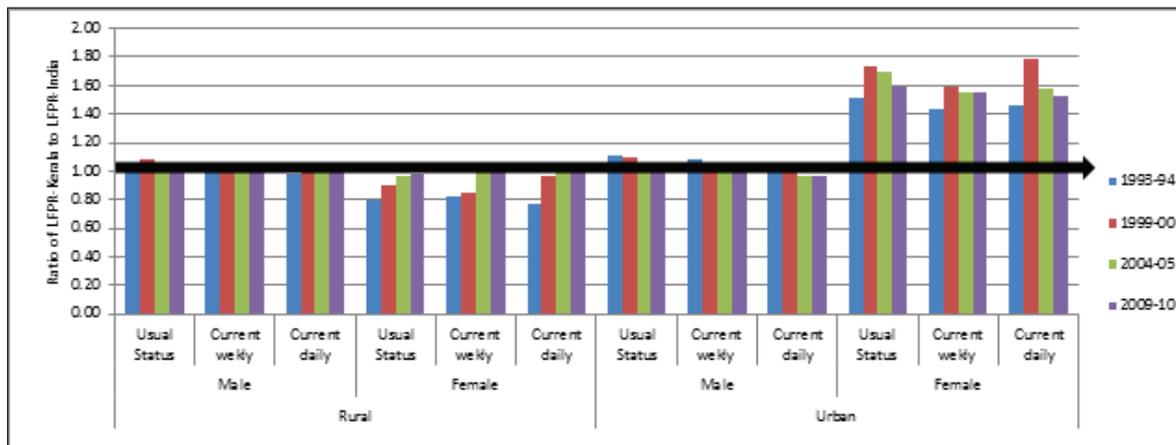
*Note: The unemployment rate refers to unemployed persons per 1000 of the labour force*

*Source: National Sample Survey Organisation 61st, 66th & 68th rounds*

d) Economic turnaround in the State thus seems to be a typical case of jobless growth. Often it is argued that the influx of women into the labour force in Kerala is responsible for high unemployment rates in the State. Figure 1.9 shows the ratio of labour participation rates by location and gender in Kerala relative to the national averages. If it takes the value greater than one, it means that the labour participation rate is higher in Kerala vis-à-vis the national average. It may be seen that the ratio is equal to one for male labour force participation rates. This means that Kerala is on par with the national average in terms of male labour participation ratio. The ratio for rural women has increased over time from 1993-94 to reach one in 2009-10. In contrast, the ratio for urban women has always been greater than one for the corresponding period. This indicates an exceptionally high female participation rate in the urban areas that could explain high unemployment figures. The influx of a large number of women into the labour force can be attributed to an increase in the number of females with secondary or higher levels of education and declining fertility rates that relieved women of their household responsibilities. However, women's influx into labour force does not appear to be the complete story for the following reasons:

- One, in rural areas female labour participation rates have been lower than the national average, albeit rising. Despite the lower participation rate, the rural unemployment rate has been rather high.
- Two, the female-male sex ratio is rather high in Kerala compared to the rest of India.
- Three, there has been a continuous decline in the female participation rates in urban areas.
- Finally, Figure 1.8 shows that the problem of unemployment is all-pervasive in the State.

**Figure 1.9**  
**Labour Force Participation Rates by Status: 1993–94 to 2009–10**



Source: Computations by NCAER

- e) Unemployment, therefore, is a deeper problem than it is believed to be. It is directly linked with the quality of growth and growth drivers. Considering a shallow productive base in the economy and lack of structural transformation, it is hardly paradoxical in Kerala's context that gainful productive employment grows at a relatively low rate, despite a high economic growth rate over the past 25 years and the availability of a skilled workforce. This is underlined by the fact that the incidence of unemployment is most acutely felt by the educated labour force.

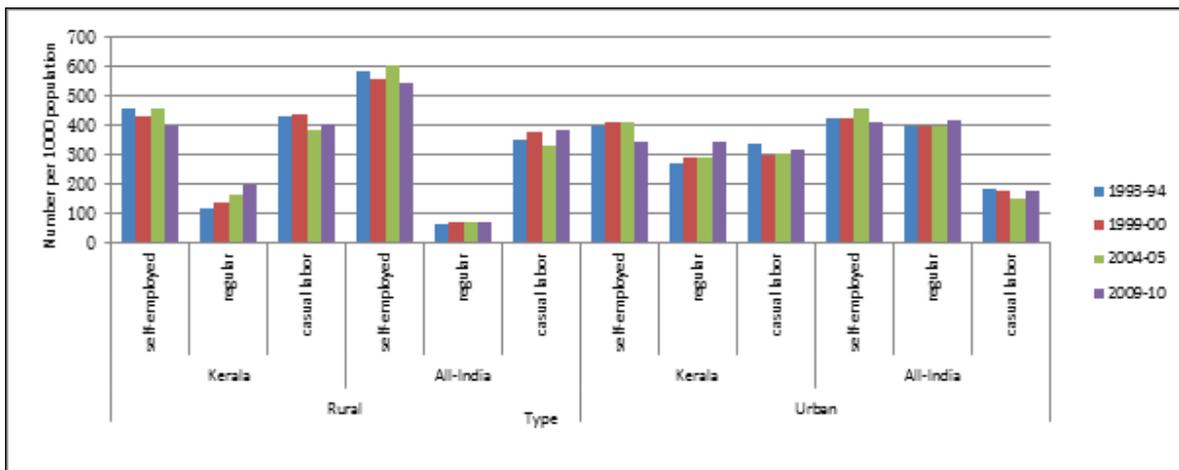
#### 1.5.1.2 Rather high share of educated unemployment:

- a) The unemployment rate is higher among the educated, particularly those with middle to secondary level education. As the general education level of the population increased over time, the problem of unemployment has tended to become one of educated unemployment. According to NSS data, overall, 14.4 per cent of males in the educated population<sup>25</sup> were unemployed (usual status) in 1983, which increased to 17.9 per cent in 1987–88.<sup>26</sup> For women the increase was from 17.1 per cent to 24.2 per cent. Those with lower levels of education showed a low incidence of unemployment whereas those with school education up to the secondary level showed the highest incidence. Those with higher levels of education, such as graduates, showed a relatively lower incidence of unemployment compared to the secondary school-educated population. This pattern remained almost the same over time, except that the incidence of unemployment among those with college degrees also rose, matching unemployment rates of those with education up to the secondary school level. The unemployment rates for the educated in Kerala are the highest for both rural and urban areas among the major states. By 2004-05, the unemployment rate for the educated in rural Kerala increased to 29.6 per cent against the all India figure of 8.5 per cent. The corresponding figures for urban Kerala and India were 29.6 per cent and 8.2 per cent.<sup>27</sup>
- b) A CDS study<sup>28</sup> indicates that unemployment in Kerala could be because the young, educated Keralite population has been choosing not to work. It was found that unemployment was rather high among men and women below 30 years of age. These are essentially educated, unmarried people who are dependent on their parents and are not the breadwinners. Apparently, they prefer to remain unemployed rather than take up any unskilled job that comes their way. This means that the problem of Kerala's unemployment has its genesis in the State's paradoxical growth patterns. It is a manifestation of high accomplishments in education and health in an economy that is characterised by low productivity and low knowledge-intensive sectors.

### 1.5.1.3 Casualisation of employment:

- a) Since the level of creation of regular jobs remains near constant, most new jobs created are casual in nature. A high level of 'casualisation' of Kerala's workforce has seen the quality of newly created employment deteriorate further (Figure 1.10).
- b) Further, the proportion of self-employed workers appears to be declining across time with a corresponding rise in that of casual workers. The proportion of regular salaried workers remains stagnant. This tendency is evident across both rural and urban areas and for both genders. A rise in casual workers is essentially displacing self-employed workers.

**Figure 1.10**  
**Workforce Rates by Category: 1993–94 to 2009–10**



Sources: Household consumption expenditure in India, NSSO–50th Round (July 1993– June 1994), 55th Round (July 1999–June 2000), 61st Round (July 2004–June 2005) and 66th round (July 2009–June 2010)

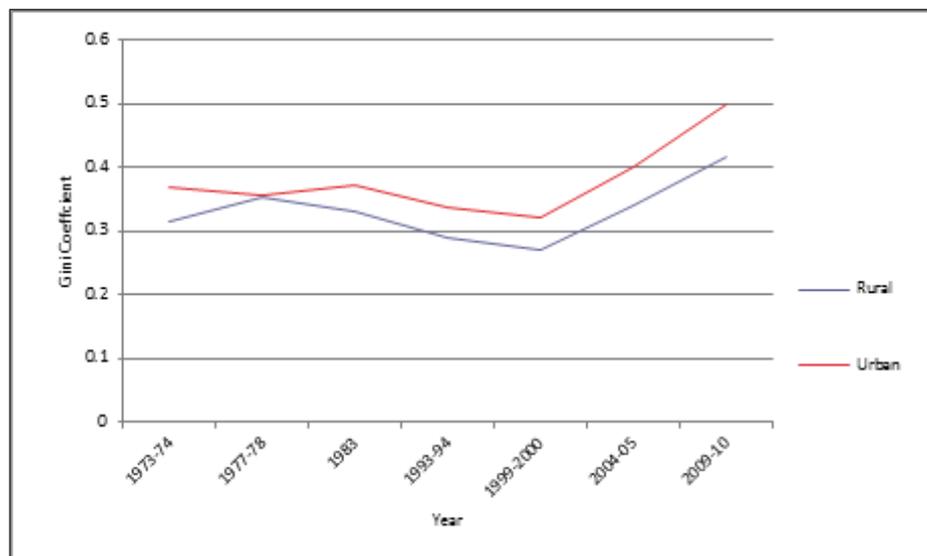
- c) In rural areas, agriculture is increasingly unable to productively absorb the growing rural labour force. However, there has been a growth in employment opportunities in low productivity non-agricultural activities such as construction and trade, which can partly be attributed to state-sponsored employment programmes. These opportunities have been temporary and casual in nature. But since they have become a major source of casual employment, it is a worrisome trend. A wider use of non-regular work arrangements has led to greater uncertainty about workers' employment status, giving rise to instability and vulnerability among certain groups of workers. There is evidence that casual workers are more likely to lack elements associated with decent employment, such as adequate social security and recourse to effective social dialogue mechanisms.
- d) Apparently, a poor quality of growth has resulted in a poor quality of employment in a setting of high quality human resources. The paradox of high economic growth with unemployment is intrinsically linked to the quality of growth in the State. The growth drivers in the State are thus subject to scrutiny.

## 1.5.2 Inequities

### 1.5.2.1 High inter-personal inequities

- a) Within Kerala's society and culture there are broad economic and social inequalities across people, communities and regions. While social inequalities cannot be measured, economic inequality can be measured quantitatively using consumption expenditure data. The most commonly used measure of inequality is the Gini coefficient. It ranges from a minimum value of zero to a maximum value of one. A Gini coefficient of zero represents perfect equality, while one implies perfect inequality. Figure 1.11 shows the patterns of inequality in personal consumption in Kerala measured by the Gini coefficient. It reveals that since 1999–2000 there has been a sharp rise in consumption inequality in Kerala in both rural and urban areas. This coincides with the accelerated growth phase post 2002–03. Clearly, growth has been accompanied by rising economic inequities.

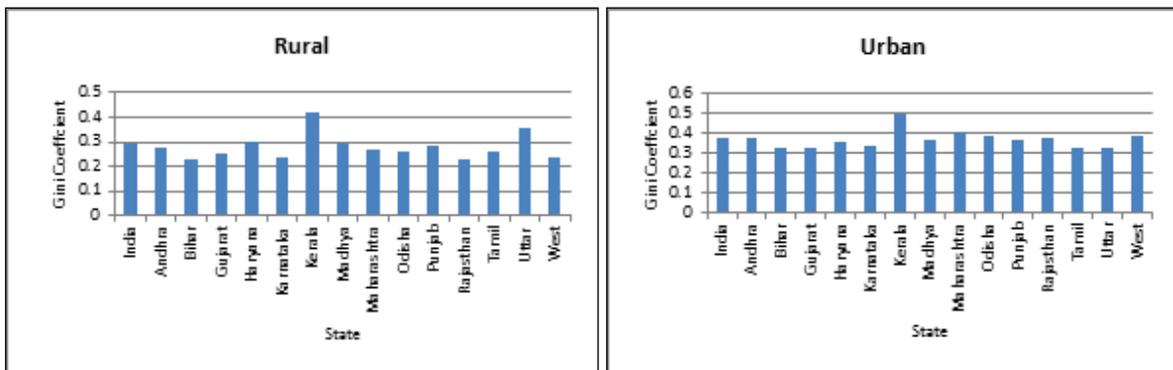
**Figure 1.11**  
**Gini Coefficient of Per Capita Expenditure in Selected Years**  
**Between 1973–74 and 2009–10**



Source: Computations by NCAER

- b) An inter-state comparison of inequality shows that in 2009–10, Kerala had the highest Gini coefficient in both rural and urban areas among the major Indian states. This is again a paradox: Deepening inequalities within, and between, different groups in society are generally associated with low levels of social cohesion and participatory citizenship. This contradicts the strong Kerala tradition of participation in public life. This could be partly attributed to remittance-induced consumption driven growth in the State with little capacity building in productive areas. Social inequality is a major challenge, which can impede growth by triggering social conflict and political instability.

**Figure 1.12**  
Gini Coefficient of Per Capita Expenditure by State for 2009–10

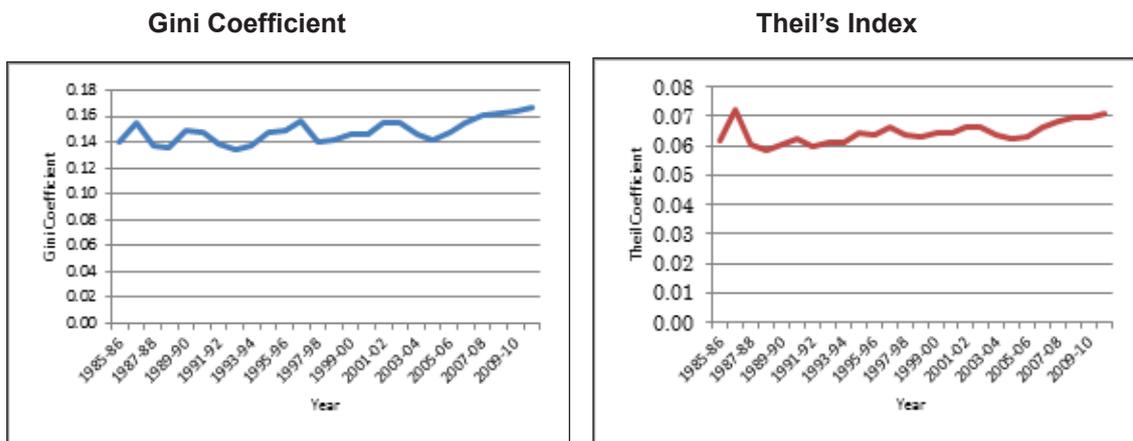


Source: Computations based on Planning Commission database

### 1.5.2.2 Slowly widening inter-regional inequality

- a) Regional imbalance has also been a major concern for policymakers and planners. Redressal of economic disparity is an important objective in any plan in India, both at the national and state levels. Two commonly used measures of regional inequality are: the Gini index and Theil's index. Estimates of these measures for GSDP per capita have been used here to gauge the level of inter-district inequality in Kerala in the period from 1985–86 to 2009–10. As presented in Figure 1.13 they show that regional inequities are rather low in Kerala. Further, they remained almost stagnant from 1985–86 to 1993–94. In 1993–94, they rose marginally and stagnated at that level. However, in the accelerated-growth phase post 2002–03 they started rising, albeit slowly.

**Figure 1.13**  
Inter-District Inequality Indices in GSDP Per Capita: 1985–86 to 2009–10



Source: Computations by NCAER

- b) Table 1. 5 positions each of Kerala's districts relative to Ernakulam, which ranks first in terms of average GSDP per capita during three decadal periods: 1981–90, 1991–2000 and 2001–2010. It shows that the basic hierarchy of the top three and bottom four districts has remained the same over the past three decades. Ernakulam, Thiruvananthapuram and Thrissur continue to be at the top while Idukki, Pathanamthitta, Kasaragod and Wayanad, in that order, remain at the bottom. There have been some changes in the ranking of the seven districts that fall between the top and the bottom. Malappuram and Palakkad, for instance, took rapid strides in terms of net state district

product per capita. Malappuram moved up 5 places from 10 to 5, close to Kollam. Palakkad also improved its position marginally from the 8th to the 7th rank. Both Malappuram and Palakkad are most affected by migration. The improvement in their ranking could, thus, be migration-led rather than due to acceleration in productive activity. On the other hand, the positions of Kollam, Kannur and Alappuzha — three districts known for traditional industries, cashew, handicrafts and coir — worsened relative to Ernakulam. The poor performance of Kollam pulls down its relative ranking, benefiting Kozhikode, which, in absolute terms, did not show any improvement. Kozhikode moved closer to Ernakulam and occupied the 4th rank. Kottayam despite a marginal improvement retained its position at the 9th place.

**Table 1.5**  
**Changes in District Ranking by Per-Capita NSDP: 1981–2010**

Rankings	1981-90	1991-00	2001-10
1	Ernakulam	Ernakulam	Ernakulam
2	Thiruvananthapuram	Thiruvananthapuram	Thiruvananthapuram
3	Thrissur	Thrissur	Thrissur
4	Kollam	Kozhikode	Kozhikode
5	Kozhikode	Kollam	Malappuram
6	Kannur	Kannur	Kollam
7	Alappuzha	Palakkad	Palakkad
8	Palakkad	Malappuram	Kannur
9	Kottayam	Alappuzha	Kottayam
10	Malappuram	Kottayam	Alappuzha
11	Idukki	Idukki	Pathanamthitta
12	Pathanamthitta	Pathanamthitta	Idukki
13	Kasaragod	Kasaragod	Kasaragod
14	Wayanad	Wayanad	Wayanad

*Source: Computation based on Statistics for Planning & Economic Review, Kerala*

## 1.5.3 Poverty

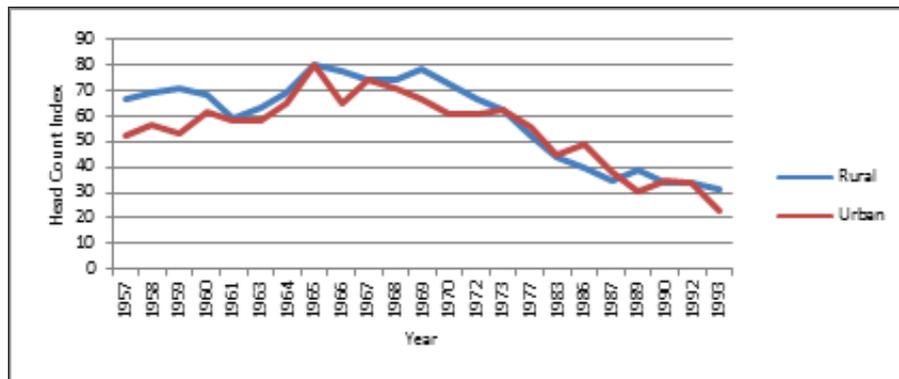
### 1.5.3.1 Poverty rates declined sharply:

- a) There are three different measures of poverty that capture its incidence, depth and severity. These are:
  - Head-count index (H): H indicates the incidence of poverty or poverty rate, and is given by the proportion of the population below the poverty line.
  - The poverty gap index (PG): PG measures the depth of poverty. It is the average mean consumption deficit below the poverty line, counting a zero deficit for the non-poor, with the mean formed over the whole population.
  - The squared poverty gap index (SPG): SPG is the average of the squared poverty gap (PG index) as a proportion of the poverty line. SPG is sensitive to distribution of inequality amongst the poor, and can be interpreted as a measure of the severity of poverty.
- b) Of the three measures, the head count index method is most commonly used to depict the prevalence of poverty. There are a number of estimates of poverty, which are, in general, fragmented and cannot be compared over time. Presented here are two sets of poverty estimates that make a long-time series.

c) The World Bank Estimates: 1957–58 to 1993–94:

- (i) In one of the most comprehensive studies,<sup>29</sup> the World Bank presents all the three measures of poverty for a long period from 1957–58 to 1993–94. Figure 1.15 plots the head count index of rural and urban Kerala for this period. It shows that poverty rates have declined drastically starting from the mid 1960s.

**Figure 1.14**  
**Rural And Urban Poverty Rates: 1951–1994**



Source: G. Datt, 1998. *Poverty in India and Indian states. FCND discussion papers 47. International Food Policy Research Institute (IFPRI).*

- (ii) According to this study, in 1957–58, Kerala had the third highest rural poverty incidence ratio after Maharashtra and Tamil Nadu with a rural headcount ratio of over 66 per cent. The head count ratio increased during the late 1950s. By 1959–60, Kerala achieved the distinction of being the poorest state in terms of the percentage of people below the poverty line. The incidence of poverty continued to increase during the 1960s. In 1969–70, 78 per cent of the rural population was below the poverty line. Not only was poverty widespread, it was also deep and severe (not shown here). Of 15 major Indian states, Kerala performed the worst in terms of the extent, depth and severity of poverty. Poverty started declining, first slowly in the 1970s and then rapidly from the 1980s. Rural poverty in Kerala declined from 70 per cent in 1969–70 to 31 per cent (29.5 per cent according to Planning Commission estimates) in 1987–88. The depth and severity also declined. In the period between 1957–58 and 1993–94, the trend rates of decline in the three indicators of poverty — the head-count index (H), the poverty gap index (PG), and the squared poverty gap index (SPG) — were 2.4, 4.07 and 5.26 per cent respectively, which were the most drastic among the Indian states. It could partly be attributed to land reforms. Kerala only lagged behind Andhra Pradesh, West Bengal, Punjab and Haryana in terms of rural poor.
- (iii) The urban poverty rate was above 52 per cent in 1957–58. It increased sharply to 80 per cent by 1965–66 and remained above 70 per cent during the 1960s, which was higher than all the other states of India. It started falling in the 1970s and declined sharply to 38 per cent (23.8 per cent according to Planning Commission estimates) by 1987–88. Kerala's urban poverty rate was only higher than Punjab, Haryana and West Bengal. The State performed most impressively after Punjab and Haryana in terms of the reduction in urban poverty, with the trend rates of decline in head count ratio being 2.1 per cent. The poverty gap ratio and squared poverty ratio declined at the trend rate of 3.4 per cent and 4.3 per cent (after Punjab and Haryana) respectively over the period 1957–58 to 1993–94.

## d) The Planning Commission estimates:

- (i) From 1973–74 onwards, the Planning Commission has been providing separate estimates of the proportion and number of poor for rural and urban India at the national and state levels using a consistent set of poverty lines. These are available for the years 1973–74, 1977–78, 1983–84, 1987–88, 1993–94, 1999–00, 2005–06, 2009–10 and 2011–12. For 2004–05, two sets of poverty estimates have been provided. These are based on Uniform Recall period (URP) and Mixed Recall period (MRP). The latter uses 365 days' consumption of low frequency items (clothing, footwear, durables, education and institutional health expenditure) and 30 days for all the remaining items unlike the URP method, which uses a 30-day reference period for all. In 2009–10, the Planning Commission introduced another change when it adopted a new definition of poverty based on the recommendation of the Tendulkar Committee. These estimates are not strictly comparable with the earlier rounds. The Planning Commission revised the estimates for 1993–94 and 2004–05 based on the new definition. These are presented in Table 1.6. It shows that there has been considerable upward revision in the estimates of poverty. However, there is an unmistakable trend of decline in poverty across rural and urban Kerala till 2000. In 2004–05, urban poverty continued to decline irrespective of the method selected (MRP or URP), while rural poverty appears to have increased. Overall, however, poverty rates declined as per the MRP-based estimates, which are normally preferred over URP-based estimates. Poverty rates further declined dramatically in 2009–10 and 2011–12.

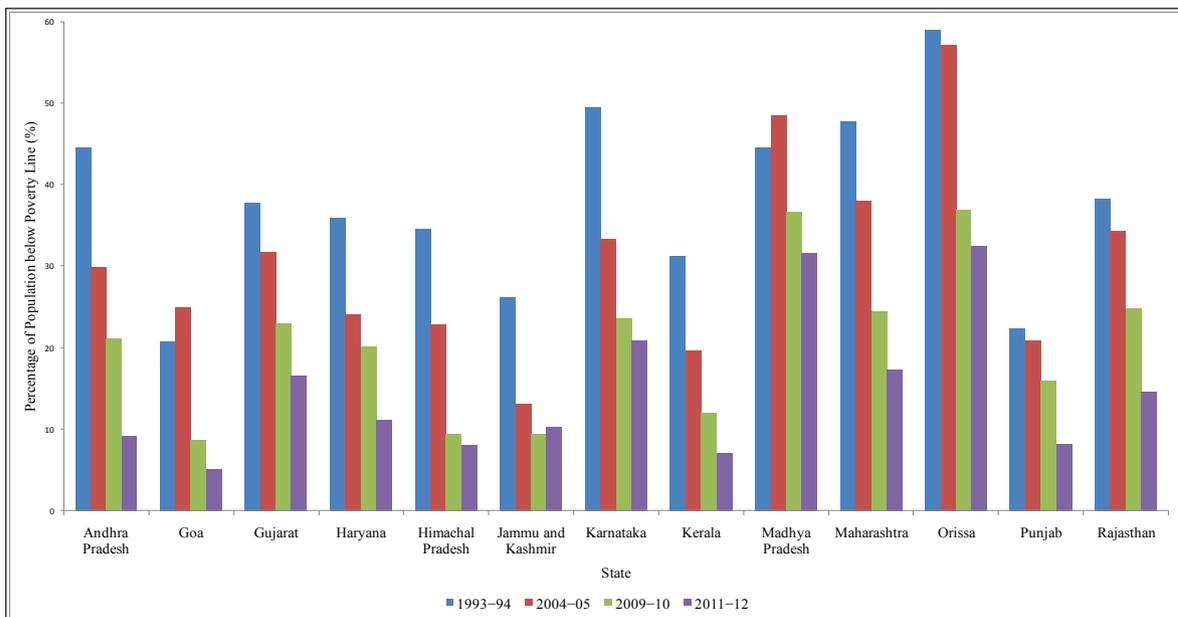
**Table 1.6**  
**Estimates of Poverty in Kerala: 1973–74 to 2011–12**

Year	Rural		Urban		Combined	
	No. of persons (lakh)	% of persons	No. of persons (lakh)	% of persons	No. of persons (lakh)	% of persons
<b>Traditional methodology</b>						
1973–74	111.36	59.19	24.16	62.74	135.52	59.79
1983–84	81.62	39.03	25.15	45.68	106.77	40.42
1993–94	55.95	25.76	20.46	24.55	76.41	25.43
1999–2000	20.97	9.38	20.07	20.27	41.04	12.72
2004–05 MRP	23.59	9.60	13.92	16.40	37.51	11.40
2004–05 URP	32.43	13.20	17.17	20.20	49.60	15.00
<b>Tendulkar's Methodology</b>						
1993–94	Na	na	Na	na	na	31.3
2005–06	42.2	20.2	19.8	18.4	62.0	19.6
2009–10	21.6	12.0	18.0	12.1	39.6	12.0
2011–12	15.48	9.14	8.46	4.97	7.05	23.95

Source: Planning Commission, Government of India.  
[http://planningcommission.nic.in/data/datatable/0512/databook\\_55.pdf](http://planningcommission.nic.in/data/datatable/0512/databook_55.pdf)

- (ii) Figure 1.16 shows the estimates of poverty based on Tendulkar's methodology for the top 10 states and reveals that Kerala has maintained its position among the top performers in terms of low poverty rates among major states. Goa, Jammu and Kashmir and Himachal Pradesh were the only three states with poverty rates below that of Kerala. In 2011–12, Kerala further improved its ranking and emerged as the second best state in terms of poverty rates after Goa.

**Figure 1.15**  
**Poverty Rates of Selected State: 1993–94 to 2011–12 (%)**



Source: Planning Commission

e) Decline in poverty in Kerala was essentially made possible by five processes:

- (i) First, the sustained process of social development. Two major factors that have contributed to poverty reduction are the increase in real wages negotiated by strong labour unions and state-sponsored redistribution programmes. An ambitious poverty eradication programme was launched by the government in 1998. Called 'Kudumbashree', it focused on eliminating absolute poverty from the State through concerted community action under the leadership of local self-governments. Kudumbashree is one of the largest women's empowerment projects in the country. It is a community-based self-help initiative involving poor women. Through Kudumbashree, women have organised themselves under a three-tier community-based organisation. The bottom rung of the programme is formed by the Neighbourhood Groups (NHGs) comprising 20–40 women members selected from poor families. Area Development Society (ADS) is formed at the ward level by uniting 8–10 NHGs. The Community Development Society (CDS), the highest tier, is the federation of all the ADSs in the respective panchayat (rural), municipality (town) or corporation (city). The programme works in close association with both urban and rural local governments through a network of community-based organisations that work with women. It strives to tackle poverty in an integrated manner through an effective convergence of resources and actions to develop micro finance and micro enterprises. The programme has 37 lakh members and covers more than 50 per cent of the households in Kerala.<sup>30</sup>
- (ii) Second, the enhancement of human capabilities through education, health and related areas.
- (iii) Third, the process of migration that resulted in significant remittances from the Keralite diaspora in West Asian countries. A significant proportion of migrant labour was rural in origin and unskilled or semi-skilled.
- (iv) Fourth, the process of demographic transition taking place in Kerala, which reached its last stage by the end of the 1980s, limiting the size of the family.

- (v) Finally, the growth of the low productivity tertiary sector, which absorbed labour released from agriculture.
- f) Notwithstanding the drop in poverty rates, policymakers are still facing challenges. It is significant that at 2004–05 prices, the official State rural poverty line of Rs 430 per capita per month is based on only 1,480 calories per person per day, which is far below the 2,400 and 2,100 calories norm adopted at the national level. The head count ratio will swell if the standard norm is adopted in its estimation.

### 1.5.3.2 Poverty rates are still high

1.5.3.2.1 Officially, approximately four million people were under the poverty line in the State in 2009–10. Of them, 2.2 million were in rural areas and 1.8 million in urban areas. In 2011–12, the figures dropped to 1.5 and 0.8 million respectively. Overall, over 2.3 million people were below the poverty line. It is noteworthy that official estimates are based only on consumption. Other dimensions of human lives are ignored. There have been efforts in recent years to measure multidimensional poverty ratios. Keeping this in view the Oxford Poverty and Human Development Initiative and the United Nations Development Programme have developed a Multidimensional Poverty Index (MPI). Multidimensional poverty is made up of several factors that constitute people's experience of deprivation — such as poor health, lack of education, inadequate living standards, lack of income, disempowerment, poor quality of work and threat of violence. The Multidimensional Poverty Index (MPI) for Kerala shows that there were 5.6 million people living in poverty in Kerala in 2010. The challenge is to pull this vast population out of poverty. It also shows that Kerala ranks 169 among 673 provinces of 104 countries across the world in terms of the head count ratio. The State's position (128) is slightly better on the intensity of deprivation.

#### 1.5.3.3 High intra-regional inequality in terms of poverty:

- a) The poverty ratio is more than 10 fold higher in the worst performing districts when comparisons are made between the districts with the highest and lowest incidences of poverty. In 2004–05, Thiruvananthapuram was the best Monthly Per Capita Expenditure (MPCE) district in both rural (Rs 1,442) and urban (Rs 1,867) Kerala. It also had the lowest urban poverty ratio of 6 per cent.<sup>31</sup> At the other extreme was Kannur with the lowest average MPCE (Rs 556 in rural areas and Rs 824 in urban areas) and the highest poverty ratio in both rural and urban areas (35.4 per cent and 39.4 per cent, respectively).
- b) This brings out the issue of regional disparities within Kerala, in relation to the incidence of poverty. This is also to emphasise that even though the State's overall outcome in social and economic achievements is far better compared to many other states and the national average, there exist pockets of deprivation when compared to Kerala's own achievements.

### 1.5.3.4 Nutritional deprivation is serious

1.5.3.4.1 In 2008, the Hunger Index was estimated for 17 major Indian states, covering more than 95 per cent of the country's population.<sup>32</sup> In that year, India's rank on the Global Hunger Index (GHI) 2008, with a score of 23.7 was 66th out of 88 countries. The Hunger Index scores for Indian states ranged from 13.6 for Punjab to 30.9 for Madhya Pradesh. Among the Indian states, Kerala ranked 2nd, next to Punjab, indicating a relatively low prevalence of hunger in the State. However, its rank in relation to the international GHI was 47, between Mauritania and Swaziland, with a score of 17.6. Overall, Indian states were ranked between 34 for Punjab (placing it between Nicaragua and Ghana) and 82 for Madhya Pradesh. Notably, the per capita calorie intake in Kerala as per the report of the National Sample Survey Organisation is below the national average calorie intake (Table 1.7).

**Table 1.7**  
**Average Per-capita Intake of Calorie, Protein and Fat per Day: 1972–73 to 2009–10**

Calorie (kilo calories)							
Urban/Rural	Geography	1972–73	1983	1993–94	1999–00	2004–05	2009–10*
Rural	Kerala	1,559	1,884	1,965	1,982	2,014	1,964
	India	2,266	2,221	2,153	2,149	2,047	2,020
Urban	Kerala	1,723	2,049	1,966	1,995	1,996	1,941
	India	2,107	2,089	2,071	2,156	2,020	1,946
Protein (gram)							
Urban/Rural	Geography	1972–73	1983	1993–94	1999–00	2004–05	2009–10
Rural	Kerala	38	47	50.8	52.4	55.4	52.7
	India	62	62	60.2	59.1	57	55
Urban	Kerala	44	51	52.4	55.2	56.7	54
	India	56	57	57.2	58.5	57	53.5
Fat (grams)							
Urban/Rural	Geography	1972–73	1983	1993–94	1999–00	2004–05	2009–10
Rural	Kerala	19	32	32.7	38.8	40.8	42.8
	India	24	27	31.4	36.1	35.5	38.3
Urban	Kerala	27	38	37	42.9	44.9	45.6
	India	36	37	42	49.6	47.5	47.9

*Note: \*Based on different collecting methods, the NSSO has started reporting two types of estimates, Types I and II from the year 2009–10. This table only lists the Type I estimate because it is comparable to previous years' estimates.*

*Source: National Statistical Organisation. 2010. Nutritional Intake in India. Report No. 540.*

## 1.6 Social Capital

### 1.6.1 Social capital needs upgrading

1.6.1.1 For centuries, Kerala has had strong connections with international markets. These ties were strengthened by the large-scale migration of people from Kerala to various parts of the world. When India's economy opened up, it was expected that the State's historical ties to other parts of the world would enable it to profit from the new opportunities. But this did not happen. The inflow of foreign investment, collaborations and technology following liberalisation appear to be almost bypassing the State. This may partly be due to the business environment in the State, and partly because of resistance to foreign investors. This is a major challenge that needs to be overcome.

1.6.1.2 Further, even within the context of strong overall social development, the issues of inequity and exclusion in development outcomes persist. Particular groups of people and individuals continue to be excluded from resources, services and opportunities that could help them move out of poverty. The basis of this exclusion and inequity includes a complex range of political, social and economic factors. There are also issues pertaining to social justice. These are:

- Gender issues: The incidence of crimes against women including rape and sexual harassment is high in Kerala. Autonomy of women in household matters and their participation in economic activities is also low.

- Social exclusion: Despite powerful social movements, there are caste-based inequalities that have persisted over time and remain a source of social exclusion. In Kerala, despite a strongly egalitarian, radical socio-political movement and high levels of literacy, caste awareness remains acute in the private sphere. Using field work conducted at the beginning of the 1950s, along with data from early twentieth century research, the anthropologist McKim Marriott (1965) examined variations in the rigidity of the caste system across five regions of India: Kerala, Coromandel, Upper Ganges, Middle Indus, and Bengal Delta.<sup>33</sup> He ranked Kerala at the top in terms of the degree of the hierarchy of castes, the extent of delineation of hierarchy by ritual and the extent of limits on social interaction between high and low castes. It cannot be said that the same situation prevails now, but a serious study is required to assess the current situation.

## 1.7 Human Development and Demographic challenges

### 1.7.1 Middle human development trap

1.7.1.1 Kerala's achievements in terms of human development have been lauded internationally and are well documented. Human development is measured by the Human Development Index (HDI), which captures three dimensions: health, education and income. The first comprehensive state-wise Human Development Report published by the Planning Commission, which provided human development indices for 1981 and 1991 for all Indian states and union territories, ranked Kerala on top in both the years.<sup>34</sup> Over time, however, Kerala's relative ranking has worsened, with other states catching up rapidly and even out-performing Kerala. Also, the gap is closing between the all India average and Kerala's. The Ministry of Women and Child Development, for example, puts Kerala at the top in 1996 and 2006 in terms of HDI among major Indian states.<sup>35</sup> But it shows that the union territories of Delhi and Chandigarh have out-performed Kerala in terms of HDI over this period. The Human Development Index of the Institute of Manpower shows that Kerala slipped below Goa in 2007–08 when compared to 1999–2000 in terms of HDI.<sup>36</sup> Following the UNDP's lead, the Ministry of Women and Child Development published two new measures in 1996 and 2006: a Gender-related Development Index (GDI) and Gender Empowerment Index along with the HDI.<sup>37</sup> The GDI adjusts the average achievements on the same three dimensions that are captured in the HDI, income, education and health, to account for the inequalities between men and women. Kerala topped the GDI index in 1996, but slipped below Goa and Delhi in 2006. The Gender Empowerment Index ranking also worsened for Kerala over time. While the value of the index improved from 0.48 to 0.52, Kerala's relative ranking fell from 2 to 9.

1.7.1.2 In its first-ever estimate of HDI for major Indian states, the UN report in 2010 places Kerala at the top in terms of HDI.<sup>38</sup> However, if Kerala is compared with nations, it shows that Kerala falls into the category of middle human development countries — below countries with a very high and high HDI index — with an overall index of 0.625. When ranked globally, Kerala's rank is 99 (between Philippines and the Republic of Moldova) among 192 countries across the world and its current index is lower than even the 1980 index of the leading developed countries. It is, thus, a middle human development state, which is two notches below the top countries (with very high and high HDI countries at the top).

1.7.1.3 The challenge is to pull the State out of the middle human development category and put it in the advanced human development category. Kerala faces challenges related to upgrading its education and health facilities and social justice system. An increasingly larger number of people from Kerala are migrating to other states in India for higher education. Since 2008, student migrants have become the number one group, in the various employment categories, among out-migrants. There were 3.1 lakh students among the State's out-migrants in 2011. The corresponding number was 2.4 lakh in 2008, 2.3 lakh in 2003 and 99,000 in 1998. Students were 30.5 per cent of the out-migrants in 2011 and 26.4 per cent in 2008. Student out-migrants have out-numbered job-seeking

out-migrants since 2008.<sup>39</sup> Students were 107 per cent of the job seekers among the out-migrants in 2011. They were only 32 per cent of the job seekers in 1998. As mentioned in a report on the Migrants Survey 2008, “in the past, the youth of Kerala used to get their education within the State and move out to other states for employment. Now, Kerala’s youth move out to other states for education and to other countries for employment.”<sup>40</sup> The flip side of this trend is that many of the young people who are educated outside Kerala never return. They tend to get employed outside Kerala, in other states or in other countries, depleting valuable human capital. Financing human development is a crucial aspect of sustaining the State’s high human development achievements.

## 1.7.2 Ageing population at low levels of growth

1.7.2.1 Kerala was one of the fastest growing states in India in terms of population growth. Until 1971, the rate of natural increase<sup>41</sup> was significantly higher in Kerala than in India as a whole. The difference was large enough to make the population of Kerala increase four-fold during 1901–81 when the population of India grew three-fold. The difference in the rate of natural increase essentially happened because of the significantly lower death rate in Kerala due to the State’s health accomplishments. As a matter of fact, the mortality transition in the State can be traced to the beginning of the 20th century, which marked the move from the first stage of the demographic transition pattern to the second. As a result, despite significant out-migration, Kerala’s population grew rapidly and the density of population increased sharply. According to the 1981 census, it was 654 persons per sq km, nearly thrice that of the all-India figure.

1.7.2.2 In the late 1980s, however, Kerala entered the third phase of demographic transition when the fertility rate also started declining. An inevitable consequence was the ‘age structure transition’ from children younger than five years to the working age population. The latter registered a phenomenal growth of around 4 per cent per annum. As per the 2001 Census data, the working age population of Kerala was around 64 per cent of the total, the highest among Indian states. This stage of age structure transition is highly conducive to growth due to a low dependency rate and a large supply of labour. However, Kerala appears to have missed the opportunity to capture this demographic dividend due to limited success in creating productive capacities in the State. It is facing a severe unemployment problem, which arose mostly due to the lack of quality employment generation rather than the absence of employment opportunities. The consequence is migration from Kerala to other states and the West Asian countries. Thus, the State lost a sizeable productive population in the absence of quality growth.

1.7.2.3 Over the past decade, Kerala has entered the final stage of age structure transition with a shift in the age structure from a young to an old population. Such changes have been associated with considerable economic prosperity in the case of many other countries. In the context of Kerala, the phenomenon has appeared in the setting of a relatively less developed economy. According to projections, the working age population is likely to fall further. The decrease in the proportion of the population in younger age groups will contribute to a drop in the overall unemployment rate, but it will also mean a decline in the active workforce and excessive growth of the aged population. This will have multidimensional effects on the economy, which may be growth dampening due to:

- Decline in labour force
- Decline in migration and remittances
- Increase in social security expenditure
- Pressure to create new infrastructure to look after the aged
- Modification of existing common infrastructure to facilitate their use by the aged

### 1.7.3 Rapidly increasing urbanisation without a commensurate increase in urban infrastructure

1.7.3.1 The 2011 Census states that up to 47.7 per cent of the people in Kerala live in urban areas. This is a quantum jump from the 26 per cent recorded in 2001. In 1981, only 18.74 per cent of Kerala's population was in urban areas. Unlike the other parts of the country, urbanisation in Kerala is not limited to the designated cities and towns and is not the outcome of rural migration. In Kerala there exists a rural-urban continuum. The process of urbanisation has led to economic, social and environmental issues. From the economic perspective there is, or will be, increasing demand for infrastructure such as housing, water, electricity, drainage, roads and, above all, solid waste management in new towns. Social issues arise as they transform societal organisations, the role of the family, demographic structures and the nature of work, inter-personal relationships and societal networks. The outcome may be increasing social stress, crime and gender-related problems. From the perspective of the environment, the changing land use pattern may result in a loss of natural vegetation, agricultural lands and open spaces due to commercial, industrial and residential development with environmental implications. The challenge is to ensure sustainable development in these areas. The problem is compounded by the fact that the entire State is a rural-urban continuum from north to south. This unique settlement pattern in Kerala aggravates the problem by distributing limited resources across large areas.

### 1.7.4 Challenges posed by return migrants

1.7.4.1 There are two categories of return migrants. The first is return emigrants or members of households who have returned to Kerala after living outside India for a year or more, or for a shorter period, if the stay abroad was for education or to look for a job (REMs). The second is return out-migrants (ROMs) or members of households who have returned to Kerala after living outside the State, but within India for a year or more. According to the Kerala Migration Survey (KMS), there has been a consistent decline in the number of return out-migrants (ROMs). It was 9.6 lakh in 1998, increased slightly to 9.9 lakh in 2003 but then declined to 6.9 lakh in 2008. However, the number of REMs has been growing rapidly. REMs assumed large dimensions in Kerala in the early 1990s. In 2000, their number shot up to 7.5 lakh. The return migrants pose both opportunities and challenges. The age distribution shows that at the time they return, they are still young and are in the working age group and have a long active life ahead. Three-fourths are below 40 years of age. Further, emigrants and return emigrants are believed to have acquired several skills while working abroad. These include various kinds of technical skills, marketing skills, managerial/supervisory skills, financial management skills and so on. A comparison of the educational levels of return emigrants with those of the emigrants who have not returned shows that those who come back have, on average, lower educational levels and technical skills. However, it does not rule out the possibility that they are better at skill acquisition than those who never migrated. With the financial resources at their disposal, the skills and disciplined work culture they have acquired and the networks they have established, it is expected that emigrants who return to Kerala could make a significant contribution to the State's development. The challenges before policymakers are, therefore, twofold: the rehabilitation of return emigrants and using their expertise and accumulated wealth for development.

### 1.7.5 Challenges of In-migration

1.7.5.1 In-migration is a new phenomenon emerging in the State. More specifically, it is reappearing after a gap of almost seven decades. The scarcity of unskilled and semi-skilled labour, coupled with a high wage rate regime, attracts migrants from other Indian states to fill the gap, leading to 'replacement migration' in Kerala. However, the replacement migrants are paid lower wages than those that exist in Kerala and they work in grossly inhospitable conditions, which are devoid of any

living facilities. They are housed in crowded settlements and unhealthy conditions, posing a serious challenge to the State to provide a suitable service delivery mechanism for the replacement migrants.

## 1.8 Environment: Strengths and Challenges

### 1.8.1 Increasing pressure on natural resources

1.8.1.1 While the State's rich natural capital presents opportunities for sustainable prosperity, there are also challenges. Urbanisation patterns, land use changes and the emerging 'consumer middle class' in Kerala are expected to result in continuous growth in demand for consumer goods and other resources. These markedly increase pressure on natural resources, which are already under stress or scarce, and may even put new stress on other resources. Wetlands, for instance, are an important part of Kerala's ecosystem and are also its most threatened feature. They serve as a buffer for food, water and drainage, function as groundwater recharge sites, offer habitat to a variety of plants and animals, act as breeding sites for several aquatic species, help maintain the local microclimate and help in carbon sequestration. However, this ecosystem is subjected to severe quality degradation in the State. Filling up wetlands and paddy growing areas and converting them into built-up areas has become a practice since the late 1980s because of increased cash flows and economic development due to NRI remittances. Other activities that have contributed to the degradation and loss of Kerala's wetlands are the discharge of industrial effluents, dumping of municipal waste in the absence of reuse, recycling and disposal facilities, and drainage of fertiliser-pesticide residues. Protecting this important ecosystem from further degradation will be a challenge for the government.

### 1.8.2 Degradation of water resources

1.8.2.1 Kerala is unique for it receives an annual rainfall of about 3,000 mm, which is about two-and-a-half times the national average. At the same time, the State is able to retain only a minuscule amount of the total rainfall it receives. The rest of the water is lost to the sea within a short time after it rains, thereby leaving little time for water infiltration, percolation and storage. This leads to deficient water supply from December to May, both for drinking and irrigation. Thus, Kerala paints a picture of abundance of rainfall co-existing with droughts of different magnitudes. Per capita water availability in water-rich Kerala is lower than even Rajasthan. The per capita water availability for India is about 15,600 litres per capita per day (lpcd), while for Kerala it is 1,250 and for Rajasthan 1,600.<sup>42 43</sup> The per-capita water availability in Australia in 2011 was 22,039 cubic meters (m<sup>3</sup>), the US 9,044 m<sup>3</sup>, France 3,059 and United Kingdom 2,311 m<sup>3</sup>.<sup>44</sup> Water is a serious issue in Kerala, with economic, social and environmental implications. Importantly, it is directly linked to energy shortages in Kerala since hydel energy is the major source of power in the State.

1.8.2.2 Degradation of water resources and water pollution pose further challenges in Kerala. Conversion of watershed areas has altered the hydrological regime while enhancing the silt movement, lowering water yield in the catchment thus affecting groundwater recharge. Introduction of plantation crops in the highlands by replacing the region's natural vegetation reduced the storage capacity of soil and resulted in surface soil erosion in watersheds and sedimentation in rivers. This has affected the summer flow in rivers. Sand quarrying in rivers and watersheds and agricultural practices along the riverbanks in the non-rainy months; sand filling of ponds, farmlands, wetlands and other water bodies; conversion of vast areas of wetlands and paddy fields into settlement and industrial areas; and construction of new roads and buildings have compounded these problems.

### 1.8.3 Deterioration of water quality

1.8.3.1 In the absence of efficient water treatment systems and solid waste management systems, untreated domestic and industrial waste and agriculture run-off flows into rivers, polluting nearly all of Kerala's 44 rivers. Further, there has been wide spread bacteriological contamination of faecal origin of ground and surface water. This relates to the close proximity of an increasing numbers of leach pit latrines; leakages from septic tanks; washing, bathing and other domestic activities around open dug wells, especially among the low income communities; inadequate and irregular disinfection of drinking water supplies, including chlorination under Kerala Water Authority (KWA) schemes; and inadequate testing and irregular monitoring of drinking water quality. This poses a serious risk to public health.

### 1.8.4 Solid waste management

1.8.4.1 According to an estimate,<sup>45</sup> about 960 million tonnes of solid waste was generated — as by-products during industrial, mining, municipal, agricultural and other processes — in India in 2007. Of this, 350 million tonnes was organic waste from agricultural sources; 290 million tonnes inorganic waste from the industrial and mining sectors; and 4.5 million tonnes hazardous in nature. In Kerala, nearly 6,000 tonnes of solid waste is estimated to be generated every day,<sup>46</sup> which turns out to be 2.2 million tonnes of solid waste per annum. It is 0.2 per cent of the Indian average. In 2002 the government launched an initiative called Clean Kerala Mission. A primary objective of the mission was to create a garbage-free Kerala. There were efforts to achieve this goal with the participation of NGOs and community organisations, such as Kudumbashree, across Kerala. However, solid waste management continues to pose a major challenge and health hazard in the State.

## 1.9 Summing Up

1.9.1 Kerala's economy is on the threshold of a second transition, in terms of the stage of its development, from 'take-off' to 'drive to maturity'. The old regime of low per capita income growth has given way to a relatively high rate of growth with the services sector as the single largest provider of new employment. Kerala has been growing at an average annual rate of 6.3 per cent over the past two-and-a-half decades. However, the business as usual scenario is grim. It is now a well-known fact that growth may come about in a variety of ways and that different types of growth processes may have different effects on growth potential, employment, poverty, human resource development and the environment. Kerala's growth process is also characterised by major fault lines. There is a need to improve the quality of growth in terms of the generation of productive capacity, structural transformation and the quality of human development. Job expectations, especially among the youth, have changed. The labour force is ready to move into more skilled, technologically superior, high value-adding occupations with better wages and conditions of employment. There is, thus, a need to look for new growth drivers. A shift in political underpinning is also discernible, accompanied by a deep concern for sustained growth. A major growth challenge is to pull the economy out of the vicious cycle of low productivity, poor quality, high unemployment and social and environmental degradation to a virtuous circle of high quality growth. The challenge is to increase competitiveness and productivity by reforming the investment climate through infrastructure reforms. Kerala needs to reconsider its development strategy in order to gain considerable autonomy in growth and become a major player in the national and global economy. This calls for a strategic policy intervention based on an understanding of the growth drivers and the strengths and challenges the region faces. Growth policies need to be region-specific, addressing the unique challenges each faces. Strategic planning is an essential first step to place the region on an upward trajectory.

## Appendix A1.1

### Technical note on business as usual scenarios

#### A1.1.1 Introduction

A1.1.1.1 During the first decade of this century, the GDP growth rate in Kerala was impressive at about 7.4 per cent per annum. If Kerala can maintain this level of GDP growth for a generation (about 30 years) it would, by 2040, reach the per capita income level of developed countries today (2010). However, the structure of growth in the last decade has been highly unbalanced and sustained high growth over the next three decades may not be possible without some major restructuring of sources of growth.

A1.1.1.2 As noted in Table A1.1, during 2000–10 GDP in agriculture grew at only 0.5 per cent, and GDP in manufacturing also grew slowly at only 5.7 per cent per year. On the other hand, the services sector grew fast, with a spectacular 29 per cent per year growth in communication and 12.6 per cent per year in banking and insurance. The construction sector also grew fast at 9.8 per cent per year. The spectacular growth rates in these selected services sub-sectors were due to some exceptional factors that are unlikely to continue in the future. For example, the high growth rate of the communication sector was largely due to the technological revolution in the sector, and the sector's growth rate is already coming down. Similarly, the high growth rate in construction and banking and insurance was partly due to the heavy inflow of remittances, which may not continue at a similar rate in the future. Thus, a Perspective Plan for Kerala from 2010 to 2030 has to assess the consequences of a slowdown in these sectors. Moreover, as discussed in the chapter on a vision for the perspective plan, Kerala needs to improve the growth of the agriculture and manufacturing sectors and identify new sources of growth, which may come from human resource development. It is therefore necessary to see how Kerala's growth perspectives will be with such restructuring of the economy.

**Table A1.1**  
**Sectoral Average Growth Rates (2000–10)**

Industry of Origin /Year	2000–10 (Average)
Agriculture	0.49
Forestry & Logging	2.09
Fishing	0.45
Mining & Quarrying	8.83
Manufacturing	5.67
Electricity, Gas and Water supply	4.66
Construction	9.77
Railways	7.99
Transport by other means	9.9
Storage	6.35
Communication	28.99
Trade, Hotels & Restaurants	6.14
Banking & Insurance	12.6

Real estate ownership, Business, Legal	10.14
Public Administration	8.62
Other Services	7.37
Gross Domestic Product	7.41

*In fact, became negative during 2005–10.*

*Source: Computations by NCAER*

A1.1.1.3 The art of model-building lies in designing the model to tackle the issues under consideration. In this case, the issue is the growth consequences of a slowdown in the sources of past growth and the effect of new sources of growth on the economy. In order to address these issues we avoid using the standard macro-models and design a special purpose model for Kerala Perspective Plan.

## A1.1.2 Analytical Framework

A1.1.2.1 The key point of departure in our analysis was to break down GDP sectors into two groups: growth drivers/exogenous sectors and growth driven/endogenous sectors. Table A1.2 divides all the 16 sectors into these two types. For example, agriculture, forestry and logging, fishing, mining and quarrying, manufacturing, construction, communication, banking and Insurance and public administration are taken as drivers of growth. The communication sector is classified as a driver of growth because it is driven, to a considerable extent, by remittances, which is an external factor. Similarly banking and insurance is taken as a driver partly because of the impact of remittances on the sector and partly because of the financial innovations that characterised this sector during 2000–2010. Public administration is classified as a driver for it reflects the views and actions of political leaders rather than being derived from other sectors of the economy.

**Table A1.2**  
**Sectoral Division into ‘Driven’ And ‘Drivers’**

Drivers	Driven
1.Agriculture	9.Public Administration
2.Forestry & Logging	10.Electricity, Gas and Water supply
3.Fishing	11.Railways
4.Mining & Quarrying	12.Transport by other means
5.Manufacturing	13.Storage
6.Construction	14.Trade, Hotels & Restaurants
7.Communication	15.Real estate ownership, Business, Legal
8.Banking & Insurance	16.Other Services

*Source: NCAER*

A1.1.2.2 On the other hand, electricity, gas and water supply, railways, transport by other means, storage, trade, hotels and restaurants, real estate ownership and other services are driven by growth in Kerala. Growth in goods-producing sectors such as agriculture and manufacturing contribute to the growth in related sectors such as transport, storage, railways and electricity, gas and water supply. Similarly, growth in trade, hotels and restaurants, other services and real estate is dependent on growth in other sectors of the economy.

A1.1.2.3 In order to substantiate the long run relationship between growth drivers and growth driven sectors, Granger Causality Test of total GDP in 'Drivers on total GDP of 'Driven' sectors was performed. Drivers growth granger causes the growth in the driven sector with P value=0.08, which is significant at 10 per cent level of significance (Table A1.3). Furthermore it was found that driven sectors (both individually and collectively) show a high degree of correlation with the sum of 'drivers'. The equation we chose for further analysis is:

$$\text{Growth driven} = 0.92 \text{ Growth drivers} \quad R\text{-squared} = 0.7483$$

[SE (0.133), t Statistic=6.90, P value=0.00]

A1.1.2.4 Regressing growth in total GDP of drivers on total GDP growth of driven sectors, and suppressing the constant, shows that elasticity turns out to be 0.92. It means that a 1 per cent increase in growth of drivers leads to a 0.92 per cent increase in growth of driven sectors. Statistically R square turns out to 0.74, which means that 74 per cent growth in driven sectors is explained by growth drivers. At 5 per cent level of significance (t value is 1.96) the calculated t value of 6.90 is greater than 1.96, which means we reject the null hypothesis that drivers and driven sectors are unrelated to each other; in fact, drivers affect driven sectors positively and in a significant way.

**Table A1.3**  
**Granger Causality Wald Tests**

Equation	Excluded	Chi2	df	Prob>chi2
Driven	Drivers	4.91	2	0.086

Source: NCAER's Calculation

A1.1.2.5 After establishing the statistical relationship between growth drivers and growth driven sectors, we begin with alternative assumptions on growth in 'drivers' and using the above equation, find total GDP growth.

### A1.1.3 Business as usual Scenarios

A1.1.3.1 The recent growth trends are likely to suffer a serious drop in the future particularly in sectors such as communication, construction and banking. Using the model, the drop in GDP growth rate due to expected drop in growth rates of the above three sectors is assessed. Construction sector growth rate is expected to fall from current 9.8 per cent in 2010 to 5.8 per cent in next plan period of 2012–16 and then further fall to 4 per cent growth per annum from 2017 onwards till the end of the perspective plan period. A fall in growth rate of construction will lead to a loss of growth rate by 0.6 percentage points of GDP in the next plan period (2012–16) and 0.1 percentage points in 2027–31 (Table A1.4).

A1.1.3.2 The communication sector, which has been driving the growth of Kerala's economy in a big way, is expected to slow down. Growth rate in this sector is assumed to slow down from current 20 per cent to 8 per cent in the coming plan (2012–16), with a further fall to 7 per cent in the next plan (2017–21) and subsequently down to 5 per cent from 2022 to 2031 (Table A1.4). Assumptions regarding a fall in the communication sector's growth will reduce Kerala's GDP by 2 percentage points during 2012–17.

A1.1.3.3 Banking sector's growth rate is assumed to fall from 10 per cent to 4 per cent, the related fall in GDP is represented in Table A1. 4. Overall loss of growth rate is presented in Table A1.4, a loss in GDP growth around 3 to 4 percentage points is estimated.

**Table A1.4**  
**Loss in Growth Rates**

Year	2012–16	2017–21	2022–26	2027–31
Loss of Growth - Due to Fall in growth of Construction				
Plan Wise Growth Rate	0.60	0.38	0.15	0.10
Loss of Growth - Due to Fall in growth of Communication				
Plan Wise Growth Rate	2.06	2.44	1.69	1.87
Loss of Growth - Due to Fall in growth of Banking				
Plan Wise Growth Rate	0.21	0.60	0.70	0.76
Total Loss of Growth from Banking, Construction and Communication				
Plan Wise Growth Rate	2.87	3.42	2.54	2.73

Source: Computations by NCAER

**Table A1.5**  
**Plan Wise Growth after reduction in Banking, Communication and Construction growth**

Year	2012–16	2017–21	2022–26	2027–31
Plan Wise Growth rate	5.1	4.8	4.5	4.6

Source: Computations by NCAER

A1.1.3.4 The overall growth rates in Kerala are expected to fall to 5.1 per cent in 2012–16, continuing this fall, the growth rate could reach a new low of 4.6 per cent in 2027–31 (Table A1.5). However, the growth scenario in Kerala is even grimmer if some more assumptions regarding a fall in the growth rates of all other sectors are as follows:

- It is possible that due to climate change, growth in agriculture and allied sectors may suffer. Agriculture and fishing growth is assumed to fall from 0.5 per cent in 2011 to 0.25 per cent in 2031. Similarly, forestry and logging growth rate is presumed to fall from 2 per cent to 1.5 per cent in 2031.
- A fall by 2 percentage points, from 7 per cent to 5 per cent, during 2012–16 in the mining sector, with a further fall to 3 per cent and 2 per cent growth in 2017–21 and 2022–30 respectively is assumed. A plausible reason for the fall in the growth rate of the mining sector is the depletion of resources in the future.
- Manufacturing growth is expected to fall from 5.7 per cent to 4 per cent in 2012–16, and then fall to 3 per cent subsequently, till 2031.
- Fall in GDP due to many other reasons as indicated above, will cause a decline in the growth rate of public administration. Public Administration growth is assumed to fall from 8 per cent to 5 per cent in the first plan period of 2012–16, then falling to 4 per cent in the next plan 2017–21 and then to 3 per cent till 2031.

A1.1.3.5 Assumptions regarding a fall in the growth rates of all the above sectors, along with banking, communication and construction can bring Kerala's economy further down to a growth rate ranging from 3 to 4 per cent.

**Table A1.6**  
**Plan Wise Growth Rate After All the Changes in Growth Rates in All Sectors**

Year	2012–16	2017–21	2022–26	2027–31
Plan Wise Growth rate	4.6	4.1	3.6	3.8

*Source: NCAER's calculations*

## A1.1.4. Impact of Remittances On GDP Growth

A1.1.4.1 Remittances account for 15 per cent of GDP in Kerala's economy. However, these are not included in estimates of the State's income. In our modelling exercise, in order to account for the impact of remittances, we project remittances. Remittances growth has been around 9 per cent in the last decade, but due to the global financial crisis growth of remittances in the last few years has fallen dramatically. Assuming the remittances growth rate falls from 7 per cent to 3 per cent in 2012–16 and then further to 2 per cent growth in 2017–21 and 1 per cent in 2022–26 and 0 per cent growth in 2027–31 due to crises in West Asia, we obtain remittances projections.

A1.1.4.2 Addition of remittances to Business as Usual (BAU) GDP projections (after all shocks) provides a rough projection of GSI (Gross State Income) which is a sum of GSDP and remittances. The Plan wise growth of GSI is presented in Table A1.7. In the BAU scenario GSI growth may drop by about 4 percentage points to about 3 per cent per year, thus coming close to the dismal growth experience of Kerala in the 1970s and early 1980s, with its severe implications for unemployment and standards of living.

**Table A1.7**  
**Plan Wise Growth rate after falling growth of remittances**

Year	2012–16	2017–21	2022–26	2027–31
Plan Wise Growth rate	4.4	3.8	3.3	3.3

*Source: NCAER's calculations*

## Appendix A1.2

### Basic Concepts of Important Labour Force Parameters

Labour force participation rate (LFPR): Is defined as the number of persons in the labour force per 1000 persons.

$$\text{LFPR} = ((\text{no. of employed} + \text{no. of unemployed persons}) / \text{Total Population}) * 1000$$

Worker-population ratio (WPR): Is defined as the number of persons employed per 1000 persons.

$$\text{WPR} = (\text{Number of employed persons} / \text{Total population}) * 1000$$

Unemployment Rate (UR): Is defined as the number of persons unemployed per 1000 persons in the labour force (employed & unemployed).

$$\text{Unemployment rate} = (\text{Number of unemployed persons} / \text{Labour Force}) * 1000$$

**Usual activity:** The usual activity status relates to the activity status (employed/unemployed) of a person during the reference period of 365 days preceding the date of survey.

**Usual subsidiary economic activity status:** A person whose usual principal status was determined on the basis of the major time criterion could have pursued some economic activity for a shorter time throughout the reference year of 365 days preceding the date of survey or for a minor period, which is not less than 30 days, during the reference year.

**Usual activity status considering principal and subsidiary status taken together:** The usual status, determined on the basis of the usual principal activity and usual subsidiary economic activity of a person taken together, is considered as the usual activity status of the person and is written as usual status (ps+ss).

**Current weekly activity status:** The current weekly activity status of a person is the activity status obtained for a person during a reference period of 7 days preceding the date of survey.

**Current daily activity status:** The activity pattern of the population, particularly in the informal sector, is such that during a week, and sometimes, even during a day, a person could pursue more than one activity.

**Self-employed:** Persons who operated their own farm or non-farm enterprises or are engaged independently in a profession or trade on own-account or with one or a few partners are treated as self-employed in household enterprises.

**Regular wage/salaried employee:** These are persons who work in others' farm or non-farm enterprises (both household and non-household) and, in return, receive salary or wages on a regular basis (i.e. not on the basis of daily or periodic renewal of work contract).

**Casual wage labourer:** A person who is casually engaged in others' farm or non-farm enterprises (both household and non-household) and, in return, receives wages according to the terms of the daily or periodic work contract, is a casual wage labourer.

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- <sup>21</sup> Harilal, K.N. and K. J. Joseph, 2003. *Stagnation and Revival of Kerala Economy: An Open Economy Perspective*. *Economic and Political Weekly*. 38 (23). June 7-13.. 2286–2294
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- <sup>24</sup> Business as usual means an ongoing and unchanging state of affairs despite difficulties or disturbances.
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# THE STRATEGIC FRAMEWORK





## The Strategic Framework

A prosperous, knowledge-driven and competitive economy, which optimises the use of its resources and reduces environmental impacts, while ensuring high living standards for all, is the vision for Kerala. The mission to achieve sustainable prosperity rests on four pillars — economic, human, social and environmental. To attain quality growth, benchmarking will be the central instrument to monitor and improve the economy's performance. Overall, Kerala will be benchmarked against the Nordic countries as these countries are both growth and welfare oriented. Education and health, the State's traditional strengths, will be the driving force of its new development strategy. Therefore, upgrading the quality of education and health to international standards, developing knowledge nodes within the State, promoting knowledge creation and diffusion are some key directions. Education and health will be inter-linked with all other sectors such as agriculture, industry, tourism and so on. Development of infrastructure is a crucial element and ICT is the lynchpin of a knowledge economy. Private investment and entrepreneurship will be encouraged. Social and environmental development will be mainstreamed. A systems approach to planning — a coordinated effort of all government departments, production systems, communities, NGOs and people — will be adopted to implement this new development strategy. However, to create an enabling environment for the new development strategy, Kerala's institutions will have to be strengthened, governance improved and factor market rigidities addressed. A robust monitoring and evaluation system that promotes transparency and accountability and facilitates regular tracking of physical and financial performance of the plan will be created.

### 2.1 Vision

2.1.1 To make Kerala a prosperous, knowledge-driven, competitive and eco-efficient economy,<sup>1</sup> among the world's advanced economies, with a spirit of entrepreneurship, innovation, social inclusion, tolerance and diversity that ensures:

- High living standards for all
- A cleaner, safer and healthier environment for both the present and future generations

2.1.2 Economic prosperity implies that the people of Kerala will enjoy high incomes and living standards. Economic prosperity is necessary because it is a key element of providing the means to meet basic needs, generate employment and reduce poverty. It will be driven by knowledge and entrepreneurship, with a new focus on the role of information technology, innovation and learning in economic performance.

2.1.3 It is also envisaged that Kerala will be a globally-oriented knowledge hub, among the world's leading knowledge hubs. As a key node in global knowledge networks, it will have distinctive expertise in education, healthcare, biotechnology, ICT, biodiversity and environment-related areas. Its success will lie in its ability to produce higher value, enabling knowledge-intensive goods and services to move up the value chain and compete globally, in the same product space as advanced countries.

2.1.4 Eco-efficiency, which combines economic and ecological efficiency, will both enhance the efficiency of production processes and create new and better goods and services. In the process, it will use fewer resources and generate less pollution along the entire value chain. Eco-efficiency will be reached by the delivery of competitively-priced goods and services that satisfy human needs and improve quality of life, while progressively reducing the ecological impact and resource intensity throughout the lifecycle to a level that is at least in line with the land's carrying capacity.

2.1.5 Kerala's vision of prosperity moves beyond accumulation of material wealth, measured traditionally in terms of Gross State Domestic Product (GSDP) or GSDP per capita. The State's policies will be inclusive and socially sustainable, meaning broader access to equal opportunities for all, to ensure that members of society can participate in and benefit from growth. Kerala will be a more diverse society in terms of culture and religion. Greater diversity will be linked to increased tolerance, creativity, knowledge and dynamism.

2.1.6 Finally, Kerala will aim at prosperity for the present without compromising the prosperity of future generations.

## 2.2 Mission

2.2.1 The mission is to achieve 'Sustainable Prosperity' benchmarked against the Nordic region comprising Finland, Norway, Denmark and Sweden. Sustainable prosperity has four elements:

- **Economic prosperity:** Economic prosperity is measured by the GSDP per capita. The standards of living of the people in a country are closely linked with per capita income.
- **Human prosperity:** Quality of life will be shaped by the quality and affordability of access to services such as health, education and effective and clean governance.
- **Social prosperity:** Equal opportunity will be ensured for every person residing in Kerala irrespective of gender, religion, caste and origin for intellectual, personal and professional development and social prosperity. The emphasis will be on promoting human capacities through improvements in infrastructure, market access, education, health and financial intermediation. Social safety nets and redistribution will prevent extreme deprivation among the socially marginal and vulnerable groups.
- **Green prosperity:** The natural wealth of Kerala will be preserved for future generations to reduce environmental risks and ecological scarcities.

2.2.2 While economic prosperity is measured by the income per capita, assessing other elements of sustainable prosperity will require some specific measurement tools. Since the early 1990s, there has been a proliferation of initiatives at the national and international level to develop specific indices that provide descriptive measures of different aspects of an economy's performance, with the indicators covering a large number of domains. While some initiatives focus on individual countries (and localities within them), as developed either by citizens and research groups or as part of the official statistical system, other initiatives are international, and typically used to monitor how a range of political commitments are followed through with specific actions. Some of these international indices are provided in Appendix A2.1. These indices cover different aspects of sustainable prosperity and are specifically tailored to the needs of policymakers. The tables A2.1 to A2.5 present selected international indices covering all four aspects of sustainable prosperity, with the ranking and scores of the Nordic countries and India. Tables A2.6 to A2.8 show other dimensions of development including gender, environment and ICT capacity. The objective is to illustrate the Nordic countries' top global ranks on all aspects of sustainable prosperity. The Mission of the Kerala Perspective Plan 2030 (KPP 2030) is to achieve the standards of these countries and share space with them on these indices.

2.2.3 Notably, the primary characteristics of the Nordic countries can be closely compared with those of Kerala's economy. There are, of course, many differences between the Nordic countries and Kerala such as geography, density of population, resources and so on. However, the Nordic countries have been able to grow in a competitive manner while being wedded to social welfare ideals. Kerala is inspired by their model to achieve sustainable, inclusive economic growth.

The main characteristics of the 'Scandinavian' or 'Nordic model' include:

- A comprehensive welfare state with an emphasis on transfers to households and publicly provided social services financed by taxes that are high, notably for wage income and consumption.
- A large amount of public and/or private spending on investment in human capital, including childcare and education, as well as research and development (R&D).
- A set of labour market institutions that include strong labour unions and employer associations, significant elements of wage coordination, relatively generous unemployment benefits and a prominent role for active labour market policies.

2.2.4 The Nordic economies have been at the top not only in terms of per capita income, but also in terms of social, human and environmental performance. In its mission to achieve the standards set by these countries in all these segments of sustainable prosperity, Kerala will draw on the best regional, national and international practices and experiences. Benchmarking is, therefore, a vital instrument for improving the economy's performance. The underlying assumption is that comparison can be an important driver of performance. At the same time, comparison does not mean blind imitation. It simply means looking at it as a model to be inspired by and learn from.

## 2.2.5 Mission statement

- Quantity is not enough — quality matters.

## 2.3 Goals

### 2.3.1 Kerala's goals will be:

#### **Economic prosperity**

- To achieve a compound annual growth rate of 7.5 per cent in GSDP per capita for the next 20 years.
- Increase per capita income from the current US\$4,763 (in terms of purchasing power parity of 2005<sup>2</sup>) to US\$19,000 and then to US\$36,000 by 2040.
- Achieve sectoral growth rates of:

- 2 per cent minimum growth in agriculture
- 9 per cent in manufacturing
- 9 per cent in construction
- 7.5 per cent in communication
- 10 per cent in the education and health sectors

(See Box 2.1 for plan-wise and sector-wise growth targets and also Table 2.1)

- Brand Kerala as a 'global education and health hub' driving India's exports in education and healthcare services.

#### **High quality of life**

- Increase the share of the education and health sectors in GSDP to 15 per cent from the current 11 per cent by 2030.

- Increase the enrolment ratio in higher education to 48 per cent by 2030.
  - Create health security for all.
  - Move Kerala to the highest category of the UNDP human development index.
  - Achieve high standards of living with a focus on:
    - The growth of smart urban and rural areas.
    - Transforming Kochi into a global city to take it on to A.T. Kearney's Global Cities Index.
    - Equitable society
      - Reduction in:
        - Unemployment rate from 9.9 per cent in 2011–12 to 2 per cent in 2031 (reduce the female unemployment rate from 26.2 per cent to 5 per cent).
        - Gini coefficient of economic inequality from around 45 per cent in 2009–10 to 23 per cent in 2031.
        - Poverty rate from 7.1 per cent in 2011–12 to 1 per cent in 2031.
      - Maintaining a culturally diverse, safe and just society.
- **Clean and Safe Environment**
  - Upgrade ecosystems, biodiversity and resources through sustainable production systems and consumption.
  - Protect wetlands.
  - Conserve the World Heritage biodiversity of the Western Ghats.
  - Increase energy efficiency to save 10 per cent of Kerala's energy and water consumption by 2030.
  - Recycle between 60 and 75 per cent of waste generated, depending on the type of waste.
  - Identify and maximise the use of sustainable resources.

### Box No 2.1

#### Plan-wise and Sector-wise target GSDP and Growth Rates

As growth in the fastest growing sectors slows down in the future, growth in overall GSDP will also slow down. It is shown in the previous chapter that the GSDP growth rate can decline sharply to 3.8 per cent. In the desired scenario, the rate of growth in GSDP has to be, on an average, 7.5 per cent over the next 20 years. Table 2.1 shows plan-wise and sector-wise growth rates based on the desired scenario.

**Table 2.1**  
**Plan-Wise and Sector-Wise Target Growth Rates: 2011–2031 (CAGR %)**

Year	2011	2012–16	2017–21	2022–26	2027–31
Agriculture	0.5	1.5	2.0	2.0	2.0
Forestry & Logging	3.5	4.0	3.5	3.0	2.0
Fishing	3.5	3.5	3.5	2.5	1.5
Mining & Quarrying	7.0	6.0	5.0	4.0	3.0
Manufacturing	6.0	8.0	10.0	9.5	8.5
Construction	5.0	8.0	10.0	9.5	8.5
Communication	10.0	9.0	8.0	7.0	6.0

Banking & Insurance	6.0	8.0	9.0	9.0	8.0
Public Administration	9.0	8.0	7.0	6.0	5.0
Other Services	10.0	11.0	11.0	9.0	9.0
Electricity, Gas and Water supply	3.2	3.9	4.3	4.1	3.8
Railways	7.7	9.3	10.4	9.7	9.1
Transport by other means	6.4	7.8	8.7	8.1	7.6
Storage	6.4	7.8	8.7	8.1	7.6
Trade, Hotels & Restaurants	6.4	7.8	8.7	8.1	7.6
Real estate ownership, Business, Legal	6.4	7.8	8.7	8.1	7.6
Target Growth Rate	6.4	7.6	8.5	7.9	7.4

*Note: CAGR is the Compound Annual Growth Rate*

2.3.2 It may be observed that the growth rates will be sustained in all sectors over the next 20 years, with the exception of communication, mining and public administration. This growth can be sustained in the long run only if there is substantial restructuring of economic activity in each sector. The targets set by KPP 2030 are, thus, ambitious and require a new development strategy with a significant amount of policy support. It calls for a paradigm shift from a consumption-driven growth trajectory, with low investment and productive capacity, low value-added and low technology-intensive economic activities, to a knowledge and information technology-driven sustainable development trajectory. The new development strategy proposed in this document builds on education and health — the core strengths of Kerala's economy. In the current growth strategy these are non-tradable social sectors with considerable redistributive effects. They also contribute to growth indirectly by driving up consumption and upgrading human capital. In the new development strategy, these sectors will be assigned a key role in the growth process and will be transformed into Kerala's competitive strengths, while at the same time ensuring the health and education entitlements of each Keralite.

## 2.4 The Knowledge-driven Sustainable Economic Development Strategy: A New Approach

### 2.4.1 Key Principles

2.4.1.1 KPP 2030 targets leapfrogging the high middle income threshold in the next 15 years and the high income threshold in the subsequent 15 years. It also seeks to position Kerala among the Nordic countries in terms of human capital and social and environmental indices. The underlying principle of leapfrogging is to give a major push to the economy in which all sectors and stakeholders participate. It will require a massive improvement in competitiveness and a structural transformation of the economy. This is not impossible. Income transitions (for the countries that make them) today are significantly faster than those of the past. The process of globalisation and the digital revolution offer an opportunity to leapfrog to faster development to catch up with the developed nations. Netherlands (the first country to become lower middle income, in 1827) took 128 years to graduate to upper middle income in 1955. China on the other hand started the growth process in 1979 and became a lower middle income country in 1992. It graduated to upper middle income status in 17 years, in 2009. Kerala, though not a country and only a state within a country, can repeat this feat if there is a course modification in its growth process.

2.4.1.2 A central plank of Kerala's sustainable prosperity will be the development of a knowledge economy embedded within the sustainable development framework. The two principles of this strategy are:

**a) Knowledge Economy**

- (i) A knowledge economy is an economy where knowledge is acquired, created, disseminated and used effectively to enhance economic development. In a knowledge economy, 'knowledge capital' lies at the core of economic growth. It contributes to growth not only directly, but also indirectly by augmenting existing physical capital and labour as factors of production.<sup>3</sup> Knowledge capital is an intangible asset that comprises the know-how of a workforce, innovative ideas, professional skills, intellectual property, enterprise processes and information technology. A successful transition to the knowledge economy includes four elements:
- Long-term investments in education and human development: Investment in human development builds an educated and skilled workforce that can continuously upgrade and adapt its skills to efficiently create and use knowledge.
  - Development of innovation capabilities: An effective innovation system of firms, research centres, universities, consultants and other organisations can keep up with the knowledge revolution, tap into the growing stock of global knowledge and assimilate and adapt it to local needs.
  - Modernisation of the information infrastructure: Promotion of a modern and adequate ICT infrastructure can facilitate effective communication, dissemination and processing of information and knowledge across all sectors.
  - Structural transformation of the economy from low to high value-added products and services: This transformation does not merely mean transformation of education and health systems. For economic transformation to materialise there needs to be a dramatic shift from low value-added, low technology-intensive activities to high value-added and knowledge-intensive products and services. It is the use of knowledge capital that transforms the economic structure by allowing innovation in products, services and processes to take place.
- (ii) The knowledge economy requires an increase in the quantity and quality of the pool of knowledge available for economic production in any region. A successful transition to the knowledge economy often includes four elements: long-term investments in education, development of innovation capabilities, modernisation of the information infrastructure and the creation of a favourable economic environment. The World Bank has set these elements as the four pillars of the Knowledge Economy Framework. They are:
- An economic and institutional regime: Economic incentives need to be created for the efficient use of existing and new knowledge, and for entrepreneurship to flourish.
  - Education: An educated and skilled population is necessary to create, share and use knowledge well.
  - Innovation: An efficient innovation system of firms, research centres, universities, consultants and other organisations is crucial to tap into the growing stock of global knowledge, assimilate and adapt it to local needs and create new technology.
  - Information and communication technology: ICT facilitates the effective creation, dissemination and processing of information.
- (iii) The World Bank Institute has developed a Knowledge Assessment Methodology (KAM) to measure the transition to the knowledge-based economy. The KAM is designed to use 148 structural and qualitative variables to assess a country's preparedness to compete in the

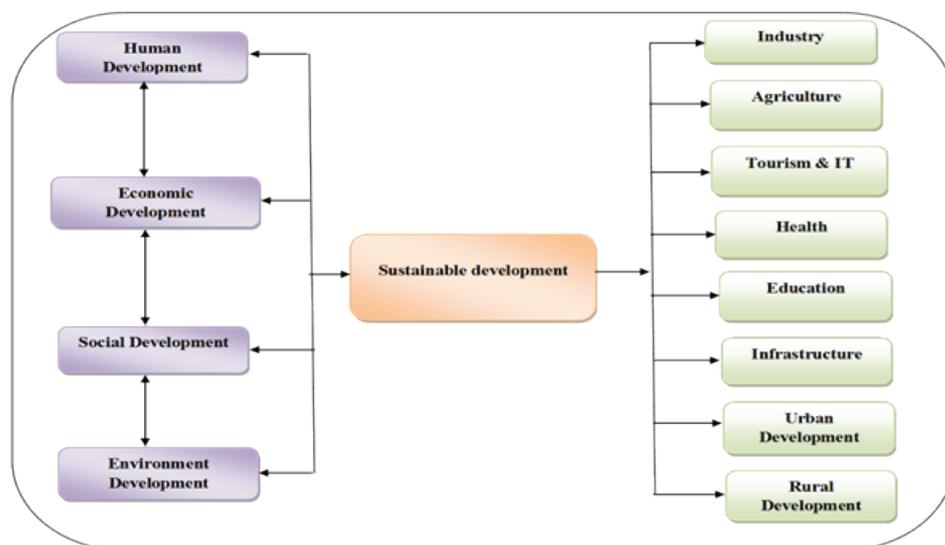
knowledge economy (See Appendix A2.3). The Knowledge Economy Framework postulates that the amount of knowledge and how it is used are key determinants of total factor productivity (TFP). Strengthening the four pillars of knowledge will increase the knowledge intensity of production of goods and services and will, in turn, increase productivity and, thus, economic growth.

- (iv) The knowledge economy with its heavy emphasis on human skills and intellectual capabilities can, however, also have negative aspects in terms of its impact on inter-personal, inter-regional and social inequities, gender insensitivity and the availability of opportunities. Further, in the process of transforming the economy, natural capital may also be adversely affected and urbanisation-related issues such as congestion, pollution and depletion of natural resources start emerging. These aspects deplete social and natural capital and may slow down the process of economic growth in the long run. There can be some difficult trade-offs between quantity and quality. Managing this qualitative aspect becomes essential for achieving sustainable improvements in welfare. Integrating them is technically and politically complex. It requires mutually supportive approaches, whenever possible, and making trade-offs where necessary. The pursuit of sustainable development, thus, requires improving the coherence and complementarity of policies across wide-ranging sectors.

**b) Sustainable development:**

- (i) Sustainable development is defined as a process of growth in which capital investments, the orientation of knowledge creation and technological development and institutional changes are all directed towards enhancing physical, natural, human and social capital to ensure development. Acceleration in physical investment is only a necessary, and not a sufficient, condition for sustainable growth. It needs to be matched by commensurate growth in human, social and natural capital as well. All policies are judged by how they contribute to the four pillars of sustainable development: economic, human, social and environmental. This means that sustainable development will become the central objective of all sectors and policies (Figure 2.1).

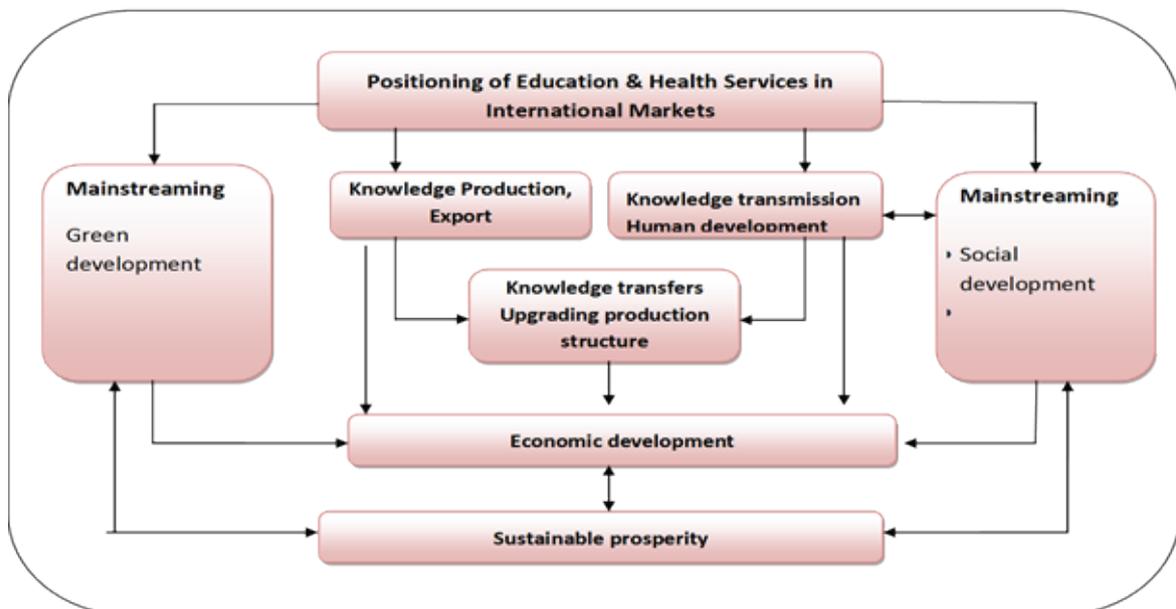
**Figure 2.1**  
**The Sustainable Development Framework**



Source: Conceptualised by NCAER

- (ii) Historically, developed countries sequenced economic, social and environmental goals in three stages:
- The second half of the 19th century to the beginning of the 20th century: The Industrial revolution with 'rapid' economic growth.
  - The beginning of the 20th century to 1970: Creation of the welfare state.
  - 1970 to the present: Increasing attention to environmental problems.
- (iii) With better management of resources and emerging technologies, however, mutually supportive approaches are becoming increasingly feasible. Managing this qualitative aspect will be central to achieving sustainable improvements in the economy's performance. In other words, the new development strategy will integrate the principles of social justice and environmental protection so that human, social and environment capital complement physical capital to push the economy into the virtuous cycle of a knowledge-driven sustainable development process. Economic, social, human and environmental aspects will be recast in a manner that allows various aspects of development to interact dynamically to reinforce each other.
- (iv) There are, thus, four pillars for the new development strategy proposed for Kerala:
- Building human capacity to meet the demands of a knowledge society through knowledge creation and dissemination.
  - Creating a conducive business environment for utilising knowledge.
  - Social development dimensions.
  - Mainstreaming environment considerations in the growth process.
- (v) The strategic elements of this new development strategy for Kerala are illustrated in Figure 2.2.

**Figure 2.2**  
The strategic elements of development framework



Source: Conceptualised by NCAER

## 2.4.2 Key directions of the new development strategy

### 2.4.2.1 Upgrade the quality of education and health to international standards

- a) Constructing a knowledge-driven economy requires new skills, new ideas and a heightened level of creativity from a highly trained, flexible and adaptable workforce. This requires a massive push not only in education, research and development (R&D) and ICT, but also in health services. In the new strategic framework, the education, health and ICT sectors will be placed at the centre of Kerala's economy. Some specialised services, such as R&D, will be directly covered under these sectors. Kerala already has a comparative advantage in education and health given its history as discussed in the previous chapter. But in the current system, both education and health are viewed as non-tradable low value-adding social sectors essentially based on public spending. Hence, the focus has been only on the quantitative aspect of health and educational accomplishments. But the quality of these sectors is not comparable with standards in the advanced countries.
- b) The new development strategy for the State, proposed here, recommends that Kerala upgrade its education and health services to international levels, bundles them into product and service offerings and positions itself in the Indian and global markets of these services.<sup>4</sup> Essentially, this means that the State will strive to build a global reputation in the production, consumption and export of knowledge. The quality of the services offered in these sectors will be enhanced by developing strong regulatory and efficient international accreditation mechanisms. The set of performance indicators suggested in the knowledge economy framework (above) will be employed to measure its ability to generate, adopt and diffuse knowledge. It may be augmented to incorporate health indicators as well, to indicate the overall potential for knowledge development in the State.
- c) Importantly, long-term investments in the proposed sectors will not only build human capacities for knowledge creation and dissemination, but will also stimulate growth by encouraging productive capacities in other knowledge-intensive sectors.

### 2.4.2.2 Promote education and health

- d) There is increasing recognition of the potential of education and health as drivers of growth through trade and investment. These services are increasingly internationalised the world over. According to an estimate for 2013, the size of the medical tourism market is US\$24–40 billion, based on approximately eight million cross-border patients worldwide spending an average of US\$3,000–5,000 per visit, including all medically-related costs, cross-border and local transport, inpatient stay and accommodation.<sup>5</sup> There has been phenomenal growth in the global education market as well. In 2008, about three million students were studying in countries other than their own.<sup>6</sup> The fast growth in this number can be attributed to several factors: high rates of return to students for investments in foreign education; global competition for skilled labour; the emergence of wealthy middle and upper classes in some of the dynamic, high-growth developing countries like China, South Africa and India, who are able to pay high fees and incur travel and living costs to study abroad; and the low quality of education in their home countries.
- e) A major push to the education, health and ICT sectors as part of the new strategy can be leveraged to harness the trade opportunities created by the process of globalisation and the ICT explosion. Service exports, both inter-state and international, will receive a major push from all the four modes of trade, generating income and investment in the State:
  - One, cross-border (inter-state and international) exchange of services through ICT resulting in income from knowledge and business processing in health and education-related sectors.

- Two, promotion of services through the consumption of these services by non-Keralite and foreign nationals in Kerala generating an income stream from education and health tourism.
- Three, the presence of service providers from outside the State bringing investment into Kerala.
- Four, migration resulting in income from remittances generated by temporary and permanent emigrants in the areas of education and healthcare.

Efforts will be made to ensure that a significant part of the wealth thus created is used to provide access to education and health to the needy.

### 2.4.2.3 Create key knowledge infrastructure: Develop knowledge nodes as key structuring elements of the strategy

a) The establishment of global cities of excellence in education and healthcare will be used as the building blocks to transform Kerala's economy into a knowledge-based one. As a creator of knowledge, the State will implement knowledge architecture as well as an epistemic landscape by creating universities, research institutes and centres of applied R&D to provide access to high-quality education and training for both international and domestic students, and attract foreign investment in different branches of knowledge. Tacit knowledge will be imported through the immigration of foreign talent and overseas training schemes. The State will lower barriers to knowledge flows (with the help of central government support), build an ICT backbone, increase knowledge assets, close knowledge gaps and develop a legal infrastructure that allows and encourages creative and diverse knowledge production. Key action plans are:

- (i) Promote 5 global cities within the State over the next 20 years: These global knowledge and medical hubs will attract reputed domestic and foreign service providers and universities to start campuses, research organisation and start-ups. These hubs may be benchmarked against some of the well known education cities in UAE, Singapore, Hong Kong, Malaysia, Qatar, Bahrain and South Korea; and medical hubs in Thailand, the Gulf region and South Korea. These will be knowledge hubs (not merely clusters)<sup>7</sup> with universities and colleges, research institutions, think tanks, government research agencies and knowledge-intensive firms in specified areas of knowledge. The knowledge-intensive firms will be characterised by high connectedness, high internal and external networking and knowledge sharing capabilities.

Knowledge hubs fulfil five major functions: (i) Generate knowledge and create a skilled labour force; (ii) Attract a young population from other Indian states, and also from other countries, particularly developing countries; (iii) Train a skilled labour force ready to exploit job markets in other countries; (iv) Transfer knowledge to sites of application; and (v) Transmit knowledge to other people through education and training. These cities will be leaders in knowledge dissemination and creation in the State and will attract students and experts not only from Kerala, but also from outside the State and abroad. Their locations will be in Kozhikode (education), Thrissur (education), Thiruvananthapuram (education), Palakkad (technical education) and Malappuram (health). The rationale for these locations and further details are provided in later chapters.

- (ii) Promoting specialised knowledge clusters in each district: Each district will have a small hub in a specialised knowledge domain and will be connected to the proposed global cities. These knowledge clusters will be based on the specialised knowledge that is the competitive strength of that region. For instance, Ernakulam is an industrial and business centre and can be a hub of business studies and industrial R&D. Similarly, Alappuzha is known for its ayurvedic centres; Idukki has a Veterinary and Animal Sciences University; and the Western

Ghats are rich in biodiversity and plantation crops. Further, there are seven District Institutes of Education and Training (DIETs) in the State. The best performing DIETs may be identified and promoted as centres of excellence in teachers' training. A similar exercise will be done to identify the best institutions in other branches of education. The objective is to promote the host district as a centre of excellence in the respective branch of knowledge.

- (iii) Develop world-class urban centres around knowledge infrastructure: Historically, educational institutions and hospitals have been recognised as key infrastructure in the social and economic life of the city in Kerala. Following this Kerala tradition, the government will promote smart urbanisation around its global cities and district hubs. Education and health facilities can make a major contribution to urban sustainability by virtue of their location, their interrelationships and their coordination with business investments, knowledge exchange, cultural diversity and political engagement. Further, the development of urban centres around knowledge infrastructure will introduce the design qualities and facilities associated with world-class cities. The strategic placement and development of universities, hospitals and associated facilities can focus on urban development in a way that mitigates climate change pressures and underpins the social and economic sustainability of growing urbanisation (Urbanisation strategy is discussed in detail in Chapter 15).

#### 2.4.2.4 Promote knowledge creation and diffusion

- a) The proposed transformation of the economy requires sound economic policies and institutions to encourage efficient mobilisation and allocation of resources, stimulate creativity and offer incentives for efficient knowledge creation.
  - (i) Introduce a paradigm shift in higher education services: Traditionally, higher education is a process of imparting knowledge through lectures. This makes universities knowledge dissemination centres and not knowledge creation centres. In order for an economic entity to survive in the increasingly competitive knowledge economy, it must continually create knowledge. Universities cannot be an exception. They need to be production centres of ideas and intellectual property and not of passive learning. For this strategy to be successful, students should be developed as future professionals. The prevailing 'instruction paradigm' needs to be supplanted by a new 'learning paradigm'. In the instruction paradigm, the mission of the university is to instruct students; in the learning paradigm, its mission is to produce learning in students (see Chapter 10 for more discussions and an action plan).
  - (ii) Ensure quality hospitals and medical facilities: The strategy is to create high quality hospitals and medical facilities, with a focus on patient-oriented research and ensuring high standards of health, which are a key element in promoting a knowledge economy (see Chapter 21). Medical facilities means the totality of the physical environment; the processes and practices of providing care; the diagnostics, treatment and other technologies used; the adequacy, expertise and morale of staff; and the organisational culture. International accreditations alone will not suffice. The health department will need to define specifications for a detailed benchmark to assess a healthcare organisation's claim of providing quality and satisfactory healthcare, as well as a strategic framework for those aspiring to achieve this level of excellence. These will be rigorously adhered to through strict legal enforcement.<sup>8</sup>
  - (iii) Innovation and R&D: The knowledge-based economy places great emphasis on the creation, dissemination and diffusion of information and knowledge.<sup>9</sup> Intense global competition demands constant innovation. Kerala will be strongly committed to strengthening R&D through increased national, international and private sector investments, with the emphasis on leading competencies in agriculture, industry, transport and services. Universities, research institutes and private enterprises all have an essential role to play in promoting

research that supports efforts to ensure that economic and social growth and environmental protection reinforce each other. Kerala will strengthen its base in science and technology (S&T) and R&D and become a competitive knowledge-based economy using an integrated approach — infusing greater awareness of and fostering greater appreciation for science and the teaching of science in schools and higher education; increasing S&T and R&D manpower; improving related infrastructure; strengthening existing mechanisms to support R&D and technology development; and diffusing and enhancing S&T management. The promotion of outcome oriented R&D and commercially viable innovation will help Kerala's economy improve efficiency and competitiveness, move up the value chain and compete effectively in the same product space as the advanced economies. The State will accelerate product and process innovation through its own R&D and also by participating in global R&D networks. The State has already introduced a range of initiatives to establish infrastructure and programmes for R&D. Its priority needs to be an increase in the quality of research and development, rather than just quantity. It also needs to initiate schemes to financially support highly innovative start-ups (See Chapter 11).

- (iv) Promotion of ICT: The last twenty years have seen an explosion in the application of computing and communication technology in all areas of business and community life. The central feature of the ICT revolution is its ability to store and transmit large quantities of information at very low cost and its ability to reduce asymmetries in information. An equally important feature of these technologies is their pervasiveness. Information technology is generic. It impacts every element of the economy, both goods and services, and every element of the value chain, from R&D to production, marketing and distribution. The State will take initiatives to promote the use and development of ICT in Kerala (see Chapter 4).

#### 2.4.2.5 Increase the knowledge intensity of economic activity across all sectors

- a) Another key element of the strategy will be to create a policy framework that supports the use of knowledge or science and technology as a factor that plays a leading role in the growth of all sectors. Increasing knowledge intensity involves both the increasing knowledge intensity of all economic activities and the growing importance of knowledge-intensive goods and services in the economy. Focusing on knowledge-intensive production calls for:
  - Vigorously developing high-tech industries (both in the industry and services sectors).
  - Increasing the knowledge content of all activities (including those in the primary and traditional industries and services sector).
- b) The strategy will be to move each sector from low value-adding activity to high value-adding activity by identifying the scope and areas. The focus will be on knowledge, technology and intangible assets. The shift towards sectors and activities that add high value will be instrumental in raising productivity within the economy, which will generate higher wages and have poverty reducing effects (see Chapters 3 to 9, Chapter 10, Chapter 21 for the sectoral strategic frameworks). Two key policy elements will be:
  - (i) Regional innovations systems: As production becomes more science-based, advantages such as a developed research infrastructure, a highly qualified workforce and an innovative culture become more important than natural resources. This means that a supportive environment for innovative companies will need to be created. This calls for the promotion of regional innovative clusters. Regional authorities will identify their present industrial strengths and develop a strategy to create regional innovation networks to promote clusters. Regional networks comprise many innovative firms cooperating and interacting not only with other firms such as suppliers, clients and competitors, but also with research and technology resource organisations, innovation support agencies, venture capital funds, private and public consultancy firms and local and regional government bodies. Knowledge

hubs will offer the platform to promote regional innovation systems, knowledge-intensive productive capacities and high value-added tourism in these services.

- (ii) **Organisational innovation:** A critical element of this strategy is organisational transformation in all sectors. An entrepreneurial approach will be promoted to organise, create and manage ventures to achieve economic and social change. An entrepreneurial approach means identifying possibilities to transform challenges into opportunities through creativity, innovation and market understanding via the effective management of risk to optimise outcomes for the economy. This entrepreneurial approach will be promoted not only in industry, but also to strengthen the primary, tertiary and social sectors' competitiveness and innovation. Following current global patterns, for instance, there has already been a move to corporatise cooperative societies in the form of 'producer companies' (See Chapter 5). In the future, the government will have to bring all semi-skilled services within the ambit of 'producer companies'. Corporatisation does not mean privatisation. It means a change in organisational form, with an emphasis on efficiency and competitiveness.
- (iii) **Introduction of new courses:** From a broader developmental point of view, Kerala has reached a stage where the labour force is ready to move into more skilled, technologically superior and high value-adding occupations with better wages and conditions of employment. New types of jobs will be created. Further, increasing knowledge content will change the social status of all those occupations that are currently not acceptable to a young, educated workforce. In the knowledge economy, such occupations will attract the younger generation. Plumbing, for instance, is regarded as a semi-skilled, low status service. However, it is now recognised that the value-addition done by this service can increase considerably through more, and better, training and knowledge content. Thus, newer branches of knowledge need to be identified and promoted with rigorous courses and training. Education needs to be imparted to develop students as professionals and not merely as degree holders.

#### 2.4.2.6 Promote private investment and entrepreneurship

- a) The private sector will continue to be the engine of growth in a knowledge-based economy. The government will promote investment, particularly in the private sector, for the acceleration of the productive sector. This is an essential condition for building productive capacities. This will, in turn, require enabling conditions and a focused approach to promote start-ups and small businesses. Chapter 12 is devoted to the strategic directions required to promote entrepreneurship. Chapter 9 also discusses the contribution of small businesses to growth.
- (i) **Enabling business conditions:** To promote private investment, policymakers need to examine whether the domestic economic, legal and regulatory regime creates an appropriate environment to attract private investment. For this, five interlinked and mutually reinforcing factors need to be in place:
  - Providing incentives for entrepreneurship and investment.
  - Ensuring policy stability to reduce risk and vulnerability.
  - Stable political, legal and economic institutions that create an environment where different actors involved in production work in harmony.
  - Providing good physical and social infrastructure.
  - Transparent rules and regulations and simple governance.
- (ii) **Promotion of small businesses and start-ups:** In an entrepreneurial economy, new and small enterprises are critical components. Kerala will need to benefit from building vibrant entrepreneurship environments and promoting micro, small and start-up businesses by young entrepreneurs. In order to marshal the private sector to respond with urgency, the

government will have to create greater awareness of the opportunities that will be generated. The government will create the conditions and enabling infrastructure for these changes through an appropriate, well-designed policy for this segment of business, with incentive structures redesigned to target innovative activities.

- b) To succeed and stay ahead, companies in the private sector will have to adopt best practices and set higher benchmarks than those set by the best firms in their respective industries (Details are provided in the sectoral chapters).

### 2.4.2.7 Infrastructure

Good quality infrastructure is a key ingredient of sustainable development. Kerala will need efficient transport, water and sanitation, energy and urban (and rural) development if it is to prosper, attract private investment and provide a decent standard of living for its people. Weaknesses in this area can limit growth and hamper economic activity. Kerala will also need to upgrade its ICT infrastructure (See Chapter 4 for ICT strategy) to world-class levels so it can support the rapid flow and accessibility of information within the country and across countries at competitive prices. A long-term perspective will have to be taken while planning and building the ICT infrastructure to ensure that it is state-of-the-art and can keep pace with the rapid advances expected in the sector. Strategic directions for creating good infrastructure have been provided in the respective chapters.

### 2.4.2.8 Social inclusion and justice

- a) A growing body of evidence shows that social cohesion and development are critical for societies to prosper economically and for development to be sustainable. According to these studies, social capital contributes to efficiency and growth by facilitating collaboration between individual conflicting interests towards the achievement of increased output and equitable distribution. In general, there are many technical and political difficulties in integrating the social and economic objectives of sustainable growth and in adequately addressing the intergenerational dimension of sustainable development. But it is expected that the knowledge-driven strategy will minimise the social and political costs of growth and will be in agreement with the State's socio-historical-political contexts. It will reinforce social capital by enriching the intellectual diversity and overall learning environment in Kerala. The presence of students from various regions and countries broadens the international perspective of local students and faculty and the knowledge of other countries' cultures and people, which are crucial for building trust and social networks. This will also increase diversity, increase individual choice in education, break monopolies, increase competition and even mentor local institutions, all of which will result in overall improvement in the quality and efficiency of education in the region. Faculty and student exchange programmes and movements across borders will improve the quality of institutions of higher education. Further, when trained teachers and skilled personnel move to other countries for employment, remittances will flow in. These remittances will be more stable than remittances based on the movement of unskilled workers.
- b) However, there may be negative spillovers and rising inequities due to excessive emphasis on skills and tacit human capabilities. Evidence suggests that the potential costs of increased inequalities can be very high and manifest themselves in social and political tensions, riots and the inability of societies to mobilise all available productive resources. Apart from the ethical questions involved, economic and social inequities can dampen economic growth by reducing efficiency in the use of human and physical capital. Further, a knowledge-driven strategy may not automatically ensure social inclusiveness. Tracing the history of state-society relations in Kerala shows that the State has achieved high human development by creating conditions that enabled subordinate social groups to organise in their collective

interest. The advantages of higher literacy and educational development in the State have not got translated into greater prosperity, as savings in the economy have not been turned into investment owing to the social environment. Efforts will be made to turn this state of affairs in the direction of galvanising entrepreneurial flow in society. The government will, however, ensure that the objectives of social development are integrated within the growth strategy (See Chapters 22 and 23 for detailed strategic directions). A two-pronged strategic action plan is proposed:

- (i) Targeted action: Targeted policies as well as action focused on particularly vulnerable or marginalised groups is required. The State will provide equal access to opportunities for prosperity across regions and ensure employment; social mobility; access to sanitation facilities; access to healthcare facilities; improved access to drinking water; a caring and integrated system of social services that addresses development-related social stress; and comprehensive social security systems.
- (ii) Mainstreaming social dimensions: A new understanding is emerging that to successfully address the issues of social justice and inclusion, all development policies should have social dimensions. This is known as mainstreaming social inclusion. More specifically, mainstreaming social inclusion is a process that policymakers at all levels of government and administration incorporate in the design, implementation and evaluation of all public policies. It is promoted through the participation of public bodies, social partners, NGOs and other relevant actors. Thus, every sectoral plan strategy proposed in this document has a 'social dimension' as an integral element.

#### 2.4.2.9 Mainstreaming Environment

- a) The vision is to achieve economic prosperity, which is characterised by eco-efficiency and ecosystem resilience for the benefit of future generations. Eco-efficiency means achieving economic efficiency with ecological efficiency in terms of the use of resources and generation of pollution. This has a direct implication for ecosystem resilience, which can be defined as the capacity of an ecosystem to tolerate disturbance without destabilising the environmental conditions and to adapt when necessary. The strategy of promoting a knowledge-based economy is expected to minimise the effects on environment. However, environment challenges are inevitable even with knowledge-driven growth. It will indeed accelerate land and construction activities on the one hand and the demand for other non-renewable resources on the other. The environmental impact can be minimised using a well-framed policy, which will further reinforce growth. Mainstreaming environment means that environment policies will be integrated into economic and sectoral policies to promote sustainable consumption and production patterns to reduce resource (input) use while generating greater returns from raw materials. Each sectoral strategy, therefore, has an action plan for addressing environment issues specific to that sector. What follows is a summary of the major recommendations. (Detailed strategic directions are provided in each chapter, with an overview in Chapter 17).
- (i) Clean production systems: Mainstreaming environment into economic growth will result in a shift in the economy to a clean technology paradigm to ensure sustainability. Clean production is a strategy that protects the environment by reducing waste at source and reducing the use of raw materials as a more sustainable practice for limited natural resources. For production processes, cleaner production includes:
  - Conserving raw materials and energy and eliminating toxic raw materials.
  - Reducing the quantity and toxicity of all emissions and waste before they leave a process.
  - Recycling waste to recover useful materials and/or to convert it into reusable products.

For services, it incorporates environmental concerns in designing and delivering them. In agriculture, this means adopting 'integrated farming systems' (See Chapter 5). The concept of a shift to cleaner production is thus a way towards achieving sustainable development.

- (ii) Encourage the use of green technology: Kerala should encourage the use of environment-friendly technology to promote low-pollution, energy-efficient and resource-efficient production methods that lead to greener development. Accelerating the development of green infrastructure and strengthening institutions is crucial for this. Reliable, relevant, targeted and timely environmental information is an essential element in implementing environmental policy.
- (iii) Expansion of the green economy: The aim must be to encourage new investments in a range of environment-related industries. The 'green economy' is one where policies and innovations are directed at promoting environment-related investment, production and trade. A 'green' economy can create new opportunities for investment, employment and trade in industries that produce goods and services, in sectors such as manufacturing of equipment and machines, and those that rely on renewable resources (such as recycling). Similarly, social and commercial enterprises to collect, sort, refurbish and recycle waste need to be promoted. This will generate employment and combine social and economic objectives. The strategy should be to build an international competitive advantage in what is a global sunrise industry.
- (iv) Promotion of sustainable consumption: Sustainable production must be matched by sustainable consumption. Sustainable consumption means the use of services and products that are environment friendly, use fewer resources, generate fewer toxic elements and bring a better quality of life. The government will take necessary measures to set performance standards and labelling for consumption products. Some of the good practices adopted in developed countries are: setting performance standards for products, mandatory energy efficiency rating labels, organic food labels, statutory warning on tobacco products, labelling on all pre-packaged food in the form of 'nutrition facts' panels, organic labelling, campaigns, advertising and education at the school level.

## 2.4.3 The role of government

2.4.3.1 The upshot is that the government will emerge as a major contributor to the knowledge economy. This will mean an expanded role for the government. The focus, however, will be on the provision of public goods and services rather than private goods and services.

## 2.5 Implementing strategy

2.5.1 Sustainable development is a complex task. Implementing it requires a pluralistic approach that can deal with multiple actors and multiple levels, is able to help create a common vision on sustainable development and resolve trade-offs. Implementing sustainable development, therefore, calls for a strategy that adopts key principles and creates enabling conditions.

### 2.5.2 The key principles

- a) Systems approach to planning: The new approach will be a departure from traditional methods. Too often, government departments work in silos, preparing policies independent of each other. There is little coordination between state departments, with each developing its own wide-ranging policies and targets. As a result, actions undertaken in one policy area hinder or complicate progress in another. A comprehensive, cross-sectoral approach is needed to address these challenges. The new strategy proposed here is based on

the 'systems approach to planning'. This approach requires the coordinated efforts of all government departments, production systems, communities, NGOs and people to achieve certain goals. Under this approach, no part of the system can be considered in isolation. The 'systems approach' is needed because of the complexity of the issues and opportunities facing the State. This will be a significant departure from the traditional policy framework where various strategic platforms are treated as separate domains, with their own targets and strategic frameworks. In this system, all the actors will have to coordinate their efforts and ensure the smooth flow of information between them.

- b) Coordinated action at all levels of government: In general, there is a lack of effective coordination across the various levels of government. As a result, there is often no consistency in the key choices made at different levels of government. An important principle of the Perspective Plan is "complementarity in policies at all levels of government". Implementing this plan requires a bottom-up approach with local governments playing a key role in grassroots planning and implementation. Local governments will also assume a greater share of financial responsibility for basic infrastructure and services.

**Figure 2.3**  
**Links to planning frameworks and other plans**



Source: Conceptualised by NCAER

- c) Participation by all: Implementing this strategy requires the participation of the various players that have a direct or indirect influence on the economic development process. Achieving the plan's objectives depends not only on the Government of Kerala, but also on the active involvement of other stakeholders.

### 2.5.3 Enabling conditions for the success of strategy

- a) Governance for sustainability: Good governance is a prerequisite for sustainability. In general, good governance is understood as openness and participation, accountability, effective coherence, efficiency (proportionality) and regulated flexibility. For sustainability, it also needs to ensure integration of policy considerations, evaluation of options and dealing with trade-offs. It requires political will power and strong commitment. In this context, a well-defined set of action plans are proposed:
- (i) Define the role of the government: The role of the government will be to propel the development of the knowledge-based economy. It will play both facilitative and interventionist roles. As facilitator, the government will organise negotiation processes, determine objectives,

influence motivations, set standards, perform allocation functions, monitor compliance, impose penalties, initiate and/or reduce conflict and resolve disputes among actors. It will also provide the appropriate environment and, more important, act as a catalyst for the private sector to spearhead the development of the knowledge-based economy. On the other hand, it will have to directly engage in ensuring the continued achievement of social and distributional objectives, including the critical responsibility of implementing strategies to narrow the knowledge gap. It will be responsible for better implementation and coherent integration of all three considerations across sectoral policy domains.

- (ii) **Strengthen institutions:** Under the new paradigm of qualitative growth, the essential factors of production are new ideas, transformational innovations and state-of-the-art technology that focuses on developing knowledge-intensive activities across all sectors. Appropriate conditions should be created to facilitate the shift to this growth paradigm. A more integrated and comprehensive approach will be taken in developing the institutional framework needed to create a conducive environment for the proliferation of knowledge activities and knowledge-driven economic prosperity. Since Kerala is a state, its ability to adjust institutions is limited. Yet, there is substantial scope for the State to strengthen its institutions. This can be achieved by redefining the role of government, reforming and restructuring state enterprises, developing the private sector, promoting competition and deepening reforms in the land, labour and financial markets. The government will focus on improving systems, rules, regulations and policies that increase efficiency, promote competition, facilitate specialisation, enhance the efficiency of resource allocation, protect the environment and reduce risks and uncertainties. In the enterprise sector, the focus will need to be on the reform of state enterprises (including measures to recalibrate the role of public resources and introduce modern corporate governance practices) and private sector development by changing the image of the State to an investor-friendly one with increased competition in all sectors.
- (iii) **Create a well-defined administrative set up to implement the strategy:** It is proposed to create a dedicated government entity to implement the plan. This will be an inter-departmental, inter-governmental 'coordinating committee' led by the education and health ministries with participation from:
  - The private sector and social organisations.
  - The central Ministries of Commerce and External Affairs.
- b) **Address Factor Market Rigidities<sup>10</sup>:** Well-functioning factor markets are a crucial condition for the competitiveness and growth of the economy. These markets cannot function well without proper institutions because they are not, by their nature, perfectly competitive. However, regulations and institutions affecting land, labour and capital markets may cause rigidities in the factor markets, which may have adverse effects on the implementation of development projects. In the labour market, for instance, Kerala needs to do away with certain past practices, which are no longer relevant. This is especially so considering the realities the State faces while trying to attract investment and generate employment for its vast unemployed labour force. It also needs to introduce reforms in social security instruments commensurate with the new practices adopted internationally. Further, land markets need to be overhauled to increase the efficiency of land use, and policies for acquisition of rural land for urban use must be thoroughly overhauled to facilitate investment and prevent urban sprawl. Finally, implementation of the plan will require access to adequate levels of finance. This means that innovative ways to raise capital will need to be devised to enlarge the resource base. Chapter 13 provides a detailed analysis and a strategic framework to address the issues of factor markets.

- c) Engage the diaspora: The State will identify and engage with diaspora organisations while creating development strategies. It will also set up databases where members of the diaspora can register voluntarily, and promote the building of partnerships, capacity building and the sharing of best practices at all levels. The strategic framework to engage with the diaspora is discussed further in Chapter 14.
- d) Promote entrepreneurship: Kerala's economy will be an entrepreneurial economy, which will depend on entrepreneurial initiatives to address contemporary economic problems associated with structural change, economic growth and unemployment. Entrepreneurial and managerial skills must be sharpened to handle new challenges. In this economy, encouraging knowledge-based entrepreneurship will be a policy objective. Efforts will be made to develop a sufficient number of high quality technopreneurs to drive firms. The private sector must be more willing to take risks and venture into new areas and opportunities that will be generated by the knowledge-based economy. Private companies must identify niche areas in which they see potential and build their competency to world-class standards. The private sector, including the SMEs, will have to redefine their production processes by applying appropriate and cost-efficient technology. They must also take a global view, as markets will become virtual and borderless. Traditional modes of sourcing inputs and marketing products will have to be complemented by greater use of e-trading and e-business tools. In addition, the private sector will need to create new value by developing capacity to undertake R&D, product development and innovation, as well as package, market and distribute its products efficiently and speedily.

## 2.6 Monitoring and Evaluation

2.6.1 A critical success factor for any planning exercise is a robust monitoring and evaluation system. There is, therefore, a need to create a strong monitoring system to promote transparency and accountability and facilitate regular tracking of physical and financial performance of the implementation of KPP 2030. This requires performance indicators with clearly defined targets and institutional mechanisms.

- a) Develop performance indicators supported by a database: The absence of a dedicated database for the economic sector is a major drawback in Kerala, and adversely affects policy formulation and review. Its absence also hinders attempts at inter-sectoral comparisons with related departments. Currently, several agencies have been generating databases, which are poor in quality and lack consistency over time. It is proposed that the State will have a dedicated data agency under the State Planning Board, which will be accountable for all the information required for monitoring and evaluating the plan's performance.
- b) Evaluation and monitoring mechanism: Evaluation is the systematic collection and analysis of evidence on the outcomes of programmes to make judgments about their relevance, performance and alternative ways to deliver them or to achieve the same results. It supports accountability of the government to legislature and the public in general. It informs the government about whether its programmes are producing the outcomes they were designed for, at an affordable cost, and supports policy and programme improvements by helping identify lessons learned and best practices.

2.6.2 It is proposed here that the government devise a well designed 'evaluation policy'. This will require the government to produce and table an Annual Performance Plan, including forward projections for two years, consistent with the medium-term expenditure framework period, with annual and quarterly performance targets. It will:

- Develop a framework of rules to conduct effective evaluation across state government departments and agencies.

- Identify a core set of indicators needed to monitor the performance of the plan.
- Adopt a quarterly reporting system for public and private agencies.
- Ensure that there is alignment of reporting between the Strategic Plans, Annual Performance Plans, budget documents and annual and quarterly reports.
- Adopt a system of penalties for non-accountability.

2.6.3 It is proposed that an autonomous body be set up for implementing and evaluating the Perspective Plan. This will ensure transparent, independent and effective evaluation.

## 2.7 Conclusion

2.7.1 KPP 2030 envisages that the State will cross the threshold income level of upper middle income countries by 2030 and will be on its way to achieving the economic standards of the Nordic countries. It envisages that this prosperity will be driven by sustained growth in Kerala's knowledge economy, with continuous growth in the stock of useful knowledge and the extension of its application. Further, knowledge and information will be well integrated into production processes by well-educated, skilled workers who are the main source of economic prosperity and wealth. The new strategic directions provided in this chapter ensure an internally coherent policy framework for the development plan, its implementation and monitoring and evaluation. It must be observed that the sectoral growth targets set in the document will not bring about drastic change in the broad sectoral distribution of GDP over the period of 20 years (Appendix A2.2). Two major changes at the broad sectoral levels will be:

- A sharp increase in the share of 'other services' (which includes health and education services) by over five percentage points from 10 per cent to over 15 per cent. This reflects the re-orientation that the new development strategy proposed here will entail.
- An increase in the share of manufacturing by two percentage points from 8 to 10 per cent.

2.7.2 The knowledge-driven sustainable development strategy proposed here aims at achieving a coordinated growth process across all sectors, in which each sector of the economy is upgraded in terms of value addition and knowledge content. This growth process will thus have a tremendous implication for intra-sectoral transformation of the economy and will power it to a new knowledge paradigm.

2.7.3 To some extent, Kerala has already begun to move in the direction of a knowledge economy. A new policy direction for the next five years has been elaborated in the Approach Paper to the State's 12th Five Year Plan and other policy documents. KPP 2030 is the first step in a longer-term shift in Kerala's development strategy and will strengthen the state government's broader policy approach.

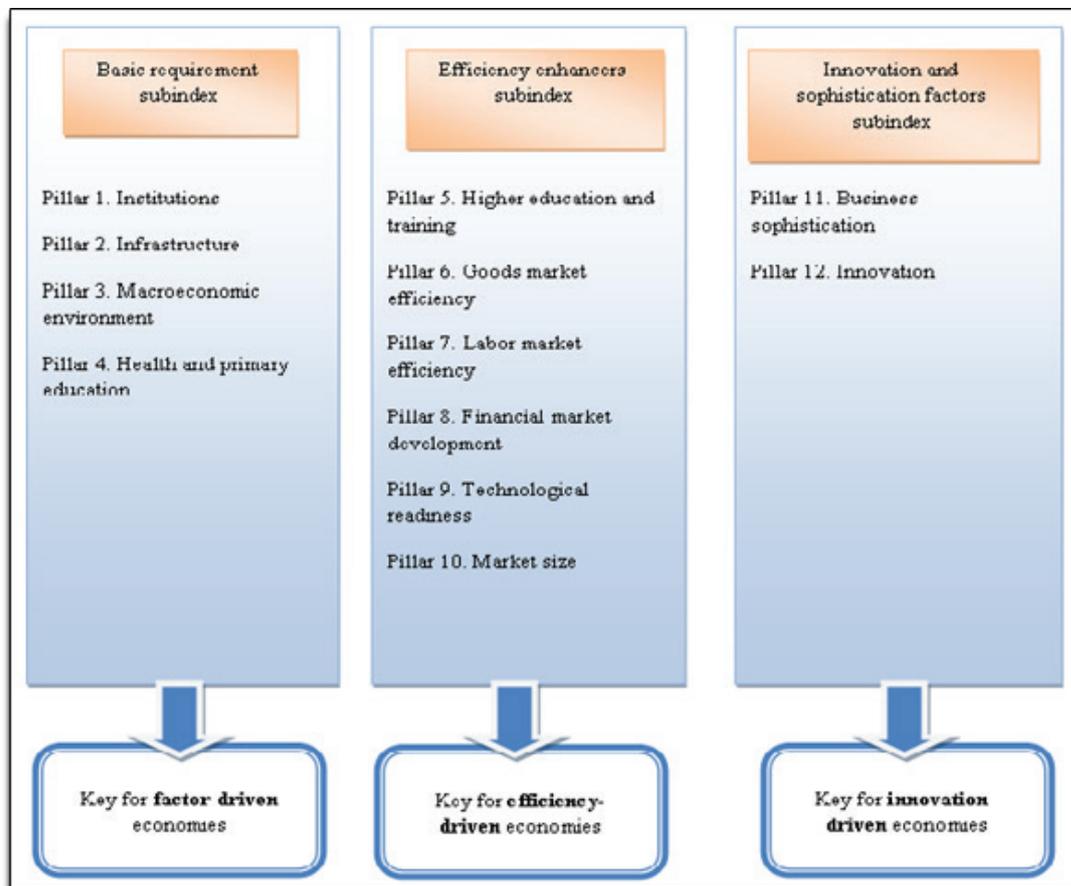
## APPENDIX A 2.1

### International indicators of sustainable development

#### A2.1.1 Global Competitiveness Index (GCI)

- Since 2005, the World Economic Forum has based its competitiveness analysis on the Global Competitiveness Index (GCI), a comprehensive tool that measures the microeconomic and macroeconomic foundations of national competitiveness.
- They define competitiveness as the set of institutions, policies and factors that determine the level of productivity of a country. The level of productivity, in turn, sets the level of prosperity that can be earned by an economy. The productivity level also determines the rates of return obtained by investments in an economy, which in turn are the fundamental drivers of its growth rates. In other words, a more competitive economy is one that is likely to sustain growth.
- The components of the GCI are grouped into 12 pillars of competitiveness (Figure A2.1). The rankings of the Nordic countries and India are shown in Table A2.1.

**Figure A2.1**  
**Global Competitiveness Index**



**Table A2.1**  
**The Global Competitiveness Index 2012–2013 Rankings**

Countries	Rank	Score
Finland	3	5.55
Sweden	4	5.53
Denmark	12	5.29
Norway	15	5.27
Iceland	30	4.74
India	59	4.32

Source: *The Global Competitiveness Report 2012–2013*

### A2.1.2 Knowledge Economy Index (KEI)

- a) The KEI is based on a simple average of four sub-indices, which represent the four pillars of the knowledge economy:
- Incentive and Institutional Regime (EIR)
  - Innovation and Technological Adoption
  - Education and Training
  - Information and Communication Technology (ICT) Infrastructure
- b) Among 146 countries, Sweden retains its first-place position as the world's most advanced knowledge economy, with a 2012 KEI of 9.43. Sweden is especially strong in innovation and ICT, ranking second for both pillars. In the education pillar, however, it falls to sixth place from third place in 2000 (Table A2.2). Sweden's competitiveness in the ICT pillar is largely attributable to an increase in Internet users. Sweden is also remarkably strong in all the innovation indicators: royalty payments and receipts, science and engineering (S&E) journal articles, and patents. Compared to 2000, Finland jumped six positions to second place in 2012 (KEI 9.33) because of improvements in the EIR, education and ICT pillars. Its strongest performance was in innovation and EIR, for which it ranks in the top three. Denmark made impressive improvement in the EIR pillar, rising eight positions to third place between 2000 and 2012. However, its ICT pillar ranking dropped 10 places to 13, because of a relatively weak showing in telephone and computer penetration. Norway rose by two places in the KEI, which is attributable to its progress in the EIR pillar, up five positions from 2000, but its innovation and ICT pillar ranking of 17 is the weakest among the Nordic countries.

**Table A2.2**  
**Knowledge Economy Index 2012 Rankings**

Countries	Rank	Score
Sweden	1	9.43
Finland	2	9.33
Denmark	3	9.16
Norway	5	9.11
Iceland	16	8.62
India	110	3.06

Source : KAM 2012 ([www.worldbank.org/kam](http://www.worldbank.org/kam))

### A2.1.3 Corruption Perceptions Index/ Transparency Index 2012

Corruption destroys lives and communities and undermines countries and institutions. It generates popular movements that threaten to further destabilise societies and exacerbate violent conflicts. The Corruption Perceptions Index (TI) scores countries on a scale from 0 (highly corrupt) to 100 (very clean). While no country has a perfect score, two-thirds of the 176 countries examined score below 50, indicating a serious corruption problem (Table A2.3). The TI results demonstrate that there are still many societies and governments that need to give a much higher priority to this issue.

**Table A2.3**  
**The Corruption Perceptions Index/ Transparency Index 2012**

Countries	Rank	Score
Denmark	1	90
Finland	1	90
Sweden	4	88
Norway	7	85
Iceland	11	82
India	94	36

Source: Transparency International Web site  
<http://www.transparency.org/cpi2012/results>

### A2.1.4 The Human Development Index

First calculated in 1990, the Human Development Index (HDI) developed by the United Nations Development Programme (UNDP) is a comparative measure of three dimensions — health, education and living standards. Over the past decades, countries across the world have been converging towards higher levels of human development. The index covers 186 countries. Table A2.4 shows the top ranking of the Nordic countries. There are various forms of this index like the inequality adjusted HDI and gender inequality index to capture other dimensions of the quality of life not captured by the standard HDI (discussed next). The 2013 report identifies four specific focus areas to sustain development momentum: enhancing equity, including on the gender dimension; enabling greater voice and participation of citizens, including youth; confronting environmental pressures; and managing demographic change.

**Table A2.4**  
**Human Development Index 2012**

Countries	Score	Rank
Norway	0.955	1
Sweden	0.916	7
Iceland	0.906	13
Denmark	0.901	15
Finland	0.892	21
India	0.554	136

Source: Human Development Report 2013, UNDP

### A2.1.5 The Gender Inequality Index

The Gender Inequality Index (GII) is a new index for measuring gender disparity, which was introduced in the Human Development Report's 20th anniversary edition in 2010. According to the UNDP, this index is a composite measure which captures the loss of achievement, within a country due to gender inequality and uses three dimensions to do so: reproductive health, empowerment and labour market participation. Table A2.5 shows the top rankings of the Nordic countries.

**Table A2.5**  
**The Gender Inequality Index 2012**

Countries	Score	Rank
Sweden	0.055	2
Denmark	0.057	3
Norway	0.065	5
Finland	0.075	6
Iceland	0.089	10
India	0.61	132

Source: *Human Development Report 2013, UNDP*

### A2.1.6 The Environment Performance Index (EPI)

The 2012 EPI and Pilot Trend EPI build on a historical time series that, for the first time, allows countries to track environmental performance over the past decade. For each country and indicator, a proximity-to-target value is calculated based on the gap between a country's current results and the policy target. The Nordic countries score at the top in this index (Table A2.6).

**Table A2. 6**  
**Environment Performance Index**

Country	EPI Rank
Norway	3
Sweden	9
Iceland	13
Finland	19
Denmark	21
India	125

Source: <http://epi.yale.edu/downloads>, Accessed on 2nd June, 2013

### A2.1.7 The Prosperity Index

The Prosperity Index is the only global measurement of national success based on both income and well-being. Econometric analysis has identified 89 variables, which are spread across eight sub-indices. By measuring prosperity holistically they are able to identify and analyse the specific factors that contribute to the success of a country (Table A2.7).

**Table A2.7**  
**The Legatum Prosperity Index, 2012**

Country	Legatum Prosperity Index
Norway	1
Denmark	2
Sweden	3
Finland	7
Iceland	15
India	101

Source: *www.prosperity.com, Legatum Institute*

### A2.1.8 The Networked Readiness Index

- The Networked Readiness Index, calculated by the World Economic Forum and INSEAD, ranks 144 economies based on their capacity to exploit the opportunities offered by the digital age. This capacity is determined by the quality of the regulatory, business and innovation environments; the degree of preparedness; the actual usage of ICTs, as well as the societal and economic impacts of ICTs. The assessment is based on a broad range of indicators from Internet access and adult literacy to mobile phone subscriptions and the availability of venture capital. In addition, indicators such as patent applications and e-government services gauge the social and economic impact of digitisation.
- The Nordic countries and the so-called Asian Tigers — Singapore; Taiwan (China); South Korea; and Hong Kong SAR — dominate the 2013 index thanks to their business-friendly approach, highly skilled population and investments in infrastructure, among other strengths (Table A2.8).

**Table A2.8**  
**The Networked Readiness Index 2013**

Countries	Score	Rank
Finland	5.98	1
Sweden	5.91	3
Norway	5.66	5
Denmark	5.58	8
Iceland	5.31	17
India	3.88	68

Source: *The Global Information Technology Report 2013*

## APPENDIX A2.2

### Economic growth in Kerala: The Perspective Plan scenario

A2.2.1 The Perspective Plan is intended to design strategies that will enable Kerala to sustain its growth trajectory of 7–8 per cent per year over the period 2010–2030. The principal components of the plan are:

A2.2.2 First, new growth drivers must be found in health, education and innovation. Consequently, the ‘other services’ sector which is a ‘driven’ sector must become a ‘driver’ with the share of GDP in the sector growing to match that of the developed countries by 2040. This would translate into GDP in this sector growing at about 10 per cent per year. Second, goods producing sectors (agriculture, forestry, fisheries and manufacturing) cannot be allowed to languish and by measures elaborated in the sectoral chapters, they must achieve decent growth rates. Third, the construction sector will be re-oriented towards infrastructure, particularly urban infrastructure, and will maintain a rapid rate of growth even with a decline in the growth rate of remittances. Fourth, migration and tourism will maintain robustness by going up the value chain and becoming more diversified geographically.

A2.2.3 Sector-specific chapters will mention the specific measures that are required to be taken in order to achieve high growth rates. However, a model building exercise helps in articulating the implications of the Perspective Plan strategy in terms of GDP growth, sectoral shares in GDP, employment level and its sectoral shares, investment requirements and their sectoral distribution.

A2.2.4 The model building exercise in this context first required assumptions regarding the growth rate of ‘drivers’. In the preferred/perspective plan scenario all the drivers are expected to grow at a rapid rate (Table A2.9). Agriculture and allied sectors are expected to grow, on an average, around 2.6 per cent throughout the perspective plan period (2012–30). Similarly, manufacturing and construction are expected to grow at an average of around 9 per cent during the same period. Furthermore, with sector-specific measures outlined in the plan, communication is expected to grow at around 7.5 per cent, banking at 8.5 per cent and public administration at 6.5 per cent during perspective plan period.

**Table A2.9**  
**Preferred Scenario Drivers Assumptions: 2012–2031 – CAGR (%) of GDP**

Year	2012–16	2017–21	2022–26	2027–31
Agriculture, Forestry and Fishing	3.0	3.0	2.5	1.8
Mining & Quarrying	6.0	5.0	4.0	3.0
Manufacturing	8.0	10.0	9.5	8.5
Construction	8.0	10.0	9.5	8.5
Communication	9.0	8.0	7.0	6.0
Banking & Insurance	8.0	9.0	9.0	8.0
Public Administration	8.0	7.0	6.0	5.0
Other Services	11.0	11.0	9.0	9.0

*Note: CAGR is the Compound Annual Growth rate*

*Source: NCAER*

A2.2.5 It is to be noted, as outlined in the section on the perspective plan’s mission, that health and education will be growth drivers for Kerala’s economy. ‘Other services’ (which include health and education services), that were previously included in the growth driven sectors are now included as

growth drivers. Other services are expected to grow at around 10 per cent throughout the perspective plan period. This reflects the re-orientation that a switch to a knowledge economy will entail.

A2.2.6 The revised regression with other services as drivers is as follows:

Growth driven=0.93 Growth drivers R-squared=0.76

[SE (.13), t Statistic=7.0, P value=0.00]

A2.2.7 The elasticity of GDP growth of 'driven' on 'drivers' has increased by 0.1; that is from 0.92 to 0.93.

A2.2.8 It means that a one per cent increase in growth of drivers leads to 0.93 per cent growth in the driven sector. R square has increased to 0.76 per cent, which validates the new relationship between driven and drivers. These regression results are further used to make GDP projections for the perspective plan scenario. Hence, the resultant GDP growth scenario in sectors and in total is presented in Tables A2.10 and A2.11 respectively.

**Table A2.10**  
**Sectoral shares – Perspective Plan Scenario: 2012–2031 (%)**

Industry of Origin /Year	2012	2016	2021	2026	2031
Agriculture	7.43	5.84	4.25	3.18	2.44
Forestry & Logging	1.21	1.05	0.82	0.65	0.50
Fishing	0.91	0.78	0.61	0.47	0.35
Mining & Quarrying	0.47	0.44	0.37	0.30	0.24
Manufacturing	8.28	8.35	8.87	9.47	9.88
Construction	10.70	10.79	11.47	12.24	12.77
Communication	7.89	8.25	8.00	7.61	7.06
Banking & Insurance	7.22	7.28	7.39	7.71	7.86
Public Administration	4.48	4.52	4.18	3.79	3.36
Other Services	11.05	12.43	13.82	14.41	15.39
Electricity, Gas and Water supply	0.98	0.85	0.69	0.57	0.48
Railways	0.48	0.51	0.55	0.60	0.64
Transport by other means	7.69	7.70	7.70	7.71	7.71
Storage	0.05	0.05	0.05	0.05	0.05
Trade, Hotels & Restaurants	18.96	18.98	19.00	19.02	19.03
Industry of Origin /Year	2012	2016	2021	2026	2031
Real estate ownership, Business, Legal	12.20	12.21	12.23	12.24	12.24

Source: NCAER

**Table A2.11**  
**CAGR of GDP in Perspective Plan Scenario: 2012–16 to 2027–2031 (%)**

Year	2012–16	2017–21	2022–26	2027–31	2012–2030
Plan Wise Growth rate (Average)	7.6	8.5	7.9	7.4	7.8

Source: NCAER

A2.2.9 Some noteworthy observations regarding the sectoral changes during 2012–31 are to be emphasised:

- a) First, despite the proposed promotion of the agricultural sector, the share of agriculture goes down from about 7.5 per cent in 2012 to about 2.4 per cent in 2031, which is close to what occurs in most developed countries. This has important implication about the pace of urbanisation in Kerala.
- b) Second, with the benefit of promotional measures, the share of manufacturing increases from about 8 per cent in 2012 to 10 per cent in 2031. This will be close to the present day figure for developed countries. However, the share of the goods sector remains low. Kerala becomes a service economy more than ever.
- c) Third, the share of 'other services', which includes health and education, increases from about 11 per cent in 2012 to 15 per cent in 2031.
- d) Fourth, the shares of trade, hotels and restaurants, as well as real estate and so on remain large and stable at about 31 per cent. Tourism, perhaps combined with medical tourism, remains an important source of income.
- e) Overall, due to acceleration provided in each of the sectors, the aggregate GDP growth will increase from 7.6 per cent in the next plan period to 8.5 per cent in 2017–21. On an average, GDP growth will revolve around 7.8 per cent in entire perspective plan period (2012–30).

## APPENDIX A2.3

### Indicators of a Knowledge Economy

Category	Indicators
OVERALL PERFORMANCE OF THE ECONOMY	Average Annual Gross Domestic Product (GDP) Growth, Gross Domestic Product (GDP) Per Capita Gross Domestic Product (GDP) Human Development Index (HDI) Multidimensional Poverty Index Gender Inequality Index Seats in Parliament Held by Women (as % of total) Composite Risk Rating
THE ECONOMIC REGIME	Gross Capital Formation as % of GDP (Average) Trade as % of GDP Tariff & Nontariff Barriers Soundness of Banks Exports of Goods and Services as % of GDP Interest Rate Spread (lending rate minus deposit rate) Intensity of Local Competition Domestic Credit to Private Sector (% of GDP) Cost to Register a Business (% of GNI per capita) Days Required to Start a Business Cost to Enforce a Contract (% of debt)
GOVERNANCE	Regulatory Quality Rule of Law Government Effectiveness Voice and Accountability Political Stability Control of Corruption Press Freedom
THE INNOVATION SYSTEM	FDI Outflows as % of GDP FDI Inflows as % of GDP Royalty and License Fees Payments Royalty and License Fees Payments Per Million population Royalty and License Fees Receipts Royalty and License Fees Receipts Per Million Population Royalty and License Fees Payments and Receipts Royalty and License Fees Payments and Receipts Per Million Population Science and Engineering Enrolment Ratio Researchers in R&D Researchers in R&D Per Million Population Total Expenditure for R&D as % of GDP Manufacturing Trade as Percentage of GDP University-Company Research Collaboration, Scientific and Technical Journal Articles Scientific and Technical Journal Articles Per Million Population Availability of Venture Capital Patent Applications Granted by the United States Patent Trade Office (USPTO) Patent Applications Granted by the USPTO Per Million People High-Technology Exports as % of Manufactured Exports Private Sector Spending on R&D Firm-Level Technology Absorption

Category	Indicators
	Value Chain Breadth Capital Goods Gross Imports (% of GDP) Capital Goods Gross Exports (% of GDP) S&E articles with foreign co-authorship (%) Average number of citations per Science and Engineering (S&E) article Intellectual Property Protection
EDUCATION	Adult Literacy Rate (% age 15 and above) Average Years of Schooling Average Years of Schooling, female Secondary Enrolment (% gross) Tertiary Enrolment (% gross) Life Expectancy at Birth Internet Access in Schools Public Spending on Education as % of GDP 4th Grade Achievement in Mathematics 4th Grade Achievement in Science 8th Grade Achievement in Mathematics 8th Grade Achievement in Science, Quality of Science and Math Education Quality of Management Education 15-year-olds' math literacy 15-year-olds' science literacy School Enrolment, Secondary, Female (% gross) School Enrolment, Tertiary, Female (% gross) No Schooling, total No Schooling, female Secondary School completion, total (% of pop 15+) Secondary School completion, female (% of pop 15+) Tertiary School completion, total (% of pop 15+) Tertiary School completion, female (% of pop 15+)
LABOUR	Unemployment Rate (% of total labour force) Unemployment Rate, male (% of male labour force) Unemployment Rate, female (% of female labour force) Employment in Industry (% of total employment) Employment in Services (% of total employment) Professional and Technical Workers as % of the Labour Force Extent of Staff Training Brain Drain Cooperation in labour-employer relations Flexibility of wage determination Pay and productivity Reliance on professional management Local availability of specialized research and training services Difficulty of hiring index Rigidity of hours index Difficulty of Redundancy index Redundancy costs Labour tax and contributions (%) Employment to population ratio, 15+, total (%) Employment to population ratio, 15+, male (%) Employment to population ratio, 15+, female (%) Employment to population ratio, ages 15–24, total (%) Employment to population ratio, ages 15–24, male (%)

Category	Indicators
	Value Chain Breadth Capital Goods Gross Imports (% of GDP) Capital Goods Gross Exports (% of GDP) S&E articles with foreign co-authorship (%) Average number of citations per Science and Engineering (S&E) article Intellectual Property Protection Employment to population ratio, ages 15–24, female (%) Employment to population ratio, Total, 25+ (%) Employment to population ratio, Male, 25+ (%) Employment to population ratio, Female, 25+ (%) Unemployment with tertiary education, total (% of total unemployment) Unemployment with secondary education, total (% of total unemployment) Labour force participation rate, 15+ Labour force participation rate, Male, 15+ Labour force participation rate, Female, 15+ Labour force participation rate, total, 15-24 Labour force participation rate, Male, 15-24 Labour force participation rate, Female, 15-24 Labour force participation rate, total 15-64 Labour force participation rate, Male, 15-64 Labour force participation rate, Female, 15-64 Labour force participation rate, total, 65+ Labour force participation rate, Male, 65+ Labour force participation rate, Female, 65+ Youth unemployment rate, total Youth unemployment rate, Male Youth unemployment rate, Female Adult unemployment rate, total Adult unemployment rate, Male Adult unemployment rate, Female Share of youth unemployment in total unemployment, total Share of youth unemployment in total unemployment, Male Share of youth unemployment in total unemployment, Female Long-term unemployment, total, 25+ Long-term unemployment, Male, 25+ Long-term unemployment, Female, 25+ Labour force with tertiary education (% of total) Labour force with secondary education (% of total) Firms offering formal training (% of firms) Females in Labour Force (% of total labour force)
INFORMATION AND COMMUNICATION TECHNOLOGY	Telephones Per 1,000 People Telephone Mainlines Per 1,000 People, Mobile Phones Per 1,000 People Computers Per 1,000 Persons TV Households with Television, Daily Newspapers Per 1,000 People International Internet Bandwidth (bits per person) Internet Users Per 1,000 people Fixed broadband Internet access tariff (US\$ per month) Availability of e-Government Services Government Online Service Index ICT Expenditure as % of GDP

## Reference

- <sup>1</sup> *The World Business Council for Sustainable Development (WBCSD) describes eco-efficiency as a management strategy of doing more with less. In practice, eco-efficiency is achieved through the pursuit of three core objectives: (i) increasing product or service value; (ii) optimising the use of resources; and, (iii) reducing environmental impact. (Industry Canada website: [http://www.ic.gc.ca/eic/site/ee-ee.nsf/eng/h\\_ef00010.html](http://www.ic.gc.ca/eic/site/ee-ee.nsf/eng/h_ef00010.html))*
- <sup>2</sup> *Purchasing power parities (PPPs) are indicators of price level differences across countries. They indicate how many currency units a particular quantity of goods and services costs in different countries ([http://epp.eurostat.ec.europa.eu/portal/page/portal/purchasing\\_power\\_parity/introduction](http://epp.eurostat.ec.europa.eu/portal/page/portal/purchasing_power_parity/introduction)).*
- <sup>3</sup> *'Factors of production' is an economic term to describe the inputs that are used in the production of goods or services. Typically the factors of production include land, labour, capital and entrepreneurship. (<http://www.investopedia.com/terms/f/factors-production.asp>).*
- <sup>4</sup> *Development of the new model will upgrade the quality of education and health being provided to people living in Kerala. For example, domestic students will choose to stay in the state because it will offer world-class education. Further, by staying in Kerala students will get exposure to best of minds from around the world. Development of knowledge inside the state may help in coming up with innovative solutions for both the emerging problems and future challenges in local communities. Therefore, the new model is not exclusive but expansionary. <http://www.patientsbeyondborders.com/medical-tourism-statistics-facts>*
- <sup>6</sup> *Tilak, B.G. 2011. Trade in Higher Education: The Role of General Agreement on Trade in Services. UNESCO International Institute for Education Planning, Paris.*
- <sup>7</sup> *A cluster is characterised by geographic proximity of firms, and research and academic institutions. The hub is a cluster along with with networking and knowledge sharing capabilities of the institutions.*
- <sup>8</sup> *Kizer, K.W.2010.. What Is a World-Class Medical Facility? American Journal of Medical Quality. Online. First, published on February 9, 2010.*
- <sup>9</sup> *Focus on S&T does not mean that social sciences or humanities will be ignored. Rather innovative skills of S&T students will be enhanced by taking classes from other disciplines. A great example is of Steve Jobs, founder of Apple computers. "Steve Jobs, who was neither a computer programmer nor a hardware engineer, famously told graduates of Stanford University in 2005 that one of the most influential and lasting experiences in his brief tenure at Reed College was his dabbling in calligraphy. "It was beautiful, historical, artistically subtle in a way that science can't capture, and I found it fascinating," Jobs said. "None of this had even a hope of any practical application in my life." Ten years later, his knowledge of serif and sans serif typefaces came rushing back to him as he designed the first Mac. If he had never dropped in on that calligraphy class, Jobs said, "personal computers might not have the wonderful typography that they do. Knowledge of history, literature, music, philosophy teaches students to be creative, critical thinkers gives them a broad base of historical knowledge to rely upon when solving problems and equips them with the tools to continue assimilating new knowledge throughout the courses of their lives."*  
*Gentile, S.N.. 2011. Is a liberal arts degree worth it?. October 27.Can be assessed on [www.pbs.org](http://www.pbs.org)*
- <sup>10</sup> *Factors of Production are the inputs. Factors of production is an economic term to describe the inputs that are used in the production of goods or services. Typically, the factors of production include land, labour, capital and entrepreneurship. (<http://www.investopedia.com/terms/f/factors-production.asp>). The markets for these factors of production called factor markets are similar to markets for goods and services. They differ from goods and services markets in one important way i.e. demand for a factor of production is derived demand i.e. firm's demand for a factor of production is derived from its decision to supply a good in another market. (<http://www.econ.uiuc.edu/~seppala/econ102/lect16.pdf>)*

# SUSTAINABLE TOURISM





## Sustainable Tourism

### 3.1 Economic Benefits and Costs of Tourism

3.1.1 Travel and tourism is the world's largest industry and creator of jobs across national and regional economies. In 2012,<sup>1</sup> the industry generated, directly and indirectly, 9.2 per cent of the global GDP and nearly 261 million jobs worldwide. By 2030, it is expected to increase to 12.9 per cent and 389 million respectively. Jobs generated by travel and tourism are spread across the economy — in retail, construction, manufacturing and telecommunications, as well as directly in travel and tourism. It, thus, plays an important role in driving growth and bringing about economic prosperity. It has great strategic importance for Kerala's economy due to its capacity for wealth-generation and job-creation.

### 3.2 Tourism in Kerala

3.2.1 Kerala has pristine beaches, backwaters, wetlands, biodiversity hot spots and cultural heritage sites all lying within easy reach of one another. For the State extends for only about 600 km north to south and varies in width from 35 to 120 km on the east-west axis. These advantages notwithstanding, Kerala largely ignored its tourism potential for a major part of the 20th century and was a relatively unknown destination. However, great strides have been made since 1986 when, realising its economic potential, the Government of Kerala declared tourism an industry. In 1995, the state government announced a comprehensive tourism policy underpinning public-private partnership for the development of tourism infrastructure, tourism products, human resources and marketing. Thus, began the saga of tourism in Kerala and within a decade the State established a global brand and the number of foreign tourist arrivals has been doubling every six years since then.

3.2.2 In 2001, the government unveiled the 'Tourism Vision 2025' document. It aimed at developing Kerala as an 'upmarket, high-quality tourist destination' through optimal utilisation of resources. The focus was on conserving and preserving heritage, enhancing productivity and income and creating employment opportunities, thereby making tourism the most important sector for the socio-economic development of the State. It called for the withdrawal of the government from directly running tourism business activities, and focused on encouraging investment in a more open and competitive environment.

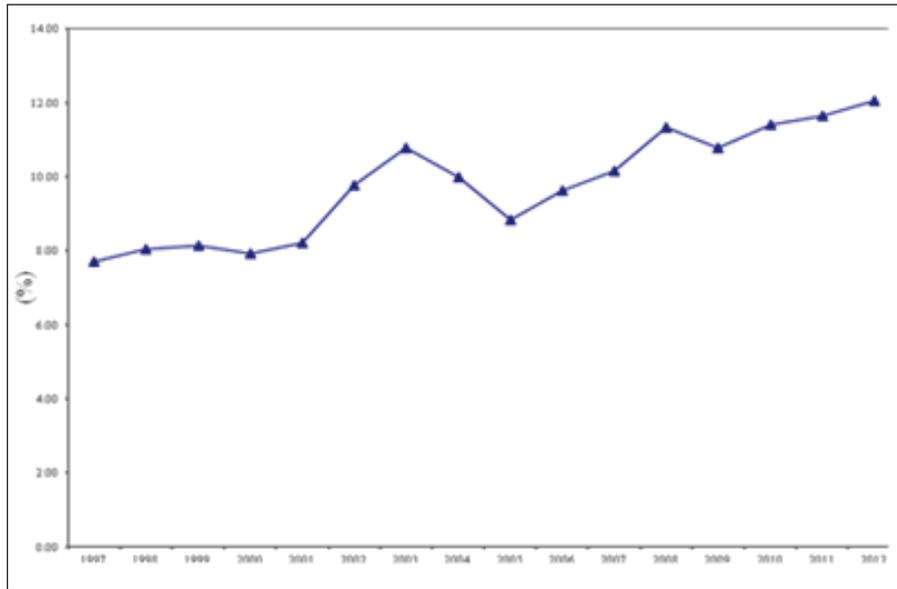
### 3.3 Achievements

#### Rapid growth in tourist arrivals

3.3.1 Over the past one-and-a-half decades, the total number of tourist arrivals in Kerala increased sharply. Between 1997 and 2011, it more than doubled from 51 lakh to 121 lakh, registering an annual increase of 9.3 per cent per annum. While the number of domestic tourists increased from

49.5 lakh to over 93 lakh, that of foreign tourists increased several times from 1.8 lakh to 7.3 lakh. It is significant that Kerala has been able to capture an increasing percentage of the national pie in foreign tourist arrivals (Figure 3.1). Its share of India's foreign tourist arrivals has grown from less than 8 per cent in 1997 to 12.1 per cent in 2012. Clearly, foreign tourist inflow has been growing at a faster rate in Kerala than at the national level.

**Figure 3.1**  
**Share of Kerala in National Foreign Tourist Arrival (%): 1997–2012**



Sources: Department of Tourism. 2011 and previous reports. *Tourism Statistics*. Government of Kerala. State Planning Board. 2000. *Economic Review 1999*. Government of Kerala and Market Research Division, Ministry of Tourism. 2013. *Indian Tourism Statistics at a Glance 2012*. Government of India. July.

3.3.2 Notably, the share of foreign tourists in total tourist arrivals in Kerala has been rising, while at the national level the share of foreign tourists in the total has been declining (Figure 3.2). In 2011, Kerala was ranked 8th in the number of foreign tourist visits in India. In 2011, Kerala's foreign exchange earnings from tourism were Rs 4,222 crore while the total revenue generated by tourism was Rs 19,037 crore. This trend is expected to continue in the future as well. The Kerala Tourism Policy 2012 targets an annual growth rate of 15 per cent in foreign tourist arrivals and expects 30 lakh international tourists to visit Kerala in 2021. On the domestic front, the policy looks to achieve an annual growth rate of 7 per cent for the next decade, with a target of 180 lakh domestic tourists a year by 2021.

### Kerala tourism is relatively more stable

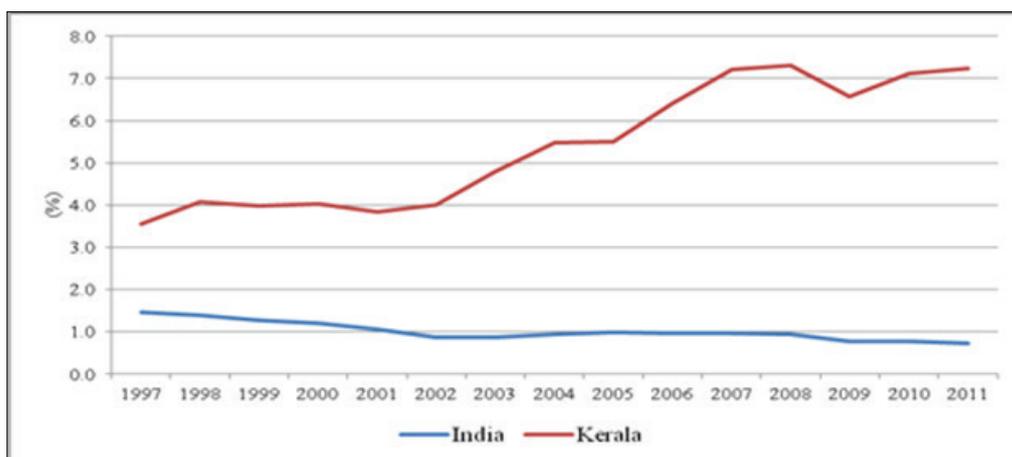
3.3.3 The flow of tourists into Kerala is relatively more stable than that at the national level. While the coefficient of variation is 54 per cent at the all India level, it is a mere 25 per cent for Kerala. This could entirely be attributed to the stability in domestic tourist arrivals as most domestic tourism originates within Kerala and is triggered by social and religious motives. Foreign tourist arrivals in Kerala are more volatile than domestic tourist arrivals; it is even more volatile than foreign tourist arrivals at the national level. This could be because most foreign tourist traffic to Kerala originates in Europe and is vulnerable to economic shocks in the European countries, especially in recent years.

## Awards won

3.3.4 Kerala has won national and international acclaim for its achievements in tourism. The State's accolades include:

- The best tourism state award of the Government of India for several years.
- The most eco-friendly organisation award.
- Acclaim from *National Geographic Traveller* magazine as one of the '10 paradises of the world' and one of the '50 must-see destinations of a lifetime'.
- International awards for its Responsible Tourism initiative.
- The national award for best tourism Web site for deploying the latest advances in information technology for marketing.

**Figure 3.2**  
Share of Foreign Tourists in Total Tourist Flow (%): 1997–2011



Sources: Department of Economics and Statistics. 2009. *Statistics for Planning 2009*. Government of Kerala and Department of Tourism. 2011 and previous reports. *Tourism Statistics*. Government of Kerala.

## 3.4 Economic Contribution of Tourism in Kerala

3.4.1 Tourism is an aggregation of travel, accommodation, restaurants, local purchases and so on. Its economic impact, however, is much greater, since many inputs are needed in order to produce tourism and leisure services. In broad terms, the economic impact of tourism has been defined under three categories — direct impact, indirect impact and induced impact.<sup>2</sup> The total impact is the sum of the three.

3.4.2 A global analysis of the contribution of the tourism industry to national value added or GDP shows that the countries where tourism sector contributes more than 50 per cent of GDP are Macao, Aruba, Antigua and Barbuda, British Virgin Islands, Anguilla, Seychelles and Vanuatu.<sup>3</sup> In absolute terms, the US is ranked number one. The sector contributed US\$1,348.2 billion (or 8.6 per cent of GDP) in 2012. In the case of India, tourism contributes 6.6 per cent of GDP, equivalent to US\$119.4 billion.

3.4.3 The direct and indirect contribution of tourism to Gross Value Added (GVA) and employment in Kerala in 2009-12, as calculated by the NCAER (2012) using the Tourism Satellite Accounts (TSA), are given in Tables 3.1 and 3.2. The direct contribution of tourism to Kerala's GVA was Rs 11,308 crore, which was 4.7 per cent of GVA. The total impact of tourism on GVA in Kerala was equivalent to 9.52 per cent of GVA in 2009-12 (Table 3.1). It is important to note that in terms of value added, tourism will have overtaken the stagnant agriculture sector in the State by 2014.

**Table 3.1**  
**Contribution of Tourism in GVA of Kerala: 2009-12**

Share in GVA (%)			
Country/state	Direct Impact	Indirect + Induced Impact	Total Impact
India	3.8	3.2	7.0
Kerala	4.7	4.8	9.5

Source: NCAER. 2012. *Regional Tourism Satellite Account for Kerala and Madhya Pradesh 2009-10*. Study Commissioned by the Ministry of Tourism, Government of India.

3.4.4 With respect to employment, the study found that the sector generated over 14 lakh jobs. This means that the direct contribution of the tourism sector to the total number of jobs in Kerala was 9.9 per cent in 2009-12. The total number of jobs created directly and indirectly by the sector turned out to be 23.52 per cent of the total employment in Kerala. Thus, in terms of employment generation, tourism has emerged as one of the largest economic activities in the State with significant backward linkages.

**Table 3.2**  
**Contribution of Tourism to Total Employment between 2009 and 2012**

Share in Total Employment (%)			
Country/state	Direct impact	Indirect impact + Induced	Total impact
India	4.4	5.8	10.2
Kerala	9.9	13.6	23.5

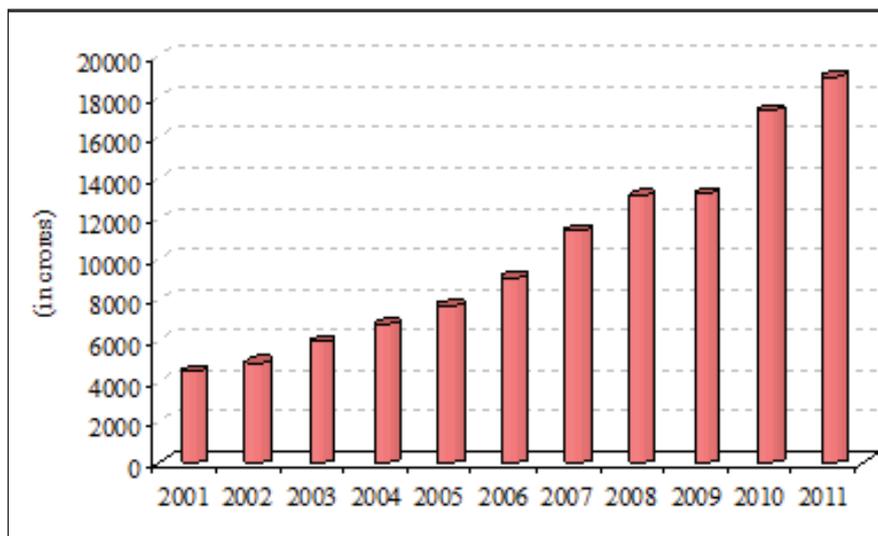
Source: NCAER. 2012. *Regional Tourism Satellite Account for Kerala and Madhya Pradesh 2009-10*. Study Commissioned by the Ministry of Tourism, Government of India.

3.4.5 This is the first ever attempt to use the Tourism Satellite Account (TSA) to estimate the size of the tourism sector in Kerala. In 2003, the World Travel and Tourism Council (WTTC) used an expenditure-based approach to show that travel and tourism accounted for 7.7 per cent of the total economy and generated employment for 10 lakh people, which was 6.2 per cent of total employment (less than its share in GSDP).<sup>4</sup>

## Revenue earnings from tourism

3.4.6 The total revenue generated from tourism (direct and indirect) in Kerala increased sharply from Rs 4,500 crore in 2001 to Rs 19,037 crore in 2011, registering a compound annual growth rate (CAGR) of 15.5 per cent in total tourism receipts in Kerala (Figure 3.3).

**Figure 3.3**  
**Total Revenue Generated from Tourism (Direct & Indirect) (Rs crore): 2001–2011**

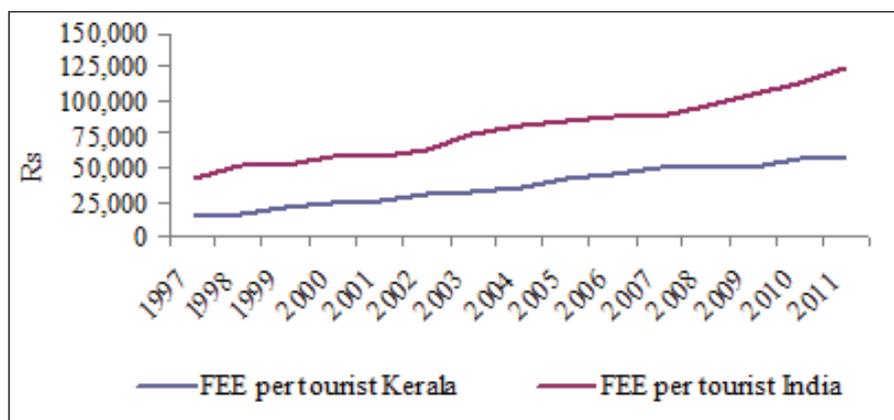


Source: Department of Tourism. 2011 and previous reports. Tourism Statistics. Government of Kerala.

## Foreign exchange earnings

3.4.7 Kerala recorded total foreign exchange earnings (FEE) of Rs 273 crore in 1997, which increased to Rs 4,222 crore in 2011, registering a compound annual growth rate of 21.6 per cent.<sup>5</sup> In 2011, total FEE were 22.2 per cent of the total earnings from tourism. This large increase in FEE has been supported by a significant increase in foreign tourist visits to Kerala. However, the share of foreign exchange receipts in total receipts is less than the corresponding share in total foreign tourist flow (Figure 3.4). While the foreign exchange earning per tourist has been increasing in nominal terms in India, Kerala's FEE per tourist is less than the national average and the differential has been growing. In 2011, it was almost half the national average.

**Figure 3.4**  
**Foreign Exchange Earnings (FEE) per tourist of Kerala and India (Rs): 1997–2011**



Sources: Department of Economics and Statistics. 2009. Statistics for Planning 2009. Government of Kerala and Department of Tourism. 2011 and previous reports. Tourism Statistics. Government of Kerala.

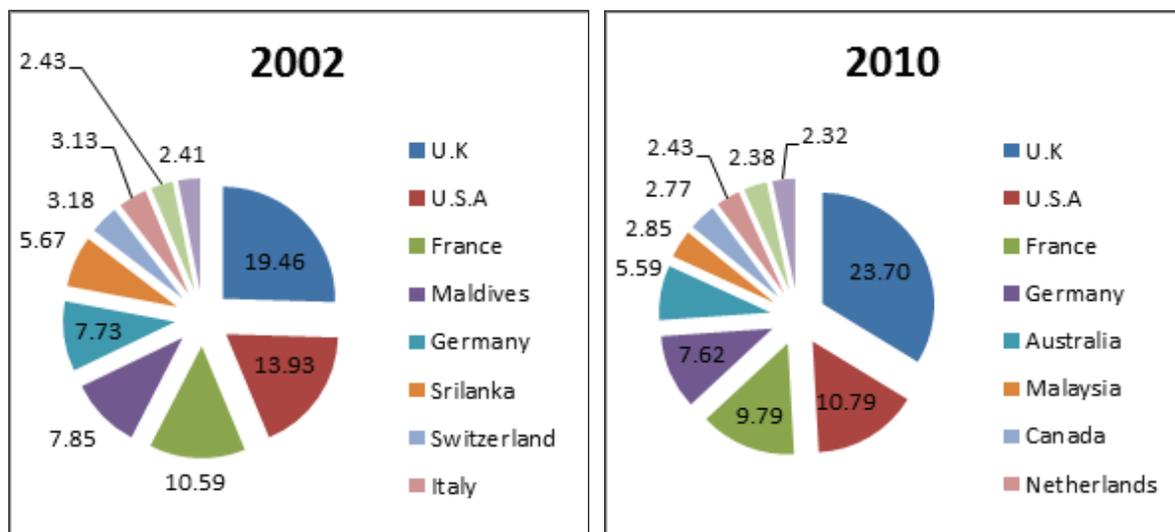
## 3.5 Regional Dimensions of Tourism

### Limited source markets

3.5.1 Kerala's tourism sector is dependent on visitors from a handful of countries, with the top ten accounting for over 70 per cent of the total tourist flow (Figure 3.5). At the national level it is slightly above 62 per cent. The foreign tourists who visit Kerala mainly come from European countries, the US, Canada and Australia. In 2010, a majority of the foreign tourists in Kerala came from the UK (23.7 per cent) and the U.S (10.8 per cent), followed by France (9.8 per cent), Germany (7.6 per cent), Australia (5.6 per cent) and Canada (2.8 per cent); together accounting for 60.3 per cent of the foreign tourists in Kerala. Among the top ten countries, five are from Europe — UK, France, Germany, Netherlands and Italy. These countries account for 45 per cent of the total inflow. At the national level, however, only two European countries figure in the top ten, and they account for a mere 21 per cent of the total tourist flow. Kerala does not seem to be popular with tourists from Asian countries. Only Malaysia and the UAE figure among the top 12, accounting for 5 per cent of tourist arrivals.

3.5.2 Over time, there has been some diversification in tourist arrivals. The share of the top 12 countries has declined from over 76 per cent in 2002 to 70 per cent in 2012. However, the share of the European countries in the top 10 has remained almost constant. The high number of foreign tourist arrivals from a few source markets, may be viewed in two ways. First, it could be indicative of very high brand recall, with revisits at periodical intervals as well as word of mouth communication about the brand. Such a view would suggest the success of Kerala Tourism in building a strong global brand. Another way of looking at the reliance on a few countries is to say that Kerala has not been able to diversify, which could be a problem in case of a severe shock in any of these countries. The arrivals will fall and it could be distressing to the sector. But with a high rate of growth in tourist arrivals, the first view is likely to carry more weight.

**Figure 3.5**  
**Distribution (%) of Foreign Tourist Visits to Kerala by Nation: 2002 and 2010**



Source: Department of Tourism. 2011 and previous reports. Tourism Statistics. Government of Kerala.

**Table 3.3**  
**Distribution of Domestic Tourist Visits to Kerala by State of Origin: 2010**

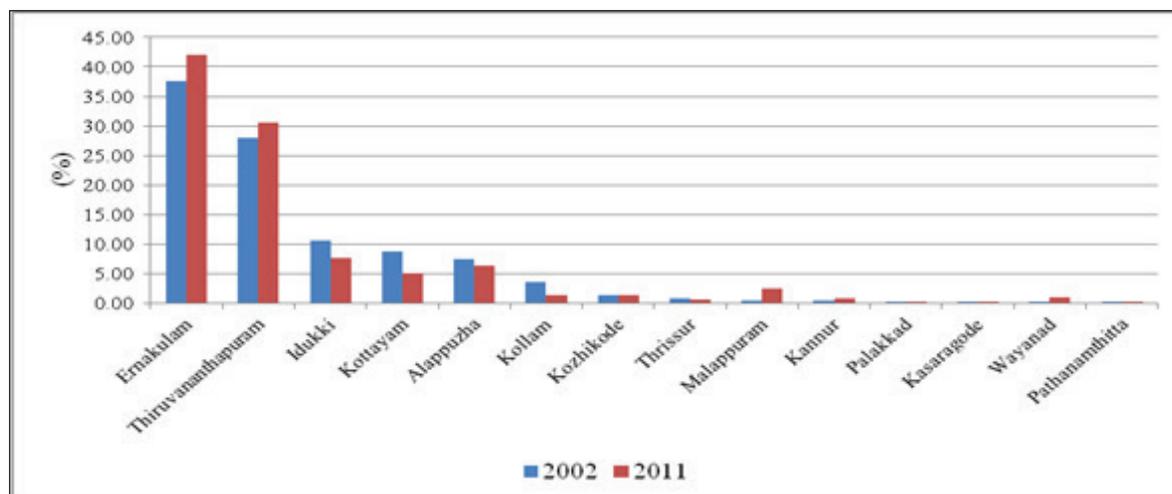
State/UT	Domestic Tourist Visits (Lakh)	Share (%)
Kerala	61.1	71.03
Tamil Nadu	11.2	13.02
Karnataka	5.5	6.5
Maharashtra	2.9	3.4
Andhra Pradesh	1.7	2
Delhi	1.3	1.5
Total	86	97.3

Source: Department of Tourism. Tourism Statistics 2011. Government of Kerala

## Highly skewed inter-regional tourist arrivals

3.5.4 Foreign tourist arrivals vary significantly across the districts (Figure 3.6). In 2011, a fairly high proportion of foreign tourists preferred to visit Ernakulam (42.1 per cent) followed by Thiruvananthapuram (30.6 per cent), Idukki (7.6 per cent), Alappuzha (6.3 per cent) and Kottayam (5.1 per cent). These five districts together accounted for 91.7 per cent of foreign tourist arrivals in Kerala. During the same year, a majority of domestic tourists preferred to visit Ernakulam (23.1 per cent), followed by Thrissur (22 per cent), Thiruvananthapuram (13.7 per cent), Kozhikode (6.9 per cent), Idukki (5.4 per cent) and Kannur (5.2 per cent).

**Figure 3.6**  
**Distribution of Foreign Tourist Arrivals (FTA) by District: 2002 and 2011**

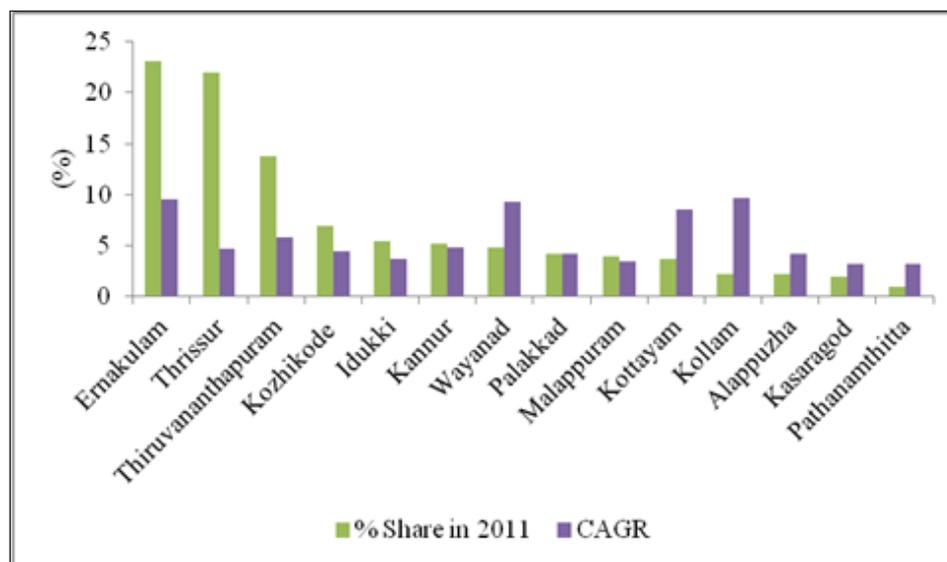


Source: Department of Tourism. 2011 and previous reports. Tourism Statistics. Government of Kerala.

3.5.5 The fairly high concentration of tourist visits to a few districts of the State is on account of the high concentration of infrastructure in these districts. While Ernakulam is the commercial capital of Kerala, Thiruvananthapuram is the political capital. Both are among the most developed regions. Alappuzha and Kottayam are among the middle income districts. They are famous for their beaches and backwaters. Idukki, which attracts tourists for wildlife sanctuaries and forest walks, is a relatively

backward district, but has well developed tourist infrastructure. Of the 413 homestays in Kerala in 2012, 111 were in Idukki, followed by Ernakulam (71), Alappuzha (70) and Kottayam (62). These homestays are regarded as one of the major attractions for foreign tourists. The flow of domestic tourists is relatively more evenly distributed across the other districts of Kerala, when compared to the foreign tourist arrivals (Figure 3.7).

**Figure 3.7**  
District-wise Share (%) in 2011 and CAGR of Domestic Tourists during the period 2002 and 2011 (%)



Source: Department of Tourism. 2011 and previous reports. Tourism Statistics. Government of Kerala.

## Medical tourism

3.5.6 Kerala is one of India's popular destinations for medical tourism. The tourism department does not publish any regular database on medical tourism. Table 3.5 presents an indicative pattern of the arrival of medical tourists in the State. Kerala seems to attract medical tourists from different parts of the world. Ayurvedic treatment is popular with tourists from Germany, France, Switzerland and the US. Modern medical treatment also attracts tourists, mainly from West Asia, the UK, Germany and the US. Building the ayurveda tourism brand has attracted foreign tourists to visit Kerala regularly.

**Table 3.4**  
Medical Tourists from Different Countries to Kerala (%)

Alternative Medicine		Modern Medicine	
Germany	22.2	Middle East	26.4
France	13.1	UK	18.41
Switzerland	12.8	Germany	13.4
USA	12.9	USA	12.4
UK	7.2	Maldives	11.4
Italy	7.2	France	7.3
Russia	6.7	Australia	3.5
Middle East	6.3	Spain	2.4

Denmark	5.0	Switzerland	2.4
Japan	4.6	East Africa	1.8
Spain	1.6	Kenya	.24
Kenya	0.42		

*Note: The paper does not mention the year the survey was carried out.*  
*Source: Cherukara, J.M. and Manalel, J. 2008. Medical tourism in Kerala: challenges and scope. Proceedings of the Conference on Tourism in India Challenges Ahead. 15–17 May 2008. IIML. 369–379.*

3.5.7 Overall, Kerala has become one of India’s best performers when it comes to attracting foreign tourists. This has much to do with the State’s success in establishing a global tourism brand — ‘God’s Own Country’. The State has seen its share of foreign tourists rise rapidly. While the proportion of repeat visits is high, the bulk of the tourists arrive from a few countries. Whereas the numbers have been increasing, tourist visits are largely confined to just five districts and mostly to a few selected sites. Kerala’s approach to tourism development and the practices followed could be taken as a model for emulation by others.

## 3.6 Marketing and Promotion

### The Beginning

3.6.1 Kerala initiated tourism development in a small way by establishing an international beach resort in Kovalam in 1976 with the patronage of the central government. It took another ten years for the State to declare tourism an industry. The first tourism policy of the State was announced in 1995, underlining the importance of public-private partnership. And within the span of a decade, Kerala succeeded in establishing its tourism brand in the international market. Tourism in Kerala has come a long way since then, capturing new markets with its innovative products and marketing strategies. From hardly 50,000 foreign tourist arrivals and 0.13 billion rupees as foreign exchange in 1986, it has reached a status of 0.6 million foreign tourist arrivals and 37.97 billion rupees as foreign exchange in 2010. How did Kerala achieve this?

3.6.2 In the words of the WTTC, the State’s tourism policy (1995) was the basis for much of its progress whether in terms of infrastructure and product development or tourism performance. Kerala’s Tourism Policy 1995 stated that its main aim was “to serve as a guiding force to make maximum use of Kerala’s tourism potential and also to make it an ideal instrument of social and economic growth.”

### Effective marketing

3.6.3 Kerala’s striking achievement in tourism has been its effectiveness in marketing the State abroad through focused marketing and promotion efforts. The highlights of Kerala’s marketing strategy have been: the State’s focus on target international markets; initiating focused marketing efforts directed at the media and tour operators in select markets; and direct interaction with the key international players on home ground through initiatives such as the Kerala Travel Mart (KTM). At the KTM, the State hosts tour operators and media from select international markets, while buyers and sellers directly interact to close deals and packages.

3.6.4 In 2000, the first KTM was held in the State as a buyer-seller meet for the tourism trade. It was attended by 350 buyers and 150 sellers. At this mart, Kerala formally launched its iconic

slogan — ‘Kerala–God’s Own Country’ — to create a strong international brand. The branding of the tourism industry in Kerala has contributed to its success and placed it on the global tourism map. The brand ‘God’s Own Country’ has become popular around the world. Kerala is regarded as one of the destinations with the highest brand recall and has been named as one of the ‘ten paradises of the world’ by *National Geographic Traveller* magazine. The seventh edition of the KTM in 2012 witnessed participation from 48 countries, with over 2,000 buyers and over 400 sellers. The brand has gained in strength over the years.

3.6.5 Kerala has relentlessly marketed itself as a quality brand to the rest of the world. Beginning with its immensely successful slogan ‘God’s Own Country’, the State has continued to make rigorous efforts to build and sustain its image in the world tourism market. Some of the key aspects of this brand building have been the development and supply of quality promotional material, an advertising focus on some markets and participation in international fairs. Kerala Tourism also conducts roadshows in select new markets to widen the tourism base.

3.6.6 In addition to formal marketing and promotional efforts, Kerala Tourism has explored all avenues to place the State on an international and global platform, especially by organising the KTM where buyers and sellers are brought together. KTM, formed as a society in 2000 with all players (tour operators, travel agents, airlines, hotels) as members, is an occasion where ‘buyers’ (international tour operators and the media) are hosted. It is an international forum for tourism buyers and tourism sellers (resort owners and the state) to meet in dynamic sessions where destinations are discussed and packages finalised.

## Information dissemination and IT

3.6.7 Along with marketing and promotion, core information dissemination also forms an important part of creating awareness about Kerala Tourism and the products offered. Kerala Tourism’s attractive and dynamic official Web site uses IT and its various applications in tourism promotion. Launched on 24 December 1998, it has won critical and popular acclaim as a premier tourism site. Very quickly, it came to be recognised as ‘one of the 10 best Indian sites’; it provides extensive information on Kerala and tourism in the State.

3.6.8 As far as information dissemination is concerned, Kerala has not gone for random dissemination. The State is extremely focused in where, how and to whom it gives information. The marketing agencies of the State maintain personal and direct relationships with international tour operators, integrating relationships built during international and domestic trade shows and travel marts. It is a key strategy of the State that information dissemination is focused and specifically targets the selected market and segment.

3.6.9 Information and awareness on the products, culture and heritage of Kerala is also spread through fairs and festivals, most of which are linked to Kerala’s key religious, historical and cultural events. Kathakali, Kerala’s celebrated dance form; Kalaripayattu, Kerala’s martial art form; the Alappuzha boat race; the Thrissur Pooram festival; and the Onam festival are some mediums for communicating Kerala’s culture and heritage to the national and international communities.

3.6.10 Primary surveys show that the source of tourists’ ‘first awareness’ of Kerala is clearly word of mouth — especially good feedback about the experience in Kerala from friends and relatives. Hence, there is ‘positive’ word of mouth endorsement of Kerala Tourism.

## 3.7 Accommodation as an Experience

3.7.1 Tourists look for comfortable accommodation and all conveniences while travelling. Kerala has addressed this dimension by providing high quality service, clean food, good ambience, comfort and value for money. Kerala’s greatest innovation in tourism is the range and quality of accommodation

provided to tourists. It ranges from 5-star to 1-star to heritage hotels. In addition to classified and formal hotels, Kerala has popularised the concept of individual 'bed and breakfast' called 'homestays', where homes are converted into tourist accommodation with all facilities and conveniences. This has enabled the State to provide quick accommodation in places where demand exists, but formal hotels may take time to come up. They also provide the tourist a first-hand experience of Kerala's heritage and culture. Homestays and 'bed and breakfast' have come to be recognised as low environment impact accommodation the world over.

3.7.2 Certain aspects of tourist accommodation in Kerala are distinct and emerge from the policy consciously followed by the State. In most destinations of Kerala, accommodation is synonymous with the 'experience' and not just with the provision of convenient rooms with various facilities. Accommodation may mean being afloat on a houseboat cruising the backwaters, undergoing a complete rejuvenation ayurvedic package or staying in cottages by a lagoon. In all cases, the accommodation is related to the 'experience' provided and goes beyond the room and the facilities that come with it. Often, lack of conventional facilities and conveniences (TV in the room, newspapers, air-conditioning) are projected as the greatest assets of the accommodation, adding to the 'holistic' experience of the stay.

3.7.3 Kerala has consciously followed a policy of boldly pricing its accommodation high, duly matching the price with quality. The reason behind this was to relate pricing to the 'experience' rather than to the conventional facilities provided. Across Kerala, most hotels and resorts are priced in dollars, with pricing related to accommodation in Europe and Asia, rather than to the rest of India.

## Safety and security

3.7.4 Kerala has accorded top priority to ensuring the security of visitors, both foreign and domestic. This effort is, perhaps, reflected in the fact that while 2002 saw a dip in tourist arrivals for India as a whole following the 9/11 disaster, Kerala's tourism arrivals saw an increase. An exclusive group of trained individuals, assigned the task of providing a feeling of security to foreign and domestic travellers, is considered an imperative for promoting tourism. The Department of Tourism, together with the police department, has ensured deployment of officers and personnel to serve as tourist police. They are found in all important tourist locations in the State.

3.7.5 The State's tourism strategy may be described as a 'private sector-led growth strategy'. This describes, quite precisely, one of the vital features of tourism development in Kerala. From the time the Kerala government recognised the importance of tourism by declaring it an industry in the mid-1980s, to the announcement of the first tourism policy in 1995 and thereafter, the government has closely involved the private sector in all its planning and decision-making efforts. The involvement of the private sector is ensured through its presence in all committees and decision-making bodies. All tourism platforms in the State — whether on policy, promotion, marketing or product development — have private sector participation, in tandem with the government. The private sector also participates equally and visibly on all government-led platforms, be it delegations to overseas trade fairs and festivals, hosting of promotional events, roadshows or trade meets.

3.7.6 The Kerala model of tourism development 'allows the professional to lead the way', respecting the expertise brought in by the private sector. The government plays a predominantly 'facilitating and catalytic role', focusing on policy and promotion, while the private sector is predominantly involved in product development and positioning.

## International cooperation

3.7.7 Kerala has initiated certain key measures for international cooperation, which have resulted in significant gains to the State in terms of international recognition and positioning. The World Travel

and Tourism Council (WTTC) is a global forum for travel and tourism, with its activities directed towards assisting travel and tourism flourish globally in a sustainable manner, benefiting all stakeholders. Kerala is the first state in India, and the world, to become a 'partner state' to the WTTC. Kerala Tourism also shares an active and on-going relationship with the Pacific Asia Travel Association (PATA), a grouping of regional stakeholders.

3.7.8 WTTC's 'Kerala Declaration' ensured for Kerala the support of the international body towards: providing support to devise a marketing brand for the State; promoting it as a high-quality destination; developing supportive infrastructure to sustain tourism; removing barriers, stimulating tourism growth and assisting liberalisation; promoting a responsible industry that is the employer of choice and is welcomed by host communities; engendering an economically, culturally and environmentally sustainable industry; and making the most of emerging technology and communication.

## Quality assurance

3.7.9 Kerala Tourism has focused on human resources as the 'hospitality face' of the host country. The State ensures proper quality control of its human resources through certification, education and regular training. Kerala Tourism has put in place certifications for its key tourism products — houseboats, ayurveda and hotels — to ensure that the tourist receives products that are acceptable, uniform and adhere to certain basic standards.

3.7.10 Considering the sustainability of its unique tourism product — the houseboat — and the fragile backwater environment, Kerala Tourism has instituted an approval scheme for these boats. This covers the quality of the houseboats: material used for their construction, facilities offered by them, the quality of furniture, services and safety and security measures. They are awarded 'gold star' or 'silver star' certification depending on the optional conditions they satisfy, in addition to the essential conditions which all of them have to meet. In addition, they can also obtain certification for environment-friendly practices in their operations. Specifications for obtaining this certification mainly include non-discharge of solid waste and sewage directly into the water; alternative arrangements for disposal of solid waste and sewage; and use of environment-friendly material.

3.7.11 Another product unique to Kerala is the ayurvedic rejuvenation centre. A classification scheme for ayurveda centres, whether established in hotels, resorts or hospitals, has been developed early on in the State. The quality, safety and service standards of the ayurvedic centres is evaluated in terms of the authenticity of the treatment provided, training of the staff, the conveniences and amenities and the quality of furniture. The classification scheme contains 15 essential conditions and six optional conditions.

## Tourism training institutions

3.7.12 Kerala Institute of Travel and Tourism Studies (KITTS), established in 1988, offers post-graduate programmes in tourism and travel studies and also conducts a wide range of training programmes to help enhance the skills of personnel in various tourist destinations, as well as to benefit the industry. The main objective of the institute is to create a visitor-friendly attitude among the public and all those who come into contact with tourists.

3.7.13 The Kerala Institute of Hospitality Management Studies is also active in tourism education. The institute offers courses in food production, food and beverage service, accommodation operations, front office operations and so on. It conducts training programmes for guesthouse managers, homestay owners, tourist police, tourist taxi drivers and other groups who come into contact with tourists on a continuous basis.

3.7.14 There are numerous other self-financing institutes running courses on travel and tourism, hotel management and catering.

## 3.8 Private Sector at the Centre

3.8.1 Private sector enterprises have been at the centre of tourism development in Kerala. The government has played the role of a facilitator and regulator. Incentives to the private sector in tourism have taken the form of investment subsidy of various forms, special incentive for waste management, package of incentives for foreign direct investment in tourism and so on.

3.8.2 A land bank scheme for private participation in tourism was initiated early on with the objective of identifying land along the beaches, backwaters, hill stations and heritage sites. An attractive land lease policy for resort development was also framed.

3.8.3 Often, what comes in the way of enterprise development are the various approvals from government departments. To ease approval processes and save time and money, Kerala instituted a single window system to clear tourism projects. It constituted a state-level committee, headed by the Chief Secretary, to aid tourism projects and to issue necessary clearances within a clear time frame for major tourism projects coming up in the State.

### Product development

3.8.4 Among the reasons for the success of tourism in Kerala are the unique product development initiatives taken early on. In product development, Kerala has focused on its areas of strength and core competence, actively seeking products that are distinct to the State and not easily found elsewhere. Backwaters, spice centres and ayurveda may be mentioned here, as well as some of the unique eco-tourism projects.

3.8.5 Kerala's backwaters are distinct and accordingly, the State focused on this product, augmenting the backwaters with the 'houseboat' concept, based on the Kerala tradition. To ensure the sustainability of this unique tourism product and the fragile backwater environment, Kerala Tourism, in addition to encouraging investment in accommodation, took various measures such as deepening and dredging its inland waterways to ensure that the backwaters remain clean, deep and distinct. It introduced strict environmental measures for houseboat owners and operators, including the 'Green Palm' certification to prevent degradation of the backwaters and to encourage houseboats to accept environment-friendly practices.

3.8.6 Kerala has a long tradition of ayurveda and society has strived to maintain its authenticity. The traditional medical system of Kerala was positioned internationally for rejuvenating as well as therapeutic purposes. Indeed, ayurveda alone, where long-term treatment is often demanded, has succeeded in increasing the international tourists' length of stay. By positioning ayurveda as a 'monsoon' therapy (traditionally recommended during the monsoon season) the State has also ensured strong tourist arrivals during one of the most difficult seasons in Kerala. To ensure sustainability of this traditional offering, Kerala Tourism has introduced the 'Green Leaf' and 'Olive Leaf' certification of ayurveda centres through evaluation of the authenticity of the treatment provided and safety and service standards.

3.8.7 Lack of infrastructure in the State was converted into a strength. While tourism infrastructure has been a success story, core infrastructure in terms of roads and linkages has been a weak link in Kerala's tourism story. However, as expressed by senior officials and private sector participants, Kerala "never allowed drawbacks in infrastructure to stand in the way of tourism development." What the State lacked in core infrastructure "was made up in product development and positioning."

3.8.8 Many of the projects in Kerala (Coconut Lagoon, for instance) projected the very lack of infrastructure as strengths. 'No direct road access', 'no TV in the room' and 'no newspapers' were highlighted in promotional material, stressing on 'only nature' as the offering. This has been the innovative strength of Kerala's tourism sector (see Box 3.1).

### Box No 3.1 Coconut Lagoon

Coconut Lagoon was one of the earliest projects implemented in Kumarakom, a largely rural locale with a population dependant on fishing and farming. The project used local material and local labour and also employed local people after completion. Coconut Lagoon was conceived as an eco-tourism/rural tourism project based on active experience of nature and culture. Community participation was part of the experience as tourists staying in Coconut Lagoon were taken to the local farm to experience daily life. Local fisher folk too benefited as their boats and services were used for cruises and boat rides. Kumarakom has become one of the most sought after destinations, with land prices rising and tourists from all over the world visiting.

*Source: Government of India. Kerala's Approach to Tourism Development: A Case Study, Ministry of Tourism and Culture, n d*

3.8.9 WTTC in its report stated: "Kerala needs to strengthen its overall infrastructure significantly, not only in terms of tourism but for the general economic development."

3.8.10 Kerala's immensely rich classical and folk art forms, culture and heritage date back over a thousand years. Kerala Tourism focused on branding these through national and international campaigns, as recommended by the WTTC in its report. A major heritage conservation project was implemented in Fort Kochi to conserve and preserve the Fort Kochi Heritage Zone. This project won the international PATA Gold Award for the Best Heritage Project. Other heritage projects taken up include restoration of the Hill Palace, Napier Museum, Vallakkadavu, Fort Area, Mattancherry, the second phase of development of Fort Kochi and development of the Chennamangalam heritage village.

## 3.9 Responsible Tourism

3.9.1 In 2007, the Kerala government adopted Responsible Tourism (RT) as the bedrock of its tourism policy and chose Kumarakom, Kovalam, Wayanad and Thekkady as pilot destinations for implementing the concept. Responsible Tourism "is about creating better places for people to live in and better places for people to visit," and aims at minimising negative economic, environment and social impacts (Francis and Goodwin, 2003<sup>6</sup>). The objective was to promote community engagement in tourism planning and programmes. The community engagement came through creation of micro enterprises, undertaking group farming and setting up of ethnic restaurants run by women from BPL families. The initiative has been supported by strong policy interventions that aligned incentives and subsidies within the RT framework. The tourism policy, thus, gradually evolved into the more inclusive and integrated concept of sustainable tourism. The recent Tourism Policy 2012 reinforces the need to have a sustainable development strategy to promote tourism.

3.9.2 Economic responsibility in simple terms may be defined as: Assess economic impacts before developing tourism and exercise preference for those forms of development that benefit local communities and minimise negative impacts on local livelihoods (for example through loss of access to resources), recognising that tourism may not always be the most appropriate form of local economic development.

3.9.3 Social responsibility is about assessing social impacts throughout the life cycle of the operation — including the planning and design phases of projects — in order to minimise negative impacts and maximise positive ones. The endeavour is to make tourism an inclusive social experience and to ensure that there is access for all, particularly vulnerable and disadvantaged communities and individuals.

3.9.4 Environmental responsibility may be defined as: Assess environmental impacts throughout the life cycle of tourist establishments and operations — including the planning and design phase — and ensure that negative impacts are reduced to the minimum while maximising positive ones. The principles to be followed are: use resources sustainably, reduce waste and overconsumption and manage natural diversity sustainably. The mutual accord between the local community, the tourism industry and local self-government (LSG) acts as a key success factor for destination development. This is the lesson from Kerala's RT initiative.

3.9.5 After five years of experiments and experiences of implementing Responsible Tourism, Kumarakom emerged as the most viable and replicable model (Box 3.2). A key learning was that as a mediator and facilitator, LSG's such as panchayats play a decisive role in the success of all kind of projects, especially in the robustness of industry-community partnership. Unless LSGs and the local community take ownership of RT, it will not accomplish its targets. Having acquired this learning, the Government of Kerala is now planning to replicate this model in other destinations.

### **Box No 3.2**

#### **Kerala Honoured for its Achievements in Responsible Tourism**

Last week (third week of January 2014) Kerala won the prestigious UNWTO Ulysses Award for Innovation in Public Policy and Governance, the highest honour given to government bodies for shaping global tourism policies through innovative initiatives. Now in its tenth year, the UNWTO Ulysses Awards celebrate outstanding contributions in the field of tourism across the globe. As UNWTO Secretary-General Taleb Rifai said last week: "The UNWTO Awards represent our belief that knowledge plays a central role in tourism and it is through innovation and the application of knowledge that we can advance towards a more sustainable and competitive tourism sector in line with the principles of our Global Code of Ethics."

"Kerala, a popular eco-tourism destination, portrays responsible and sustainable tourism in an exceptional manner," the UNWTO Secretary-General, said at the awards ceremony. "This recognition conferred upon the State is a great step towards creating a better understanding among other destinations of the principles we stand for," he added, wishing Kerala Tourism "continued success". The Kumarakom initiative has previously won the National Award for Best Rural Tourism Project in March last year and the PATA Grand Award for Environment.

Kerala Tourism was awarded for its path-breaking Responsible Tourism project in Kumarakom, where the department has demonstrated leadership in working with business and the communities to make 'better places for people to live in and better places for people to visit'. Their initiative has successfully linked the local community with accommodation providers, encouraging the creation of local employment and local sourcing of goods and services for the industry in Kumarakom. The Department of Tourism in Kerala has successfully established a model, which has empowered the local community to secure development and to manage the environmental impact of tourism on the farming land and the Vembanad lake, the largest freshwater lake in Kerala, heavily trafficked by houseboats.

*Source: Professor Harold Goodwin's blog, posted 28 January 2014*

3.9.6 A strong LSG is essential to bring the voiceless to the fore of society. Local government is at the forefront from the very beginning to facilitate the task of economic linkages, including identification of farmers, ensuring the availability of experts on crop management, arrangement of crop loans and insurance, leadership in liaison with hoteliers, monitoring the activities of the price fixing committee and quality assurance committee and so on. Ownership, accountability and transparency of LSGs made the process more participatory, and this good governance approach, if extended to all sections of society, ensures the development process is inclusive, equitable and sustainable.

3.9.7 Tourism is an economic activity where location, nature, culture and heritage can be turned into productive resources. Kerala, with an innovative and focused public-private partnership, succeeded in building a unique Kerala brand of tourism, which attracts visitors from all over the world, pushing up the State's share of foreign tourist arrivals in India. Because tourism resources are destructible, sustainability of economic activity hinges on the conservation and regeneration of these resources. Here too, Kerala took the approach of Responsible Tourism, which has been recognised recently with the UNWTO Ulysses Award. Overall, tourism in Kerala has emerged as an innovation-embracing sector continuously setting higher benchmarks.

## 3.10 The Challenges

3.10.1 Like any other product, tourism products in Kerala, developed as innovative creations founded on location, nature and culture and commanding premium prices, will see imitators and challenges. Kerala is already facing issues such as violation of norms in the tourism sector, which adversely impacts destinations. Regulatory mechanisms seem to be failing, chipping away at the foundations on which the brand has been built. Sustainable tourism, tourism carrying capacity and violations of coastal zone regulations are all issues in this context.

### Sustainable tourism

3.10.2 Tourism, embodied in the framework of sustainable development, can build a bridge between economic development and environment and help make a vital contribution to a better quality of life. Sustainable tourism (ST) should be the final aim of any niche tourism market. Every aspect of tourism moving towards the effective implementation of a sustainable strategy may be defined as sustainable tourism.

3.10.3 The essential components of sustainable tourism have been summarised by the National Geographic Society as follows. Sustainable tourism must:

- Inform: Tourists should learn not only about the destination, but also how to help sustain its character while deepening their own travel experiences. Residents should learn that the ordinary and familiar may be of interest and value to outsiders.
- Support the integrity of place: Tourists seek out businesses that emphasise the character of the local in terms of architecture, cuisine, heritage, aesthetics and ecology. Tourism revenues, in turn, raise local perceived value of those assets.
- Benefit residents: The tourism industry should do its best to employ and train local people, buy local supplies and use local services.
- Conserve resources: Environmentally aware tourists should favour businesses that minimise pollution and waste in general.
- Respect local culture and traditions: Visitors should learn how to behave and respect local culture; residents should learn how to deal with foreign expectations that may differ from their own.

- Not abuse its product: Stakeholders must anticipate development pressures and apply limits and management techniques to prevent degradation of the environment. Businesses must cooperate to sustain natural habitats, heritage sites, scenic appeal and local culture.
- Strive for quality, not quantity: Communities should measure tourism success not by the number of their visitors, but by the length of stay, money spent and quality of experience.
- Promote itself: Satisfied, excited visitors bring new knowledge home and send friends off to experience the same thing, which provides continuing business for the destination.

3.10.4 Sustainable tourism may be approached in two ways: tourism carrying capacity and related options (see Box 3.3 for an example from Sicily) and responsible tourism. Kerala has taken the second approach, and the problems with it will be taken up later. As regards tourism carrying capacity, some work has emerged in Kerala in recent years and the going does not look too rosy.

### Box No 3.3 Sustainable Tourism in Sicily

The Mediterranean Basin is the main tourist attraction in the world, receiving 31 per cent of global tourists in 2005, the bulk of it in the coastal zones. The pressure is especially high in Malta and Cyprus, with 23,623 tourists per square kilometre and 50 tourists present for every 1,000 residents in Malta, and 1,615 and 49 respectively for Cyprus. Parts of Italy and France too witness high tourism pressures. The pressure on some regions and in some seasons within these countries is very high. Coasts are a strong attraction because of the perception of the region as 'sun, sand and sea'.

Concerned by the sustainability issues of tourism in the coastal zones and the need to diversify, countries and regions have responded by developing alternative tourism. The effort has been to change the perception of 'sun, sand and sea' by emphasising that the tourist system should encourage local resources (landscape and human resources) in all their variety and specificity, in order to distribute tourists over seasons and areas. Agri-tourism and 'bed and breakfast' has been one such response in parts of Italy. The social function of agri-tourism was the recovery and restoration of the rural patrimony, maintaining and preserving traditions of the rural world in its various aspects including handicrafts, gastronomy and folklore. These activities produce minimal impact on territorial space, as they are supplementary and subordinate to the main activity.

A national framework law was legislated in 1985 in Italy. Sicily adopted a specific legislation on the subject in 1994, setting the maximum number of bed-spaces and number of rooms for each location. The legislation saw periodic amendments. The result has been a phenomenal increase in 'bed and breakfast' places in Sicily.

*Source: 3rd IRT international scientific conference.*

3.10.5 Sustainable tourism cannot be viewed independent of tourism carrying capacity, defined as "the maximum number of people that may visit a tourist destination at the same time, without causing destruction of the physical, economic, socio-cultural environment an unacceptable decrease in the quality of the visitors' satisfaction," (WTO, 1981). Although the concept seems clear from a theoretical point of view, empirical measurement of it is a complex exercise. Environment constitutes the inner value, the ground on which the tourist activity is built. Tourism uses environmental resources as its 'capital'. The tourism sector's sustainability thus depends on tourists' satisfaction and the ecosystem's protection. Thus, a tourism policy that does not incorporate environmental protection is bound to fail.

3.10.6 The Manila Declaration (1980) may be credited with the first official formulation of sustainable tourism operated in harmony with the local environment, community and cultures. The definition is based on three pillars — social, economic and environmental sustainability, and one of the instruments that can be used to measure sustainability is tourism carrying capacity.

3.10.7 Measurement of the territorial carrying capacity, which according to the definition given by UNEP, is the level of visitor use an area can accommodate with high levels of satisfaction for visitors and few impacts on resources. The concept implies that there are limits to tourist use; the major factors in estimating carrying capacity are environmental, social and managerial. Environmental factors take into consideration the size of the area and usable space, the fragility of the environment, wildlife resources, topography and vegetative cover, and specific behavioural sensitivity of certain animal species to human visits. Social factors include viewing pattern, tourists' viewing choices, visitors' opinions and availability of facilities. Last, the management procedures that can be used to increase carrying capacity like reducing conflict between competing uses, provide adequate information and interpretation services and so on. The utility of this concept is that it sets limits to tourism growth before the negative externalities destroy the environment (UNEP 1994).

3.10.8 Studies on the carrying capacity of tourist areas are important for understanding the limits of acceptable development or sustainable development of tourism. The need to adopt a 'sustainable' approach is exacerbated by tourism's fragility and sensitivity to change. But the concept of carrying capacity has met with considerable controversy and there are analytical difficulties in arriving at a proper measure of carrying capacity. Six different approaches of determining carrying capacity are — tangible resource limits, tolerance by host population, satisfaction of visitors, excessive change, evaluation of costs and benefits and capacity in a systems approach.

3.10.9 A detailed study of three tourism sites in Kerala — Vembanad lake, Varkala and Vagamon, (Brilliant Rajan, 2011<sup>7</sup>) — combines some of the approaches mentioned above and comes to the following conclusions. In the Vembanad lake, the optimal boat density is estimated to be 130. But the number of boats observed is 167; so the percentage of peak use to carrying capacity is 128.5. The carrying capacity is exceeded when the percentage at peak use is greater than 100. The total number of boats in the study area was found to be 650, far exceeding the carrying capacity. The study goes on to suggest, "Proper management of boat density by a proper boat traffic control system, greater law enforcement, educating the people on the dangers of waste disposal from the boats into the lake are the major options to protect the Vembanad lake wetland ecosystem," (Brilliant Rajan, 2011: p.204). On Varkala, the study says that the site has more or less reached its limits: "The physical carrying capacity of Varkala indicates that about 2,930 tourists can be accommodated at a time in the peak tourism season ... The total bed capacity of Varkala was found to be 1,969," (Brilliant Rajan, 2011: p.269). A large number of domestic tourists visit the site and hence it seems to have reached its limits. A related study concluded: "The coastal tourism sector in Varkala is not in the propensity of sustainable growth. Lack of planning and the haphazard developments are crafting problems ... Concentration of developments in the narrow stretch of landmass has already caused problems like overcrowding, insufficient infrastructure, environmental issues, unhealthy competition and so on," (Brilliant et al., 2013: p.47<sup>8</sup>). Vagamon has a carrying capacity of 365 tourists at a time. The total bed capacity is 102 and an unknown number of day tourists visit the place. Thus, the limited attempt at studying the three sites suggests that two of them, Vembanad and Varkala, are already working beyond their carrying capacity.

3.10.10 As part of the sustainable development of tourism, Kerala has seen some focused attention since 2007. The plan was to take up the implementation of Responsible Tourism initiatives in Kumarakom, Wayanad, Kovalam, and Thekkady on a pilot basis. After six years, only Kumarakom has seen great success (see Box 3.2), receiving an award from the UNWTO in January 2014. Little is heard about the status of the three other locations. The reasons for the inability of other locations to move in that direction call for analysis, introspection and some changes in the design and implementation of the model.

### 3.11 The Straying Spice Tourism projects of Anakkara and Kalady

3.11.1 In 2007, Anakkara located between Munnar and Thekkady, with beautiful hills and spice farms bordering Tamil Nadu, was chosen for development under the Spice Tourism Project. Anakkara was chosen as part of the spice route. The project aimed to connect Thadiyankudisal, an area of pepper and orange cultivation in lower Kodaikanal in Theni district and Kurangini, near Bodi, in Dindigul district of Tamil Nadu. The project intended to promote local and traditional art forms as well. The project was to be implemented by the Chakkupallam Gram Panchayat, with support from the Union Government and the United Nations Development Programme. Women's participation in agriculture was also part of the project. The project was aimed at building sustainable tourism infrastructure by promoting farm and village tourism. Resorts were selected and an information centre launched under the first phase. As Thekkady has already reached its carrying capacity, extension of village and farm tourism to Anakkara would have boosted the local economy, but lack of any initiative since 2009 has seen the project failing to take off.

3.11.2 The State's first nutmeg farm, about 200 years old and privately owned, seems to be riding into the sunset, having given way to property development. "Most of the trees on what was once a single entity of 18 acres, charmingly set on the banks of the Periyar on the outskirts of Kalady town, are about 200 years old," says P. D. Zachariah, President, All Kerala Nutmeg Growers' Association. Kalady too was part of the UNDP-initiated spice tourism trail project linking locations in Kerala and Tamil Nadu. However, the programme had come to a standstill and if it had been revived something might have been done about preserving the historic nutmeg plantation in Kalady. Those associated with what is now a Rs 250 crore-plus export business in nutmeg and mace are convinced that it is from Kalady that nutmeg cultivation spread to other parts of the State. The first batch of nutmeg plants were brought to Kerala from a farm near Kandy in Sri Lanka by a Scottish planter.

3.11.3 The state tourism department has asked the Ernakulam District Tourism Promotion Council (DTPC) to restructure the indigenous tourism project formulated for Kalady — Spice Tourism Circuit — as the deadline for implementing the project had expired (as of February 2012). The Kalady-Theni route was identified for the project after a survey, as Kalady is famous for its nutmeg and turmeric cultivation. Launched in 2006, the project aimed at capacity building, thereby enabling low income groups to create and articulate their skills from within. The plan was to focus on women, unemployed youth and disadvantaged groups, minimising the negative impact of tourism, conservation and socio-economic development of the region. The project was divided into two components — the hardware programme and the software programme. The central government was to provide the hardware fund of Rs 50 lakh under the Rural Tourism Scheme and the UNDP was to have supported it with Rs 20 lakh for software activities under the Endogenous Tourism Project.

3.11.4 The Kalady Area Development Authority (KADA) was the agency to implement the software part of the project, which was completed. The software component included training programmes for rural people to make them capable of receiving and hosting foreigners who visit the village. The hardware component included construction of a tourist information centre and development of better infrastructure. Of this, the Tourist Information Centre could not be constructed due to non-availability of land.<sup>9</sup>

### 3.12 Environmental Violations and Sustainability at Stake

3.12.1 It costs a great deal of time and resources to build a successful brand. Once the brand is built, however, it needs to be protected. If there are no mechanisms to protect it, there is the danger of the brand losing its value. Some recent violations seem to point to such a possibility in Kerala.

3.12.2 An expert committee constituted by the Kerala State Coastal Zone Management Authority (KSCZMA) has detected violation of the Coastal Regulation Zone (CRZ) norms along the Mulloor-Pulinkudi stretch of the Thiruvananthapuram coast. Many of the 31 structures inspected by the

committee, including tourist resorts, houses and shops, have been constructed in violation of the CRZ norms, which prohibit development activity up to 200 metres from the High Tide Line (HTL).<sup>10</sup>

3.12.3 Tourist complexes on the Vembanad lake were, till recently, confined only to its shores. Two ventures, however, were launched recently to locate hotels on islands in the middle of the lake. These buildings apparently violated coastal zone regulations, which prohibit, in the context of Kerala, any construction within 50 metres of the high-tide line. In addition, the second of these resorts had reportedly purchased an island that originally measured only about 10 acres, but expanded when 14 acres of the water body were 'claimed' as part of the island. Both resorts also restricted fishermen from the surrounding villages from casting their fishing nets wherever they wanted. Thus, in effect, a certain stretch of the Vembanad lake, which is a common property resource, was cordoned off by the hotels for their exclusive use.

3.12.4 Local fishermen's unions approached the Kerala High Court. And the court, after 51 sittings on this issue, ruled that both constructions violated the coastal zone regulations and, hence, had to be demolished (since coastal zone regulations do not permit any construction to stand if it violates them). The Supreme Court upheld the High Court ruling.<sup>11</sup>

3.12.4 Both the coastal violations and the Vembanad constructions point to the fact that tourism development can have extremely deleterious social and environmental consequences. The social consequences are two-fold. First, small producers who are separated from access to resources, are thereby rendered unviable. And second, the labourers employed by them who, therefore, lose their earnings, do not get absorbed into the ranks of the gainfully employed at a secure and decent living standard. They witness greater economic insecurity and possibly (on an average) absolute impoverishment. Obviously, the Responsible Tourism principle has been foregone in such cases, compelling the local fisher folk to seek legal remedies.

3.12.5 One common thread observed in the failure of spice tourism projects to take off in Anakkara and Kalady and the coastal zone and environmental violations in Kovalam and Vembanad is the absence of the local governments in the picture in any substantial role. They are responsible for issuing construction permits, but it is not clear whether they understand the significance of respecting carrying capacity or Responsible Tourism. However, the success of Kumarakom in RT saw a key role for the gram panchayat. Tourism development needs to draw valuable lessons from these experiences to steer course in a direction where local governments come to the centre stage of tourism.

3.12.6 One important question that arises in this context is the absence of systematic studies on any of these experiences. The exception is the Ph. D. thesis on carrying capacity referred to in an earlier section. The Vision 2025 document had a mention about turning KITTS into a centre of excellence. This has not happened; it still continues more as a training institute. There is no other institute studying or analysing the problems of tourism development in any systematic way. A sector accounting for a quarter of the total employment of the State and over 10 per cent of the State income definitely deserves more in the nature of research and analysis. Without informed policy can tourism in Kerala develop further?

## 3.13 Tourism Policy 2012

3.13.1 Kerala Tourism has seen some clear expressions of policy since the mid-1990s. In 1995, the state government announced the first tourism policy setting out some clear paths. This was followed by a vision statement — Tourism Vision 2025 — in 2001. Later, in 2007, the Responsible Tourism initiative was adopted, which could, perhaps, be seen as a step to stay ahead of global trends. The many steps taken by the government have helped the sector grow and along with it many challenges have risen as discussed in earlier sections. How has the Tourism Policy 2012 set out to tackle the many challenges facing the sector?

## Quality of visitor experience

3.13.2 In the current, highly competitive, market, a destination can flourish only by delivering quality service and improving customer satisfaction. The policy states that Kerala will endeavour to deliver a world-class experience to all visitors, by the provision of basic amenities in destinations, constant improvement in services in hotels, restaurants and visitor points and an upgrade of visitor facilities in places of interest. To improve the quality of the destinations, the department will conduct feedback surveys to assess the satisfaction level of tourists. These surveys will be conducted regularly and remedial steps taken to meet exacting standards so that brand image is not diluted.

## Managing tourism resources

3.13.3 Most of the tourism resources in the State are under the custodianship of various other departments of the government. Coordinated efforts will be made for the development, management and promotion of these resources under the Kerala Tourism brand. Nature-based tourism resources are vulnerable to degradation with any intervention in the name of tourism or otherwise. Hence, approval of the Department of Tourism will be made mandatory for interventions at declared vulnerable tourism areas by any agency.

3.13.4 Backwater tourism activities are now concentrated in the Alappuzha region. Over a thousand houseboats now operate in this area. As a result, along some backwater stretches the density of boats is much above the carrying capacity. Infrastructure such as jetties, parking bays and boarding points will be built in new areas to enable investors to begin backwater tourism operations. Such initiatives will be linked to incentives to attract private investment.

3.13.5 Pollution of the backwaters and other water bodies due to tourism activities is a major concern. The department, in association with Kerala State Pollution Control Board, will take stringent measures to see that all the houseboats have scientific solid and liquid waste management systems. Plastic waste continues to be a major concern in many tourist destinations. The department, in association with the tourism industry, will ban the use of disposable plastic in major destinations such as Kovalam, Ponmudi, Veli, Varkala, Thenmala, Alappuzha backwaters, Kumarakom, Fort Kochi, Eravikulam, Thekkady, Pookot Lake, Soochipara, Kuruva and Bekal in the first phase.

## Safety and security

3.13.6 Kerala Tourism has built its brand image on the back of water-based attractions such as beaches, backwaters, rivers, lakes and ponds, which are prone to witnessing accidents and casualties. Deploying trained lifeguards on major beaches and improving their skills and providing them with safety equipment will be a priority. Recognising the need for increasing the number of trained persons, steps will be taken to deploy them at all potentially high-risk water bodies.

## Community and tourism

3.13.7 Participation and acceptance of the local community is critical for tourism. Tourism development in any destination should benefit the local community in economic, social and environmental terms. The economic objective should focus on generating employment opportunities, besides enabling households and individuals to produce and supply products that are demanded by industry so that local people will be able to get maximum economic benefit from tourism. On the social and environmental fronts, steps will be taken to minimise negative impacts and enable the community to live in harmony with nature, culture and traditions. Suitable mechanisms have to be developed to enable the industry partners and visitors to strengthen and achieve these goals. Kerala's Responsible Tourism programme has been designed and implemented with these objectives in mind.

3.13.8 Responsible Tourism will be broad based to cover the entire State, learning from the pilot locations of Kovalam, Kumarakom, Thekkady and Wayanad. Facilities will be distinguished and classified on the basis of RT practices under RT classifications based on the principles of the Global Sustainable Tourism Criteria. The aim is to convert at least 30 per cent of the classified and approved units located in rural areas into RT classifications in 10 years. The direct incentives given by the department will be linked to RT practices. The Kerala Responsible Tourism Task Force will be created at the state level with representatives from the tourism department, local self-government, tourism industry, self-help groups, NGOs and the departments of agriculture, animal husbandry and fisheries.

### Active involvement of local self-governments

3.13.9 Local governments can play a decisive role in planning and developing tourism in destinations. Tourism development programmes will be integrated with other developmental activities of local governments. Local bodies will be encouraged, and supported, to form tourism working group in places of tourist importance. As most tourist attractions in Kerala are based on the bounty of nature, unplanned and haphazard development of destinations is a serious issue affecting tourism growth. As per the Panchayati Raj Act, the power to regulate development activities is vested in the local bodies. Master plans, detailed town planning schemes and the Kerala Municipal Building Rules (KMBR) are the tools used for controlling and regulating the development of any area.

### To market Kerala as a visible global brand

3.13.10 From the early 1990s, Kerala has been concentrating on international tourists from Europe with the emphasis on the UK, Germany and France. In the last few years, the world has witnessed a severe economic downturn, especially in Europe, and it contributed to a dip in the number of foreign tourist arrivals. This prompted Kerala to commence an aggressive campaign to attract domestic tourists. Earlier, the ratio between the funds allocated for international and domestic marketing was 70:30, which is now 50:50, giving a thrust to domestic tourism. An examination of the last decade's foreign tourist arrivals in Kerala shows that it registered an average annual growth rate of 12 per cent. In 2010, the State received 6.5 lakh foreign tourists. Considering the strategy that calls for aggressive marketing, Kerala targets a yearly growth rate of 15 per cent, which will yield 30 lakh foreign tourist arrivals by 2021. The average annual growth rate of domestic tourist arrivals during the last decade was 4.5 per cent. In 2010, Kerala received 86 lakh domestic tourists. The State will target an average annual growth rate of 7 per cent for the next decade, which will bring in 180 lakh domestic tourists by 2021. The current source markets for Kerala as per the tourism statistics 2010 are the UK (23.7 per cent), the US (10.8 per cent), France (9.8 per cent), Germany (7.6 per cent) and Australia (5.6 per cent). The potential of these markets is not tapped to the fullest. Kerala needs to formulate market-specific strategies to tap the full potential of its existing markets.

### To develop human resources in tourism and hospitality

3.13.11 There is an alarming gap between the demand for and supply of skilled human resources in the tourism sector. The requirement of HR in the tourism and hospitality industry is approximately 0.2 million per annum, whereas the supply is only 12,000. A detailed study on HR development in Kerala's tourism sector has brought out some important observations on the education system in travel, tourism and hospitality. Some of these observations are:

3.13.12 There is a strong need for creating public awareness about employment prospects in the travel, tourism and hospitality sector. For the hospitality and tourism sector is not considered a popular career option because of unattractive wages and the demanding working conditions. There is also a need for common standards, uniformity and harmony in curriculum, faculty qualifications and education delivery.

## 3.14 Tourism Policy 2012 and the Challenges

3.14.1 Does the Tourism Policy 2012 adequately address the challenges facing the sector? A comparison of Tourism Policy 2012 with the Vision 2025 document may be instructive in answering this question. The Vision document viewed tourism as a core sector of the economy in generating employment, enhancing production and productivity and contributing to the development of the State. It recognised the importance of promoting and marketing the Kerala brand at the national and international levels.

3.14.2 The Vision recognised the centrality of the private sector as the key actor in the development of tourism in the State. The necessity for developing new products to sustain Kerala's position was recognised. Innovation-embracing entrepreneurs had to enter the sector to sustain such a process. Constant and continuous innovation was emphasised as the route to ensuring the top slot for Kerala in the hearts of discerning travellers.

3.14.3 The role of the government was clearly visualised as that of a catalyst and facilitator. It needed to develop a rational taxation policy, ensure safety and security of tourists and regulate the growth of the sector for sustainability. The government was to be instrumental in preparing the host population to accept tourists. The government would also strive to develop and improve roads, drinking water supply, electricity supply and sewage and sanitation.

3.14.4 The Vision document recognised that Kerala's strength lies in its beaches, backwaters, hill stations and wild life. Sustainable tourism calls for the conservation of ecology and to preserve nature from degradation. Tourism development has to be sensitive to the carrying capacity of the destination. And the government has to play the role of an enlightened regulator.

3.14.5 Human resource development is an important component of the effective promotion and development of tourism in the State. In this regard existing institutions such as KITTS, KIHMS and IHMCT will be developed into institutions of excellence. The other institutions offering tourism related courses will be regulated to maintain quality standards.

3.14.6 Any venture in the field of tourism can only become successful if it is implemented through local participation. The strong Panchayati Raj Institutions in the State can contribute greatly to building tourism infrastructure and the necessary basic amenities. Creation of awareness about the benefits of tourism in terms of economic, physical and social development; traditions of Indian hospitality; and the importance of providing assurances on safety and security of tourists have to be done through the local governments.

3.14.7 It will be evident from a comparison of the thrust of the Vision document with the Tourism Policy 2012 that the challenges that have emerged in the interim have not been adequately recognised by the framers of the latest policy. The sustainable development strategy proposed for the macroeconomic development of Kerala will call for a longer-term strategy for tourism to bring it in line with the State's overall development strategy. Tourism, in Kerala's overall knowledge economy, will focus on identifying new products and new markets and promoting innovative business solutions enabling the sector's activities to be more competitive and sustainable in the global marketplace. The next section discusses a strategic framework for the tourism sector.

## 3.15 Strategic Plan

### 3.15.1 Vision and Mission

#### Vision

“To develop Kerala, into an up-market tourist destination with a high quality, thriving, competitive and sustainable tourism industry, which generates stable wealth, promotes environmental quality, enriches the local communities and brings enjoyment to visitors without harming local culture and heritage. Kerala will be a global brand in tourism and a top destination among Indian states in terms of tourist revenue by 2030.”

#### Mission

Achieve sustainable tourism. This means:

- Achieving economic prosperity by developing innovative products and services, and a competitive and prosperous tourism businesses in the long term.
- Facilitating social equity and cohesion through community involvement in tourism planning and management.
- Promoting safe, satisfying and fulfilling visitor experiences.
- Ensuring environmental and cultural protection by upgrading the global and local environment and strengthening biodiversity in tourism.
- Maintaining the State’s unique and diverse culture by looking after its natural and cultural heritage.
- Providing quality employment opportunities and fair pay and conditions for all employees.

#### Targets

Targets will be set in line with carrying capacities of destinations.

### 3.15.2 The strategy

3.15.2.1 An integrated approach to tourism planning and management adhering to the following principles is required to achieve sustainable tourism:

- Tourism ventures should be initiated involving all stakeholders, including the community where the development is taking place, fully sensitive to sustainability.
- Tourism should provide quality services and generate demand for high value-added services and unique experiences with high brand value.

#### 3.15.2.2 Pillar 1: Economic dimension

**The action plan consists of:**

- Product differentiation
- Market diversification
- Innovation
- Marketing
- Infrastructure

#### Product differentiation

3.15.2.3 The advancement of technology had a significant impact on the tourism industry. Continuous upgrading and modernising of tourism products is important in providing visitors with quality services. The tourism industry should be able to develop unique products, which can provide authentic experiences and value-added services. It is necessary to realise the potential of tourism and to extend products and services through product differentiation and by diversifying destinations.

3.15.2.4 In its efforts to differentiate the tourism experience, Kerala Tourism has been introducing newer products such as ayurveda, backwaters, rural tourism, plantation tourism, adventure tourism, eco-tourism, convention tourism and medical tourism. More innovative elements should be added to the development of theme products and deep utilisation of tourist resources. Two illustrations are:

- Experience element: The tourism economy has entered the age of the ‘experience’ economy and society. With this, the way people consume is also changing. There is a growing segment of tourists who are sophisticated, experienced, well-educated and discriminating. They are more aware of what the competition has to offer. They are less destination-oriented and more experience-oriented. This transformation into an ‘experience market’ is based on personalised services and customised holidays that allow visitors to play a more active role in their travel experiences and to search continually for new tourism products.
- Participation element: Contemporary tourists prefer more active and exciting activities to programmed travel arrangements. Participation in local economic activity is an integral part of tourism worldwide.

3.15.2.5 Ayurveda is almost synonymous with medical tourism in Kerala. The average duration of stay of a tourist coming to Kerala for ayurveda tourism is as long as 16.2 days. However, quality control is a major issue as there has been an influx of unqualified people running massage parlours in the name of ayurveda. In order to control the quality of ayurveda, Kerala Tourism has introduced two kinds of classification — Green Leaf and Olive Leaf — for ayurveda centres. These classifications ensure the credibility of service providers and the quality of the offering. The implementation of this programme must be monitored carefully so that Kerala does not get any negative publicity due to fake ayurveda centres.

3.15.2.6 In addition, Kerala has a distinct advantage in dental tourism. The fact that dental treatment typically requires multiple sittings, with liberal gaps between sittings, implies that a person may have to stay in Kerala for as many as 30-40 days. This makes the dental patient an ideal candidate for medical tourism. Hence, more effort should be made to market dental tourism.

3.15.2.7 Wetland tourism: Wetlands offer significant tourism opportunities. It is not only a key source of income, but also contributes to wetland conservation. The best practices of promoting wetland tourist while minimising its threats and adverse effects include the following:

- Integration of wetland tourism planning with wetland management planning to resolve conflicts arising from tourism activities in wetlands.
- Involving local communities in decision-making as a central element of wetland tourism.
- Making appropriate legislation and ensuring its effective enforcement to prevent damage to the environment and to tourism assets.

## Diversification of markets

3.15.2.8 New markets: Kerala has already strengthened the existing international markets. The State needs to explore new emerging international markets that have tremendous potential for tourism growth. The product-specific promotion of tourism offerings such as ayurveda in Germany and culture in France needs to be replicated in other countries. Foreign exchange earnings can be optimised only if Kerala succeeds in attracting more stable foreign tourist inflows. Advertising campaigns and promotional tourism programmes through electronic media, participation in major international tourism events and fairs and so on need to be further developed to promote awareness among tourists.

3.15.2.9 New destinations: The policy also emphasises continuous development of unexplored leisure destinations and enhancing local level experiences to showcase Kerala’s cultural heritage. Significantly, Vision 2025 envisaged the development of “one tourist destination every year”, but

it has lost its way somewhere. Developing micro destinations can also be a part of this policy. For example, Banat-Crişana in Western Romania was developed as a micro-tourist destination. Medical-spa tourism (48.5 per cent) is the dominant form of tourism in the region because of the existence of several thermal springs.

## Promote innovation

3.15.2.10 Kerala Tourism built its brand on many innovations. Sustainability of the brand needs continuous innovation. Most innovations currently happen outside the tourism industry and need to be drawn into tourism. Thus, contacts with customers and suppliers are far more important to the innovation process in tourism enterprises than business-academia linkages. Therefore, innovation policies in tourism should mainly aim at enhancing destination-based or networking innovations. The government should encourage innovative firms to achieve economies of scale, innovating on the basis of cooperative alliances and other forms of networking. Public policy is important and directly impacts the diffusion of innovation by creating a conducive environment.

## Marketing

3.15.2.11 The policymakers envisage marketing the State as a visible global brand with equal focus on domestic and international markets. There have also been policies to attract new investors in tour operations, homestays, serviced villas and ayurveda centres by providing marketing assistance. Information centres have been set up in all major destinations, cities and transport nodes with IT-enabled information kiosks and trained staff to cater to the needs of visitors. Kerala Tourism's Web site ([www.keralatourism.org](http://www.keralatourism.org)) is interactive and helps travellers customise their plans. Social media optimisation activity is being implemented to use social media tools such as Twitter, Facebook and YouTube to reach out to travellers. Kerala Tourism has also entered into a partnership with Google for popular search-based campaigns. These efforts need to be carried forward over the next 20 years. Encourage the use of ICT in marketing

3.15.2.12 Tourism is information-intensive and has benefited tremendously from the explosion in Information and Communication Technology (ICT). The growth of the Internet, and new technology in general, has influenced the sector in terms of accessibility for potential customers (visitors) who seek information and fulfil their purchase through the Web. Tourism seems to be directly related to the use of ICT. There is evidence that tourist companies that have Web sites increased their revenue, and the ones that have their own Web portals have even higher revenues. ICT also offers value-added services by providing information on accommodation, events, culture and leisure, together with booking and payment facilities.

3.15.2.13 ICT will also have a great impact on virtual tourism, a market share development strategy that focuses on promoting the unique aspects of a city or region in order to draw tourists interested in those particular subjects to the area. Action in the field of ICT for tourism is targeted at developing new components and distributed architectures for tourism information and communications systems, which support users and businesses by offering value-added services and multimedia information on tourist destinations. Eventually, this may also have a positive impact on the physical flow of tourists to the State.

## Infrastructure

3.15.2.14 The government has been attempting to deliver a world-class experience to all visitors in terms of basic amenities by improving the basic tourism infrastructure. The focus has been on improvement in hotels, restaurants and other visitor-related services (including wayside amenities, such as public toilets, parking bays and refreshments). This must continue, with upgrades of visitor facilities through proper management of tourism resources and overall improvement in maintaining tourist destinations by forming institutional mechanisms at various levels to make them clean and safe as per international standards.

## Pillar 2: Environment

3.15.3.1 A number of small ticket issues such as use of clean technology, ban on plastics and so on have been addressed, while leaving larger issues such as carrying capacity and zone violations unaddressed. Destination Management Councils (DMC) have been formed to cater to 35 tourist destinations in Kerala. These councils, with statutory authority, undertake and maintain tourism projects completed in the destinations and evaluate the basic infrastructure, security, protection, encroachment, new schemes and so on in the respective destination. The DMCs also implement new projects based on the characteristics of the tourist destination. Each council has the member of the legislative assembly from that region as its chairperson and the DTPC secretary as its chief executive. They have to be equipped to play new roles to guarantee sustainable tourism. DMCs also need to be structured to work closely with the local governments.

3.15.3.2 Research with hotels and travel industry executives shows that the travel industry is not fully immersed in environmental technology application programmes. A variety of environmental guidelines have been developed by different organisations such as the International Hotel and Restaurant Association (IH&RA), the American Hotel and Lodging Association (AH&LA) and the International Hotel Environmental Initiative (IHEI). Individual hotel companies now prepare their own action plans and training programmes in environmental protection. Tourism businesses are slow in adopting changes. Government policy interventions are, therefore, necessary to promote environment-friendly tourism learning from all over.

## Pillar 3: Social Issues

3.15.4.1 As far as the socio-cultural aspects are concerned, efforts have been made to increase the active involvement of local communities. The policy should ensure that Responsible Tourism initiatives are extended to all tourist destinations and cultural activities in the form of traditional art forms are promoted. Kerala celebrates many festivals, such as Onam and Pongal and local cultural programmes, with people's participation. Initiatives have been taken by the state government to promote different traditional art forms and other activities targeted at tourists such as elephant pageants, boat races, trade fairs, roadshows and so on. Multi-cultural factors should be emphasised still further to provide travellers an experience of the real culture and lifestyles of the local people.

3.15.4.2 Intensive efforts are required from the state government to increase the participation of local communities in the tourism activities of the State by creating environmental awareness and educational opportunities among them. This will help restore the environmental balance and create healthy ecosystems in the State. The government should encourage the active participation of the local community in various aspects of tourism under its Responsible Tourism programme. It generates greater economic benefits to local people and enhances the well being of local communities. It also makes positive contributions to the conservation of natural and cultural heritage and maintenance of the world's diversity. The success of the pilot Responsible Tourism project in Kumarakom needs to be replicated in other destinations.

## Pillar 4: Skill Development: Capacity Building of Service Providers

3.15.5.1 Tourism is a human-intensive sector. There are a large number of people who work in the organised and unorganised sectors, from highly organised large hotels and well-integrated tourism companies to small hotels, roadside eateries, ticketing and travel agencies and so on. A number of human resource development initiatives have been launched for skill development in the tourism and hospitality sector. Institutes such as KITTS, KIHMS and IHMCT offer tourism courses to address the scarcity of qualified personnel in the sector. Kerala, with its heavy dependence on water-based attractions, will soon start training programmes to improve the skills of existing lifeguards and will also provide them with sufficient modern life saving equipment.

3.15.5.2 While most skill development programmes focus on the human resources engaged in tourism, there is also a segment of service providers who are engaged in other professions but come in contact with the tourist. These people include the staff at bus/railway stations, police personnel, immigration staff at airports, porters, taxi/coach drivers, staff employed at monuments, guides and so on. Tourists come into contact with many of these service providers. And it is the experience they have while interacting with these service providers that governs their experience of Kerala as a tourist destination. Some of these categories of service providers currently get training and orientation in institutes such as KITTS. It is necessary to expand these initiatives.

3.15.5.3 There is a need to conduct a study on the skill requirements, skill availability and skill gaps in the tourism sector and design specialised training to address the gaps. These courses need to be evaluated on a continuous basis to upgrade their content and usefulness. The National Skill Development Corporation has prepared a report assessing the human resource and skill requirements for the tourism sector. This could be put to good use.

## Pillar 5: Build Research Capacity

3.15.6.1 The Vision document talked about developing KITTS and other institutes into centres of excellence. They have, however, largely remained training institutes. There is no doubt that a need for high quality training institutes exists in the State. But as seen in the section on the challenges in tourism, the need for good analytical studies and research reports is urgent. More information is required about the carrying capacity of Kerala's tourist destinations. Similarly, it is important to understand why Responsible Tourism succeeded in Kumarakom, but not elsewhere. Similar understanding is required of why the Spice Tourism Project did not take off in Kalady and Anakkara. Informed tourism policy has to be supported by rigorous research and there is a need to build research capacity. Two approaches are proposed:

- Develop one among KITTS, KIHMS and IHMCT into a full-fledged research institute to build research capacity.
- Institute a 'tourism research chair' in one of the State's premier research institutes, such as Centre for Development Studies, Gulati Institute of Finance and Taxation or Centre for Earth Science Studies, devoted to research on socio-economic and environmental issues associated with tourism.

## Pillar 6: Local Government Ownership

3.15.7.1 Kerala has already become largely urban and over the next twenty years, urbanisation levels will touch 80 per cent. About 10 or 12 urban agglomerations or urban corridors will account for the bulk of the urban population. Many of them will also have Kerala's tourism destinations within them. Urban governance will, therefore, become a powerful force for promoting economic growth. Pro-growth models of urban governance (called urban entrepreneurialism model) refer to policy choices, the development strategy and the selection of the network of partners pursued by urban governments for growth of the local economy. Pro-growth governance is the creation of a set of arrangements whereby accommodation is reached between the wielders of state power and wielders of market power, with economic growth as the overarching objective. Ideally, economic growth under pro-growth governance should be long term and sustainable. The sources of such growth have changed from manufacturing industries to knowledge-intensive businesses. The instruments in the hands of the local government to achieve its objectives are urban planning, mobilisation of resources and infrastructure development. A more subtle instrument is building a favourable image of the city, which attracts investment. Pro-growth governance models are purpose-driven as their focus is on outcomes and draw on entrepreneurial zeal and skills.

3.15.7.2 For tourism's long-term sustainability as a growth driver in Kerala, there is no alternative to local government ownership of tourism. Local governments will be able to play a decisive role in a number of activities. They have to participate actively in product development by promoting destinations within their region. Without local government involvement conservation and regeneration of wetlands, backwaters and beaches will be impossible. But they will need to have access to research on carrying capacity and Responsible Tourism so that they do not give permits to the type of projects mentioned in sections 3.12.2 to 3.12.5. Information dissemination too will have to count on local governments. More important, infrastructure development will become a top priority of local governments once they become responsible for local economic growth. Destination Management Councils will also become part of the local governments. They are best placed to address social issues. Overall, tourism should become a local government growth priority and local governments should be competing among themselves to offer high quality tourism experiences at premium prices.

## 3.16 Conclusion

3.16.1 In order to achieve the vision of sustaining and accelerating the growth of the sector and making sustainable tourism a reality, a number of 'best practices' need to be followed. The need of the hour is to promote quality on all fronts and provide world class experiences to tourists without degradation of the environment. Awareness of the issues appears to be relatively high in Kerala and a number of good practices have been widely adopted, but more needs to be done. The strategy should be to engage all stakeholders through marketing and social media, identifying sustainability goals/targets and creating more sustainable products and services. Two dimensions call for concerted efforts — building research capacity so that informed policymaking is greatly facilitated and local government involvement in the sector so that they come to own tourism development in the State.

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# ICT: A STRATEGIC LEVER FOR BUILDING A KNOWLEDGE ECONOMY





## ICT: A Strategic Lever For Building A Knowledge Economy

### 4.1 Background

4.1.1 Information and communication technology (ICT) is one of the forces that drives a knowledge economy. The world has witnessed an explosion in the application of computing and communications technology in all areas of business and community life. The revolution in information technology (IT) transforms not only information and its uses, but also, more important, knowledge and the way it is generated and managed. The IT revolution has intensified the move towards knowledge codification and increased the share of codified knowledge in the stock of knowledge. Knowledge is now seen as input, output and capital. The ICT strategy aims at stimulating a knowledge-based economy that embraces innovation. It will play a major role in catapulting Kerala into the league of the advanced knowledge economies, as it will enable the digitisation of knowledge. This, in turn, will take Kerala closer to being a sustainable, inclusive information society.

### 4.2 Achievements and Challenges

The ICT ecosystem is an integration of five components<sup>1</sup>:

- e-readiness, which comprises networks (infrastructure, policy, e-literacy, and e-innovation)
- e-governance
- e-industry, that is information technology services and industry
- e-innovation
- e-inclusion

4.2.1 Innovation, whether in technology, applications or business processes, drives the adoption and adaptation of digitalisation in the Indian economy. The extent of digitalisation will be affected by the ability of the three main users — firms, government and consumers — to use technology for value creation opportunities, or e-readiness. e-governance measures the extent of digitalisation by the government to deliver services. Finally, the extent of digitalisation in industry and services for value creation opportunities is measured in e-industry. These three together measure the extent of digitalisation. The outcome of the digitalisation process on users is captured in e-inclusion — whether the digitalisation has diffused across various groups, regions, gender and so on. A review of achievements and challenges requires a careful analysis of each of these components of the ICT ecosystem.

#### e-readiness

##### Policy approach

4.2.2 The Government of Kerala is cognisant of the critical role ICT can play in creating and maintaining economic and social progress. Reflecting the emphasis placed on technology, knowledge and scientific education by the international development community, the Government of Kerala was one

of the first in India to develop a policy designed to promote and accelerate the diffusion and use of ICT within the region. First written in 1998 and followed by numerous revisions (one in 2001, another in 2007 and a third in 2012), Kerala's policy agenda lays out the goals of establishing "Kerala as a leading IT destination [and] significantly enhance direct and indirect employment creation in the IT sector." The goals of the IT policy include, but are not limited to, building the necessary technological infrastructure to create an environment favourable for ICT development; enhancing the necessary human capital required to both produce and use new technology through education and skill building; and establishing Kerala as an IT industry destination by attracting investment from within and outside the region.

4.2.3 Kerala is also ahead of many states in implementing fully or partially several IT-related acts such as the IT Amendment Act 2008. It also has a state level cyber law to supplement the IT Act 2008. Kerala has implemented legislation for the Electronic Service Delivery Act and a Cyber Security Policy (that is, a computer emergency response team has been set up in the State). A back-up policy was initiated in 2010 to ensure that electronic records (applications and databases) are not lost due to equipment failure or physical or cyber disaster. It was mandated in 2010 that all critical information infrastructure were to be 'protected systems'. As part of the security measure, only certain people were authorised to access the protected system.

4.2.4 Last, but not least, support for Malayalam language is provided for in the policy. This is important for the inclusiveness of e/m-governance, as Malayalam is Kerala's language.

## e-infrastructure

### Tele-density

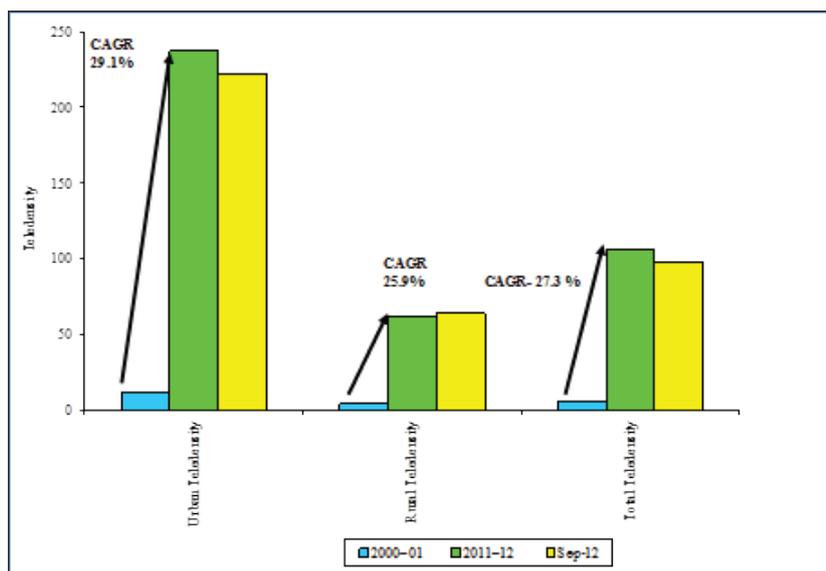
4.2.5 Tele-density is the number of telephone connections for every hundred individuals living within an area. Tele-density, led by mobile tele-density in the last decade, has had significant implications for economic growth. It has been shown that a 10 per cent increase in mobile penetration delivers, on an average, a 1.2 per cent point annual increase in per capita GSDP.<sup>2</sup> Further, a 1 per cent increase in income will result in a 2.45 per cent increase in mobile tele-density. The correlation between real per-capita GSDP and tele-density of Kerala is 0.97 for the period 2000–01 and 2011–12.

4.2.6 Tele-density in Kerala has grown at a compound annual growth rate (CAGR) of 27.3 per cent between 2000–01 and 2011–12 (Figure 4.1).<sup>3</sup> The latest available data till January 2013 shows that Kerala is ranked fifth in terms of overall tele-density (behind Delhi, Tamil Nadu, Himachal Pradesh and Punjab) at 97.1. This is much higher than the all India level (73.1).

### Rural-urban divide

4.2.7 There is considerable variation in tele-density between rural and urban areas across the Indian states (Table 4.1). In urban tele-density, in September 2013, Kerala (194.79) is ranked second after Himachal Pradesh (333.16). It is ranked below Himachal Pradesh (75.59), Tamil Nadu (69.45) and Punjab (68.83) in terms of rural tele-density. The ratio of urban to rural tele-density in Kerala has increased from 2.8 in 2000–01 to 3.8 in 2011–12, signalling a rising digital divide in the State. However, between 2011–12 and September 2013, rural tele-density increased while urban tele-density declined.

**Figure 4.1**  
**High Growth in Tele-density – 2000-01, 2011-12 and January: 2013**



Sources: Keralastat.com and Telecom Regulatory Authority of India.

## Wireless vs wireline tele-density

4.2.8 Wireless tele-density is ahead of wireline tele-density. This trend is very similar to other Indian states and developing countries. Table 4.1 shows the de-composition of tele-density across technology and states. Within the Southern region, Kerala has the highest wireline tele-density. Comparison across the Indian states shows that it is lower than only Delhi, thereby signalling very good telecommunications infrastructure in the State. Nonetheless, wireless tele-density in Kerala is lower than in Delhi, Tamil Nadu, Punjab and Himachal Pradesh.

**Table 4.1**  
**Wireline and wireless Tele-density in Rural and Urban areas as of September 2013**

Service Area	Rural wireline tele-density	Urban wireline tele-density	Total wireline tele-density	Rural wireless tele-density	Urban wireless tele-density	Total wireless tele-density	Rural tele-density	Urban tele-density	Total tele-density
Andhra Pradesh	0.93	6.46	2.47	42.58	157.97	74.69	43.51	164.43	77.16
Delhi	N.A.	N.A.	15.37	N.A.	N.A.	206.73	N.A.	222.10	222.10
Himachal Pradesh	3.16	8.75	3.80	72.43	324.41	101.13	75.59	333.16	104.93
Kerala	7.51	11.28	8.47	55.37	183.51	87.96	62.88	194.79	96.43
Karnataka	0.95	8.68	3.89	43.65	159.27	87.63	44.60	167.95	91.52
Punjab	2.11	7.13	4.25	66.72	145.98	100.43	68.83	153.11	104.68
Tamil Nadu	1.76	6.18	4.29	67.69	132.15	104.67	69.45	138.33	108.96
All India	0.74	6.09	2.38	40.96	137.93	70.63	41.70	144.02	73.01

Source: Telecom Regulatory Authority of India.

4.2.9 International comparisons show that Kerala (95.19) out-performs China (73) and is fairly close to France, Japan and the US in wireless tele-density (Table 4.2). But it is still below Finland, Russia, Brazil and several advanced countries.

**Table 4.2**  
**International Comparisons of Tele-density in 2011**

Service Area	Wireline Tele-density	Wireless Tele-density
Brazil	21.88	123.18
Belgium	43.06	116.61
China	21.16	73.19
Denmark	45.13	126.46
France	55.92	105.03
Finland	20.06	166.02
Germany	63.05	132.3
India*	2.55	74.49
Japan	51.06	102.67
Kerala*	8.96	95.19
Netherlands	43.53	115.45
Norway	42.71	116.75
Russia	30.93	179.31
South Korea	60.9	108.5
Sri Lanka	17.15	87.05
Sweden	48.72	118.57
United Kingdom	53.24	130.75
United States	47.91	105.91

Note: \* this is as of September 2012.  
Source: International Telecommunications Union (ITU)

### Quality of services: A matter of concern

4.2.10 Table 4.3 presents the quality of wireless services for Kerala as of September 2012. It shows that wireless services do not meet the standards mandated by Telecom Regulatory Authority of India (TRAI).

**Table 4.3**  
**Parameter-wise Non-compliance of Quality of Service Benchmarks for Wireless Service Providers for Kerala: September 2012**

Parameter	Service Provider	Benchmark	Performance
Metering and billing credibility- post paid	Aircel	≤ 0.1%	0.15
Percentage of calls answered by the operators (voice to voice) within 60 seconds	Aircel	≥ 90%	50.08
	Airtel	≥ 90%	89.76
	Reliance CDMA	≥ 90%	83.07
	Reliance GSM	≥ 90%	72.06
	TATA GSM	≥ 90%	88.09
	Vodafone	≥ 90%	82.14
Time taken for refund of deposits after closures	TATA CDMA	100% within 60 days	98.2

Source: Telecom Regulatory Authority of India

4.2.11 Table 4.4 presents the quality of the wireline service providers. Kerala has both fault incidences and fault repair times that are higher than the benchmarks mandated by TRAI.

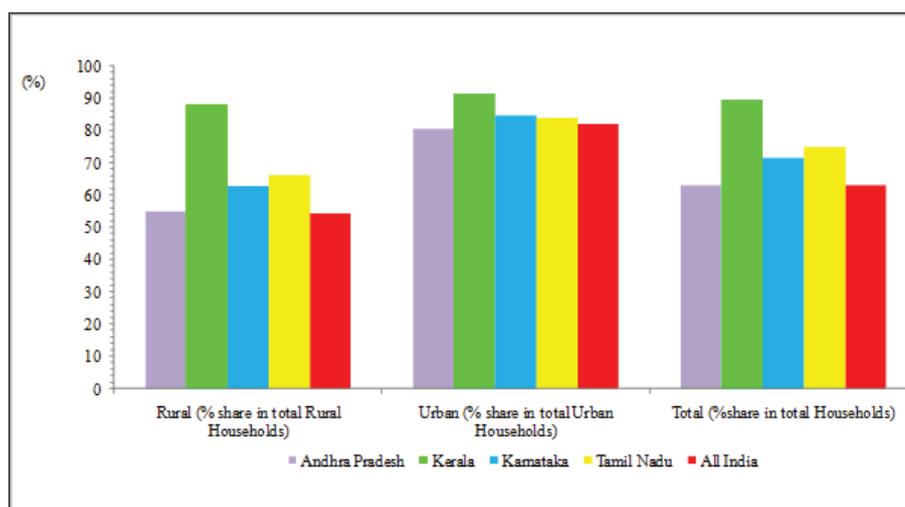
**Table 4.4**  
**Parameter-wise Analysis of Non-compliance of Quality of Service Benchmarks for Wireline Service Providers for Kerala: September 2012**

Parameter	Service Provider	Benchmark	Performance
Fault incidences per 100 subs/month	BSNL	≤ 5	7.32
% Fault repaired by next working day	BSNL	≥ 90%	71.56%
% Fault repaired within 3 days	BSNL	≥ 100%	98.2%
% Fault repaired within 5 days	BSNL	≥ 100%	87.49%
MTTR (Mean Time to Repair)	BSNL	<8 Hours	16.12
% age requests for Termination/Closure of service complied within 7 days	BSNL	≥ 100% within 7 days	96.15%

Source: Telecom Regulatory Authority of India. Percentage of households with access to telephones/mobile phones: Blurring rural-urban digital divide.

4.2.12 The Census 2011 shows that the total number of households (both rural and urban) in Kerala with telephones/mobile phones is significantly higher than states such as Andhra Pradesh, Karnataka and Tamil Nadu (Figure 4.2).<sup>4</sup> In Kerala, 89.7 per cent of households own telephones/mobile phones, followed by Tamil Nadu (74.9 per cent) and Karnataka (71.6 per cent). Further, the percentage of rural households with access to telephones/mobiles (88.0 per cent) is close to urban households (91.5 per cent) in the State, revealing the successful reach of ICT Infrastructure to all rural areas as well. The Annual Status of Education Report (ASER) confirms this finding.<sup>5</sup> The results of a survey of 349 villages and 8,471 households in 14 districts in Kerala in 2012, show that 91 per cent of rural households have a mobile phone. The corresponding numbers in 2012 for Andhra Pradesh, Gujarat, Karnataka, Tamil Nadu, and the whole of India are 78, 62.1, 65.4, 74.3 and 66.6 per cent, respectively.

**Figure 4.2**  
**Percentage of Households with Fixed Line Telephones and/or Mobile phones: 2011**



Source: Census of India Web site: Office of the Registrar General and Census Commissioner of India. 2011. [www.census.gov.in](http://www.census.gov.in)

## District-wise variations

4.2.13 Table 4.5 shows the district-wise percentage of households with telephones, either mobile or wireline or both in rural and urban areas of Kerala. Even the rural areas of Wayanad, the lowest ranked district, performed better than the national urban average. Clearly, telecommunications has reached all parts of the State on a relatively equal basis.

**Table 4.5**  
**District-wise Percentage of Households with Telephones: 2011**

District	Rural	Urban	Total
Kasaragod	88.3	91.2	89.4
Kannur	91.5	93.3	92.6
Wayanad	83.6	87.2	83.7
Kozhikode	91.2	93.1	92.5
Malappuram	91.9	94.4	93.0
Palakkad	83.3	89.9	84.9
Thrissur	88.1	91.3	90.2
Ernakulam	92.4	94.2	93.6
Idukki	88.9	95.6	89.2
Kottayam	93.6	94.7	93.9
Alappuzha	87.5	89.1	88.4
Pathanamthitta	90.7	93.1	91.0
Kollam	84.5	87.7	85.9
Thiruvananthapuram	81.0	87.0	84.2
Kerala	88.0	91.5	89.7
India	54.3	81.9	63.2

Source: Census of India Web site: Office of the Registrar General and Census Commissioner of India. 2011. [www.census.gov.in](http://www.census.gov.in)

## Internet

4.2.14 Kerala has the advantage of submarine cables, which link India to the rest of the world via the State's shores. Submarine cable systems generally use optical fibre cables to carry international traffic. The optical fibre network of Power Grid covers the main urban areas of Kerala. However, there are no such plans for the midlands and uplands of Kerala due to technical reasons. Thiruvananthapuram and Kochi, along with Mumbai and Tuticorin, are some of the landing stations of these submarine cables. TRAI has lowered access facilitation charges for submarine cable landing stations in December 2012.<sup>6</sup> This is good news for the IT industry in Kerala as communication costs of BPOs and small enterprises have reduced. Kerala has provided 997 out of 999 village panchayats with broadband Internet connections, as per the latest Bharat Nirman Report available till June 2011.<sup>7</sup>

4.2.15 In terms of Internet subscribers, Kerala is among the top ten states of India. The numbers of broadband subscribers is double that of narrowband subscribers in Kerala (Table 4.6). While it remains far below Maharashtra, Tamil Nadu, Andhra Pradesh and Karnataka in terms of total number of subscribers, Kerala is marginally better at 4.98 than Maharashtra (4.22)<sup>8</sup>, when Internet

subscribers per 100 population is considered. The all India number (1.98) is lower than either of the two states. A note of caution is that the number of Internet subscribers reported by TRAI excludes subscribers who are capable of accessing the Internet over phones through data packages. This number (4,470 lakh) is substantially higher than the Internet and broadband subscribers for all of India as of September 2012. Therefore, one may reasonably conclude that the number of people accessing the Internet over the phone in Kerala will be higher than the Internet subscribers reported by TRAI. Even after inflating the number by including the mobile Internet users, these numbers are fairly low compared to international standards. The latest available number for China is for 2009 and is 8.35 per 100 inhabitants, only for fixed line.<sup>9</sup>

**Table 4.6**  
**Speed Category-wise data on Internet/Broadband subscribers for Top 10 States:**  
**September 2012**

States	No. of Subscribers (in lakh)		
	Narrowband, < 256 Kbps	Broadband, ≥256 Kbps	Total
Maharashtra	22.59	24.82	47.41
Tamil Nadu	9.58	18.31	27.89
Andhra Pradesh	7.19	15.33	22.52
Karnataka	6.02	14.82	20.84
Kerala	5.89	10.73	16.62
Delhi	4.40	10.64	15.04
Uttar Pradesh	6.50	7.72	14.22
Madhya Pradesh	5.56	5.70	11.26
Punjab	3.50	7.34	10.84
All India	93.3	146.8	240.1

*Source: Telecom Regulatory Authority of India.*

4.2.16 Notably, Internet users are typically more than the number of subscribers. Literature on the subject uses a 1 subscriber: 5 users ratio. By that ratio, the Internet users per 100 people in Kerala works out to 25. Table 4.7 shows the Internet users per 100 inhabitants and percentage of Internet users in some other countries. Kerala is substantially above the Indian average, but far below the developed countries.

**Table 4.7**  
**Fixed Internet Subscriptions and Internet Users per 100 Inhabitants-**  
**International Comparisons**

Countries	Fixed (wired) Internet subscriptions per hundred inhabitants, 2011	Internet users (per 100 people), 2009	Percentage of Internet Users out of total population (%), 2011	Facebook Users, (million) December, 2012
Belgium	32.95	75.2	78	4.9
Brazil	11.64	39.2	45	58.6
China	8.351	28.8	38.30	0.6
Denmark	40.19	85.9	90	3.0
France	36.53	71.3	79.58	25.6
Finland	26.792	83.9	89.37	2.3
Germany	24.233	79.5	83	25.3
India	1.80	5.3	10.07	62.7
Japan	30.61	77.7	79.53	17.2
Netherlands	38.104	90	92.3	7.6
Norway	36.27	91.8	93.97	2.8
Russia	13.60	42.1	49	8.0
Sri Lanka	1.434	8.7	15	1.5
Sweden	34.454	90.3	91	5.0
United Kingdom	32.74	83.2	82	33.0
United States	27.754	78.1	77.86	166.0

*Notes: 1. Data from 2009, 2. Data from 2004., 3. Data from 2005., 4 Data is from 2010.*  
*Sources: International Telecommunications Union, Internet World Stats: Usage and Population Statistics*  
*(<http://www.internetworldstats.com/>) and World Development Indicators*

4.2.17 The objective of this analysis is to show that while the numbers are impressive in the Indian context, Kerala still has a long way to go before becoming an information economy.

### Access to computers as a percentage of total households

4.2.18 The Census 2011 shows that in that year, 15.7 per cent of total households in Kerala had computers, but only 6.3 per cent of households had computers with an Internet connection (Table 4.8.)<sup>10</sup> Among the Southern states, Kerala tops in terms of the number of households with computers. This is not because of its urban areas. In fact, its urban figures are lower than those for Karnataka. The story lies in its rural numbers. The percentage share of rural households possessing computers is not only the highest amongst the Southern states, but also among the rest of India (excluding Delhi, Goa and Chandigarh). The number of rural households having computers with Internet connections in Kerala is also the highest amongst the Southern states.

**Table 4.8**  
**Percentage of Households with Computers (%): 2011**

India/State/ District	Computer/Laptop			Computers with internet		
	District	Urban	Total	Rural	Urban	Total
Kerala	11.6	20.4	15.7	3.9	8.9	6.3
Andhra Pradesh	4.4	16.7	8.4	0.5	7.1	2.6
Karnataka	5.6	23.6	12.8	0.7	11.0	4.8
Tamil Nadu	4.8	16.9	10.6	1.0	7.6	4.2
India	5.1	18.7	9.4	0.7	8.3	3.1

Source: Census of India Web site: Office of the Registrar General and Census Commissioner of India. 2011. [www.census.gov.in](http://www.census.gov.in)

But nonetheless, Kerala is far below the rest of the world in terms of computer ownership and the Internet (Table 4.9).

**Table 4.9**  
**International Comparison: Personal computers (per 100 people): 2005**

Countries	Personal Computers (per 100 people)
Brazil	16.1
Belgium	37.7
China	4.9
Denmark	69.6
France	57.5
Finland	50
Germany	60.6
India	1.6
Netherlands	85.4
Norway	59.4
Russia	12.2
Sri Lanka	3.7
Sweden	83.6
United Kingdom	75.8
United States	77.9

Source: World Development Indicators

## District-wise variations in access to computers

4.2.19 Table 4.10 shows the percentage of households that have computers and computers with Internet at the district level, based on Census 2011.<sup>11</sup> Inter-district variations are not large in either of these categories. However, inequities seem more pronounced for computers with Internet connections.

**Table 4.10**  
**Percentage of Households with Computers by District (%): 2011**

India/State/ District	Computer/Laptop			Computers with internet		
	Rural	Urban	Total	Rural	Urban	Total
Ernakulam	15.6	26.9	23.3	6.4	13.5	11.2
Kottayam	15	23.8	17.5	6.4	11.6	7.9
Pathanamthitta	14.3	25	15.5	5.8	12.6	6.6
Malappuram	13.6	17.9	15.5	3	4.3	3.6
Thrissur	12.8	20.4	17.9	4.6	9	7.5
Kozhikode	12.1	17.6	15.7	3.2	6.5	5.4
Alappuzha	11.6	15.2	13.6	4.4	6.3	5.5
Thiruvananthapuram	11.2	25.5	18.7	3.4	13.3	8.6
Kannur	10.4	18.4	15.5	3.6	7.4	6
Kollam	10.3	15.4	12.5	3.5	6.4	4.8
Kasaragod	9.7	16.1	12.1	2.7	5.7	3.9
Palakkad	8.8	18.1	11.1	2.9	8.7	4.3
Idukki	8.2	24.9	9	2.6	11.4	3
Wayanad	8.2	18.1	8.6	2.4	7.6	2.5
Coefficient of variation	21.2	20.3	27.0	35.4	34.5	41.8

Source: Census of India Web site: Office of the Registrar General and Census Commissioner of India. 2011. [www.census.gov.in](http://www.census.gov.in)

## Internet cafes

4.2.20 Other than home ownership of computers, people access the Internet through Internet cafes, either privately owned or public ones (the Common Service Centres or CSCs). The CSC scheme, as approved by Government of India in September 2006 for setting up one lakh Internet-enabled centres in rural areas under the National e-Governance plan (NeGP), is being implemented in a public-private partnership (PPP) mode. Kerala has rolled out hundred per cent of its Common Service Centres (CSCs). Other states and union territories that have done the same are Arunachal Pradesh, Chandigarh, Gujarat, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Sikkim and Tripura.

4.2.21 Kerala was a pioneer in Common Service Centres (CSCs), starting as Akshaya e-Service Centres in 2002, which were then absorbed in the CSC programme of the central government.<sup>12</sup> The Akshaya programme served as a model for the Government of India's initiatives in the CSC project. The Akshaya idea originated as an initiative to address the backwardness of Malappuram district, and then spread throughout the State.<sup>13</sup> The strategy was to establish grassroots-level ICT centres at the panchayat/municipal ward level. The Malappuram Akshaya pilot project that started as a state-wide flagship programme was very successful, and it was subsequently declared the first totally e-literate district in the country. With the Malappuram experiment being a big success, Akshaya e-services were implemented in eight districts in the second stage. In the third phase, Akshaya activities are being rolled out in the remaining districts of the State. On completion of the third phase rollout, the project will provide self-employment to more than 3,000 people and direct employment to about 3–5 individuals in each of the multipurpose community technology centres called 'Akshaya e-kendras', and will bring in an investment of around Rs 100 crore in the State. There are 2,694 e-service centres as of March 2012.<sup>14</sup> The majority are located in rural areas. The target is to open 3,180 centres, with at least two centres in every village panchayat. These targets are already being

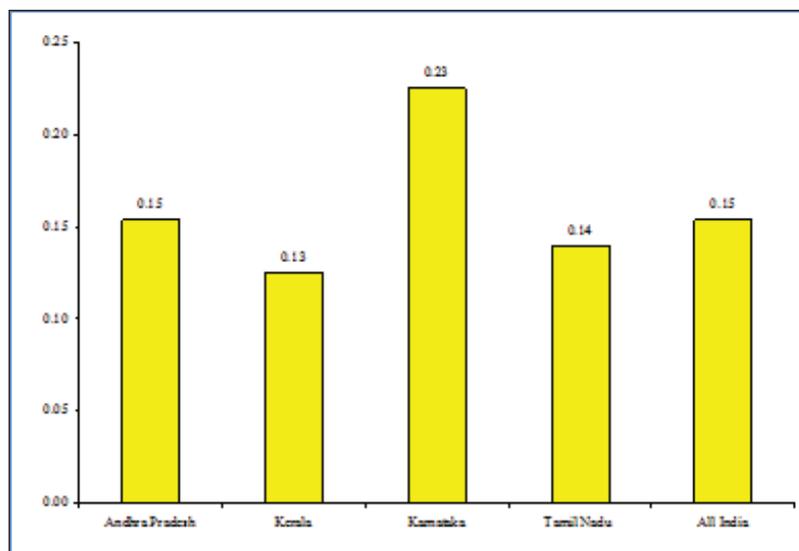
fulfilled. Each e-kendra, set up within 2–3 kilometres of every household, caters to the requirements of around 1,000–3,000 families and makes the power of networking and connectivity available to the common man.

4.2.22 The e-service centres provide e-literacy. So far, around 33 lakh beneficiaries have been trained. Malappuram and Kannur districts have already been declared 100 per cent e-literate. In addition, Kollam, Kozhikode, Thrissur and Kasaragod districts have achieved above 90 per cent e-literacy. The centres also conduct e-learning programmes, programmes from Indira Gandhi Open National University, in Malayalam computing, medical transcription and so on.

4.2.23 Twenty-two citizen services are provided through these centres including those related to UID, ration card, e-filing of commercial taxes, SPARK (Service and Payroll Administrative Repository for Kerala), e-delivery of admit cards, land revenue system, public grievances redressal and agency services for implementing insurance. One may also e-Pay at these centres, including payment of utility bills. Together, the transactions have crossed the Rs 200 crore mark. Kerala has also achieved 100 per cent VAT returns.

4.2.24 However, when the number of cybercafes and CSCs together per 1,000 people is considered, Kerala ranks below its peers (Figure 4.3).

**Figure 4.3**  
**Cybercafes and Common Service Centres per 1,000 people: 2011–12**

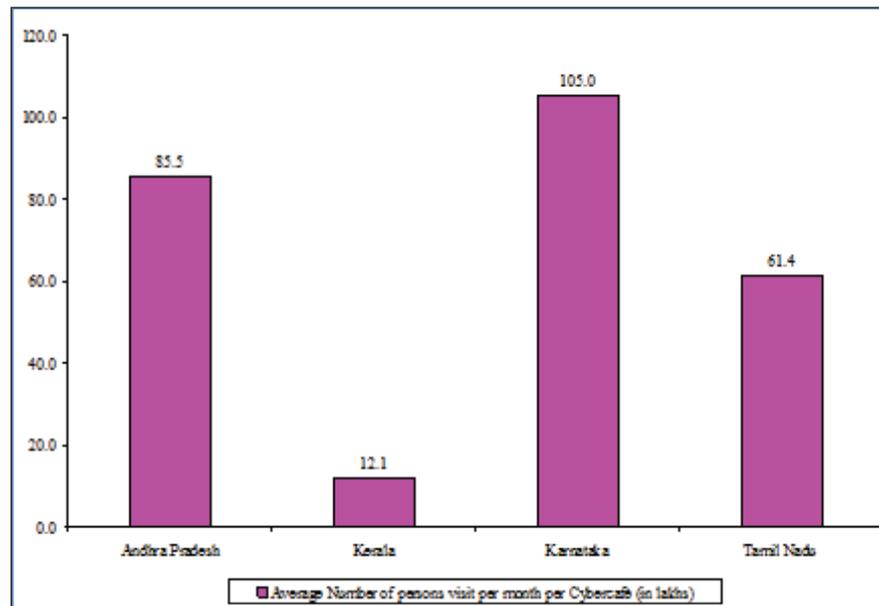


*Note: The Common Service Centres are the Akshaya centres.*

*Source: Cybercafe Association of India and Department of Electronics and Information Technology*

4.2.25 The average number of people visiting cybercafes is also the lowest for Kerala whether in absolute numbers or relative to the population. The average number of visits to cybercafes is only 12.1 lakh as compared to Karnataka (105.0 lakh) and Andhra Pradesh (85.5 lakh) (Figure 4.4).

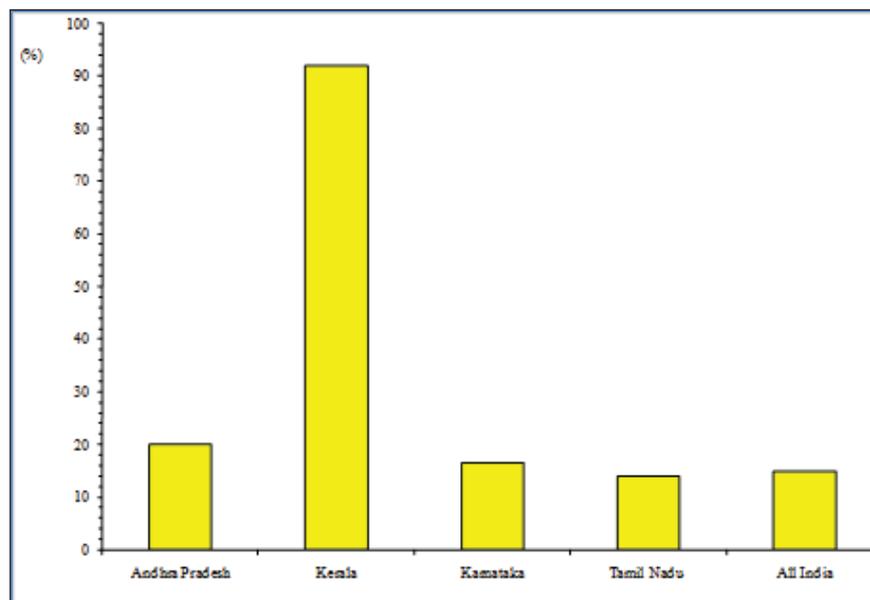
**Figure 4.4**  
Average Number of Persons Visit Per Cybercafe: 2011–12 (lakh)



Source: Cybercafe Association of India

4.2.26 When viewed from another perspective, Kerala tops in terms of the percentage share of villages with Internet cafés (91.8 per cent) compared to other states in 2012 (Figure 4.5).<sup>15</sup> From 2010 to 2012, these Internet cafés, on an average, were growing at the rate of 5.5 per cent only.

**Figure 4.5**  
Percentage of Villages with Internet Cafe in 2012



Source: ASER. 2013. Annual Status of Education Report (Rural) 2012. ASER Centre, New Delhi.

## Computer literacy: A successful programme IT@School

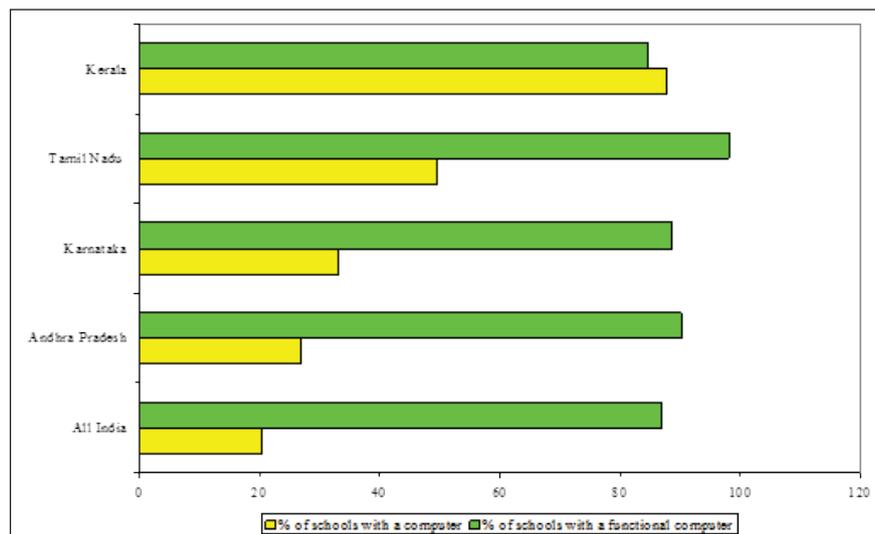
4.2.27 Kerala implemented a policy in 2001 for IT in schools (Box 4.1). It ranges from e-governance programmes and delivering broadband to schools to developing free educational software and delivering it to schools. IT education is compulsory from class 8 onwards. The data supports Kerala's initiatives in inducting computer education in schools. It scores above the other Southern states in terms of the per cent (87.72 per cent) of schools having computers (Figure 4.6). It is only ranked behind Lakshadweep (97.8 per cent) and Puducherry (94.6 per cent).<sup>16</sup> Latest available statistics from 2012–13 show that 100 per cent of secondary and higher secondary schools have computers in Kerala and 92.31 per cent of schools have computers and Internet facility. Of primary and upper-primary schools, 90.3 per cent have computers. On this parameter, Kerala is the best performing state in secondary schools, but shows room for improvement in primary schools. The District System for Education has started reporting the number of functional computers in the schools that possess computers. In this regard, Kerala shows continuous improvement, though it is below Tamil Nadu and Karnataka. This is supported by the impact study of the IT@School programme in Kerala, which shows that while the first phase of the programme has been hugely successful in terms of IT education of both students and teachers, the variation of quality in IT infrastructure lessens the positive impact.<sup>17 18</sup> Overall, the challenge is to ensure functional IT infrastructure in schools.

### Box No 4.1 IT@School

- Initially, IT@School focused mainly on teacher empowerment programmes. In 2003, Information Technology was made a compulsory subject in class 8.
- The training contents were mostly developed on proprietary software in association with Intel.
- Free software has been developed now for the whole project. Apart from this, several free educational software programmes such as Dr Geo, Rasmol, K-Tech lab, Geogebra, Chemtool, Kalcium and so on are being extensively customised by the project to develop teacher-friendly applications for facilitating complete ICT-enabled education in the State.
- The project has also prepared interactive multimedia CDs, handbooks and training modules for ICT, as well as textbooks for IT in classes 8, 9 and 10.
- It has implemented several e-governance programmes in the State, which include the online transfer and posting of teachers, single window admission process for plus one admissions, noon meal distribution computerisation, youth festival software, pre-metric scholarship, centralised online textbook indent system, total physical fitness programme and so on. All these initiatives are being developed and implemented using free software.
- The project has also ensured that all the valuable content that is developed reaches schools. This process has eventually resulted in the Free Digital Library in schools.
- With all schools provided with broadband connectivity, most of this content was also made available online.
- There are three main phases: the first phase, 2001–2009 consisted of IT education; the second phase consisted of IT enablement of education; and the third phase consisted of IT embedded education.

Source: <https://www.itschool.gov.in/otherprograms.php#6>.

**Figure 4.6**  
**Per cent of Primary and Upper Primary Schools having Computers (%): 2011–12**



*Note: The percentage share of schools having functional computers is calculated out of total schools having computers.*

*Source: District Information System for Education. 2012. Flash Statistics 2011–12. National University of Educational Planning and Administration (NUEPA), New Delhi*

## Higher education

4.2.28 The Kerala State Higher Education Council has published an online database of colleges in Kerala.<sup>19</sup> There were 1,063 colleges in Kerala in 2010–11.<sup>20</sup> These two data sources were used to calculate the share of ICT amenities in Kerala's colleges. Among the amenities as of 18 September 2013, the share of colleges with a computer centre is 73.6 per cent, Edusat connectivity is 15.8 per cent, Internet connectivity is 69 per cent and online journals is 26 per cent. There is no data on quality. CII and PwC (2012) list the technological challenges facing higher education in India — absence of effective e-content in regional languages; low penetration of ICT in higher education institutes; lack of ICT infrastructure; and budget constraints.<sup>21</sup>

4.2.29 Raji and Godsy (2010) examine ICT use among 200 students of arts and science colleges in five districts of Kerala.<sup>22</sup> The survey was conducted in 2008–09. It finds a positive impact of the decade-old IT@School programme on college students, in the sense that students who went through this free and compulsory programme had exposure to computers. The results indicate a wide gap between boys and girls in their use of the Internet across different socio-economic groups. Many colleges do not provide free Internet access to students. Girls more acutely feel problems in Internet access as they are restricted by social norms from visiting Internet cafes. Fewer girls than boys felt confident in using the Internet. Of course, with the Internet now available over mobile phones, the results may have improved.

## Training programmes

4.2.30 Kerala has forged ahead with offering a post-graduate diploma in e-governance from the Indian Institute of Information Technology and Management-Kerala (IIITM-K).<sup>23</sup> The programme focuses on capacity building in e-governance through developing foundations in IT, management, government process re-engineering and change management. The Institute of Management in Government

(IMG), the apex training institute of the Government of Kerala, has short-term training courses to build capacity for e-governance and is collaborating with IIITM-K on long-term programmes.<sup>24</sup> Given the tremendous amount of work that has taken place in e-governance and m-governance in Kerala, this area can be developed as a knowledge specialisation of the State.

## Performance

### Widespread usage by wireless subscribers

4.2.31 Wireless subscribers can either use GSM technology or CDMA technology. Of Kerala's wireless subscribers, 89 per cent use GSM (Global System for Mobile Communications) as of September 2012.<sup>25</sup> The Average Revenue per User (ARPU) per month in Kerala for a GSM subscriber is Rs 125. This is substantially higher than the neighbouring states of Andhra Pradesh (Rs 111), Karnataka (Rs 107) and Tamil Nadu (Rs 105). The total minutes of usages (MOU) per subscriber per month are also higher in Kerala, which is 398 minutes. The corresponding numbers for neighbouring circles are lower: Andhra Pradesh (369), Tamil Nadu (335) and Karnataka (362).

4.2.32 The ARPU among CDMA subscribers is Rs 67 per month, lower than Andhra Pradesh (Rs 86), Karnataka (Rs 91) and Tamil Nadu (Rs 93). The MOU per subscriber per month in Kerala is 237 minutes, which is similar to that in other states — Andhra Pradesh (242), Karnataka (185) and Tamil Nadu (152). Clearly, CDMA services are cheaper in the State.

4.2.33 'All India e-Readiness assessment' of states has been carried out by NCAER since 2003 based on surveys from states. It is observed that since 2005, Kerala has consistently performed as a leader in the e-Readiness indices. The Akshaya e-service centres are a re-sounding success. The IT programmes in schools — IT@School and Intel School are well known. Malappuram district was declared the first district with 100 per cent e-literacy. The IT programmes in schools — IT@School and Intel School — are cited as case studies for their stellar performances.

4.2.34 Kerala has historically been a leader in its adoption of and orientation to telecommunications. According to a report issued by the Government of India's Planning Commission in 2008, Kerala was the "first state in India to automate all telephone exchanges, the first to link the exchanges through STD facility, the first to provide public telephone facilities in all panchayat headquarters and the first to provide public telephones in every village."<sup>26</sup> The same report highlights the fact that in 2005 the State's tele-density, or the number of telephones per 100 people, was significantly higher than the rest of India — 19.5 in Kerala compared to 9.7 for the country. Diffusion of IT in the State is, in part, a reflection of this culture.

4.2.35 The ASER (2012) study indicates that in 2011, 61.6 per cent of rural households in Kerala had at least one person who knew how to use a computer.<sup>27</sup> The corresponding numbers for Andhra Pradesh, Karnataka and Tamil Nadu are 10, 12.7, and 16.2 per cent respectively. Goa, at 55 per cent, is the closest to Kerala in its achievements in this category.

## ICT in Governance

### E- Governance: Extensive infrastructure

4.2.36 Kerala's e-governance programme is exemplary. The core infrastructure for e-governance consists of the following:

- State Wide Area Network (SWAN): SWAN is an advanced telecommunication infrastructure, which is used extensively for exchange of data and other types of information between two

or more locations, separated by significant geographical distances.<sup>28</sup> It will connect all 14 districts, 152 blocks and 1,600 remote offices to the State capital. Of the 1,600 offices, 1,400 have already been connected. More than 165 IP phones are already on the network.<sup>29</sup>

- Secretariat Wide Area Network: This is being established and facilitates the information-system services in the offices of ministers and the heads of all the administrative departments of the Government of Kerala located in the Secretariat in Thiruvananthapuram.
- State Data Centre: State Data Centre, established in 2005, consolidates services, applications and infrastructure to provide efficient electronic delivery of government-to-government (G2G), government-to-consumers (G2C) and government-to-business (G2B) services.<sup>30</sup>
- State Service Delivery Gateway: The State Service Delivery Gateway project has been formulated under the National e-Governance Plan (NeGP) to fulfil the vision of providing easy and convenient services to citizens through Common Service Centres and enabling the State Portal (by implementing the key components of the State Portal, that is, SSDG, electronic form or 'eForms', application and computing infrastructure).

4.2.37 Under the NeGP capacity building programme, a State e-Governance Mission Team has been formed for training. Kerala has also set up an award for e-governance to reward the best initiatives in e-governance in the State. Obviously, this induces departments to compete with each other to digitise.<sup>31</sup> The Government of Kerala — starting with the Chief Minister — is present on social media platforms.

## M-Governance<sup>32</sup>

4.2.38 Kerala is also implementing mobile governance (m-governance). The m-governance project in Kerala is a comprehensive project aimed at 'm-enabling' the 90 government departments and 'm-powering' the people. The three channels of mobile communication (voice, signalling and data) and a wide range of technology (voice applications, applications using signalling channel and data service-based applications) are being used for this purpose. An encapsulated and comprehensive integrated Service Delivery Platform is being created, enabling the departments to roll out various m-services in a 'plug and play' mode. The focus is to build a centralised platform into which the services/solutions for each and every department can be integrated. The accesses for m-services are being developed for all phones, from basic to smart.

4.2.39 A unique 'Short Code' has been developed for the state government. The Short Code enables citizens to pay for services. Further, an M-Governance Service Delivery Platform (SDP), enabling the departments to easily m-power legacy applications, has been set up.

The M-Governance Service Delivery Platform established has the following components:

- e-SMS (Short Messaging Service) — The official SMS gateway for the state government: The e-SMS is an exclusive SMS gateway established by the Kerala State IT Mission for use by various government departments. It is used by government officials for intra and inter-departmental communication.
- MMS (Multimedia Messaging Service) Gateway: A dedicated MMS gateway, which can be used by the departments.
- Out Bound Voice Diallers: A dedicated out bound calling facility has been set up for m-governance. The plan is to also provide the facility for recording voice prompts, transliteration from English to Malayalam and scheduling voice SMS as additional services.

- **Bluetooth Kiosks:** Bluetooth kiosks can play an important role in information dissemination. They will be deployed in places like bus stations, railway stations and airports. Citizens can turn on the Bluetooth on their phones and receive information regarding government schemes, tourism and so on.
- **Servers:** Dedicated servers will be deployed for voice applications, MMS/SMS services and USSD services at the State Data Centre.

4.2.40 e-governance has percolated down to the lower levels of governance. This is distinctly visible in Kerala through the implementation of two programmes — e-District and e-Panchayat. There is, however, limited information on the latter. The e-District is a State Mission Mode Project under the National e-Governance Plan.<sup>33</sup> e-District, as a concept, proposes integrated, seamless and online delivery of citizen services at the district level through automation of workflow, back-end digitisation, integration and process re-design. The project aims to target aggregate services delivered at the district level and to undertake back-end computerisation for enabling the delivery of citizen services through Akshaya centres. The government has implemented the pilot e-District project with the vision of making all government services accessible to people in their locality through Akshaya centres and to ensure efficiency, transparency and reliability of such services. Started in 2008, the pilot phase of the project was implemented in Kannur and Palakkad districts. Kerala State IT Mission (KSITM) has been identified as the implementation agency for the project. Through this, the IT Mission plans to issue all certificates with the digital signature of the concerned issuing officer. It has also decided to roll out the e-District project across the State and has already procured equipment for three districts (Pathanamthitta, Kottayam and Malappuram). It is also been decided to constitute a District e-Governance Society (DeGS) in all districts for monitoring the development of the e-District project. The formation and other related processes of DeGS is going on. The KSITM is also planned to integrate the e-Payment gateway with this project so that any citizen can file an application without even visiting the CSC.

### e-governance: Limited usage

4.2.41 e-taal is a recently established Web portal for dissemination of e-transactions statistics of national and state level e-governance projects including Mission Mode Projects.<sup>34</sup> It receives transaction statistics from Web-based applications periodically, on a near real-time basis. The top performing state in usage is Gujarat. Madhya Pradesh, Andhra Pradesh, Uttar Pradesh and Haryana are the other top performers, but their relative ranking keeps changing. Among the Southern states, Andhra Pradesh is the leader (Table 4.11a) and the other three are far below. Kerala is a better performer than either Karnataka or Tamil Nadu in terms of e-transactions per 1,000 people, but the poorest performer when it comes to e-transactions per service.

**Table 4.11a**  
**Comparison of Electronic Transactions of Kerala: March 10, 2014**

Name of the State	Number of e-Transactions	e Transactions per 1,000 population	e-Transactions per Service
Andhra Pradesh	50,14,61,392	5,922.9	8,98,676.7
Karnataka	5,91,21,574	967.1	5,68,476.7
Kerala	4,27,45,193	1,280.3	2,84,968.0
Tamil Nadu	7,99,24,096	1,107.9	7,33,248.6
Total	2,61,73,87,299	91,545.6	1,49,42,968.4

Source: *Electronic Transaction Aggregation and Analysis Layer, Department of Electronics and Information Technology Web site. www.etaal.gov.in*

4.2.42 e-transactions are divided in six categories. Category A includes all statutory services, payment of taxes by citizens, payment of subsidies/scholarships, social benefits transfers, non-statutory services and services delivered under PDS/rural development schemes. Category B comprises utility bill payments. Category C comprises transactions such as banking transactions, addition of mobile numbers to the 'do not call registry' by telecom service providers and so on. Category D consists of transactions that involve accessing information from various government portals, downloading of forms and enquiry. Category E comprises repetitive government disbursements to citizens such as social sector pensions, MGNREGA payments, DBT, scholarships and so on, which are periodic in nature. Category F comprises end-to-end services delivered through mobile devices. Category A transactions are the largest category in Kerala (Table 4.11b) and the number is larger than Tamil Nadu. The second largest is Category D transaction, followed by Category B and Category C transactions. Kerala has no transactions in either Category E or F.

**Table 4.11b**  
**Comparison of Category Wise Electronic Transactions of Kerala:**  
**March 10, 2014**

Name of the State	Number of e-Transactions	Category A	Category B	Category C	Category D	Category E	Category F
Andhra Pradesh	50,14,61,392	24,86,59,790	97,98,488	10,47,600	42,80,358	23,05,48,953	71,26,399
Karnataka	5,91,21,574	3,93,89,138	1,79,26,072	19,601	17,86,763	0	0
Kerala	4,27,45,193	3,09,84,027	42,58,445	80,914	74,21,807	0	0
Tamil Nadu	7,99,24,096	2,67,95,501	2,12,93,812	44,049	3,17,90,734	0	0

Source: *Electronic Transaction Aggregation and Analysis Layer, Department of Electronics and Information Technology Web site. www.etaal.gov.in*

4.2.43 The above analysis shows that Kerala has done well in the e-governance category.<sup>35</sup> However, evidence suggests that the impact of the e-governance programmes in Kerala Police and other departments do not translate into changes in ground realities. CDS (2010) conducted a field survey of panchayats in 2009 to understand the demand side aspects of e-governance and interviewed various stakeholders.<sup>36</sup> The survey finds that there is a mismatch between government claims of supply and the citizens' actual use of those services. For example, 88 per cent of local elected representatives approached, wanted more services available in e-mode and 71 per cent of the representatives thought it a worthwhile effort to spend time on it. Of the panchayats in Kerala, 97 per cent have prepared a citizen's charter, but only 42 per cent are aware of this. There are supply side issues such as inadequate training of staff, non-availability of software and so on. The main point that emerges from this analysis is that there is a difference between government claims and the services actually reaching citizens, which has to be resolved in the strategic framework.

4.2.44 The NCAER has been constructing an e-governance measure since 2008. It ranks Kerala in the 'leaders/aspiring leaders' category, but it is ranked lower than its neighbours. The sheer number of e-services and m-services available in Kerala is mind-boggling, but the impact on all stakeholders is unclear. Issues of quality are still ambiguous in Kerala and data on transactions and usage that can be analysed is not available on a systematic basis.

## Use of ICT in economic sectors

4.2.45 ICT in economic sectors can be examined through various lenses. The three main lenses include:

- Development of the ICT industry.
- ICT adoption in various sectors to increase productivity.
- E-commerce/m-commerce, which is buying and selling of goods over the Internet or over the phone respectively.

Detailed data at the state level is not always available to make a rigorous comparison.

## Development of the IT industry

4.2.46 Extensive infrastructure: The development of the IT industry has topped Kerala's agenda for quite some time now. Technopark in Thiruvananthapuram is the first and the largest IT park in the State. The shift to being an IT savvy State started when Kerala enacted the Information Technology Act in 2000. Kerala has developed its IT initiatives in a 'hub and spoke model'. The major IT parks in Kerala — Technopark in Thiruvananthapuram, Infopark in Kochi and Cyberpark in Kozhikode — act as the State's IT hubs (Table 4.12). The secondary spokes are being developed in other major cities and towns. The government has set up two such parks in Kadakkal and Perinad Gram Panchayats in Kollam district. Kerala State IT Infrastructure Limited (KSITIL) is the main implementing agency of this scheme. This is a special purpose vehicle (SPV), in which the government owns 51 per cent and private stakeholders 49 per cent. KSITIL has a land bank of about 1,000 acres, which is already in its possession, for developing about 10 IT/ITES parks/townships.

**Table 4.12**  
**Major IT Parks**

Name	Area	Type of development	Status
<b>Technopark, Thiruvananthapuram</b>			
Technopark, Phase-1, Thiruvananthapuram	180 acres	Non-Special Economic Zone (Non- SEZ)	Completed
Technopark, Phase- 2 Thiruvananthapuram	86 acres	Special Economic Zone (SEZ)	Under progress
Technopark, Phase-3, Thiruvananthapuram	92 acres	Special Economic Zone (SEZ)/ Non-Special Economic Zone (Non-SEZ)	Under progress
Technocity, Phase-4, Thiruvananthapuram	450 acres	Special Economic Zone Status for an area of 47.5 acres	Under progress
Technopark, Kollam	44.46 acres	Special Economic Zone (SEZ)	Under progress
<b>Infopark</b>			
Infopark, Kochi	100.86 acres	Specific Economic Zone for an area of around 80 acres	Completed
Kochi, Phase-II	160 acres	Mix of SEZ and non SEZ clusters	Under progress
Cherthala	66 acres	60 acres has been notified as a sector specific SEZ	Under progress
Ambalapuzha	100 acres	33 acres notified as Special Economic Zone	Under progress
Thrissur	30 acres	Non-SEZ development	Completed
<b>Cyberpark</b>			
Kozhikode	69.19 acres	SEZ	Under progress
Kannur	25.62 acres	SEZ	Under progress
Kasaragod	99.83 acres	25 acres as SEZ	Under progress
ITES Habitat Centre	0.34 acres	India's first exclusive ITES training centre	Completed
Rural IT Parks / Technolodges	NA*	Rural IT parks	Planned
Other Parks	NA*	Private IT Parks	Planned
Smart City – Kochi	250 acres	SEZ	Planned/Under progress
Muthoot Technopolis	0.00815 acres	SEZ	Completed

Source: Kerala State IT Infrastructure Limited and KINFRA

Note \* Not finalised as it is in planning stage.

**Table 4.13**  
**State-wise IT exports: 2000–01 to 2012–13 (Rs crore)**

State	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2010–11	2011–12	2012–13
Andhra Pradesh	2,017	2,805	3,668	5,025	8,270	12,500	18,582	26,122	31,039	28,675	28,948	34,492
Gujarat	102	122	105	141	187	247	564	681	1,268	1,251	1,116	982
Haryana	1,450	2,140	2,734	4,292	5,953	8,358	9,287	10,960	12,410	13,651	13,507	15,363
Karnataka	7,475	9,904	12,350	18,100	27,600	37,000	48,700	55,000	70,375	70,241	82,110	95,048
Kerala	141	159	165	212	270	452	750	1,201	1,803	2,072	1,983	2,240
Madhya Pradesh	50	88	107	102	140	189	220	185	198	247	237	244
Maharashtra	2,570	4,603	5,508	8,518	11,542	15,500	27,625	35,374	42,361	49,874	46,263	49,796
Orissa	200	213	260	319	400	465	732	844	1,162	1,253	1,410	1,702
Punjab	50	70	70	182	267	182	195	228	230	438	351	505
Rajasthan	30	45	47	130	200	271	312	275	358	492	494	638
Tamil Nadu	2,954	5,014	6,305	7,621	10,790	13,960	20,745	28,295	28,356	28,290	29,082	29,183
Uttar Pradesh	1,660	2,000	2,542	2,750	3,825	5,476	8,453	10,695	10,264	10,945	10,989.4	13,195
West Bengal	250	604	1,200	1,600	2,000	2,500	3,500	4,500	5,129	5,665	5,920	6,030
India	29,523	37,176	51,458	74,019	1,00,965	1,44,214	1,80,155	2,07,358	2,05,505	2,15,624	2,26,712	2,51,498

Source: Software Technology Parks of India Web site.  
<http://www.stpi.in/index.php?langid=1>

4.2.47 Inter-state comparisons, however, indicate that Kerala lags far behind the leading states. It does not contribute even 1 per cent of the country's total exports as per the 2012–13 data. Overall, Kerala's IT infrastructure does not show much dynamism. Its exports are very low compared to its three Southern neighbours — Karnataka (leader), Andhra Pradesh and Tamil Nadu (Table 4.13). This is despite the Government of Kerala's continuous efforts to woo private sector IT companies by providing space (land) to the industry.

4.2.48 Kerala is a paradox. It was a pioneer and a leader, and in the late 1990s embarked on making ICT a priority in all aspects of the economy and society. Unlike other Southern states, Kerala stands out for the immense amount of public investment in ICT infrastructure and readiness. In addition to the government's efforts, Kerala has some competitive advantages in the IT sector. It has the highest Human Development Index in India measured in terms of educational and health attainments. In addition, the State also has the advantage of a fairly well developed e-infrastructure. Despite these advantages and its early beginnings, Kerala lost out due to the absence of a growth environment. All the favourable factors have not made Kerala an ICT hub, even nationally.

### Adoption of IT in economic sectors

4.2.49 The National Manufacturing Competitiveness Council (NMCC) and NASSCOM in their report titled, 'A Roadmap to Enhance ICT Adoption in the Indian Manufacturing Sector' carried out a survey in 2010 to examine the adoption of ICT in micro, small and medium industries (MSME) in India.<sup>37</sup> It shows uneven adoption of ICT and massive potential for improvement, thereby increasing productivity of industry in India (and Kerala). The report distinguished between 'ICT adoption' and

'ICT deployment'. 'ICT deployment' refers to the overall usage of ICT within a firm; 'ICT adoption' refers to the ICT enablement of a firm's critical business processes. A firm with high ICT deployment levels overall can still have low ICT adoption levels. ICT solutions can be categorised into various levels on the basis of their co-relation with the typical core business processes of a manufacturing firm:

- Basic ICT includes communication, collaboration, HR/payroll management and finance and accounting.
- Core ICT includes procurement and inventory management, order processing and customer management, quality management, product management, enterprise resource planning, product lifecycle management and decision support systems.

4.2.50 The report found that adoption and usage are high in two areas — communication (57 per cent adoption and 92 per cent usage) and finance and accounting (74 per cent adoption and 75 per cent usage). But other areas, such as payment, HR management, order processing and customer management, procurement/material and inventory management, process applications, quality management, centralised system (ERP) and decisions support systems show a percentage of usage below 20. Another key insight that comes from this report is that bigger firms tend to make greater use of ICT.

4.2.51 Tourism and fisheries are two sectors where ICT has been successfully adopted. The State also has programmes for e-health. In other sectors, however, the potential has not been fully captured. A major challenge is, therefore, to use ICT in a significant way, especially if Kerala wants to be a high productivity economy in the next twenty years.

### e-commerce/m-commerce

4.2.52 e-commerce is growing in India. The industry was estimated be worth around US \$10 billion, though travel-ticket sales alone accounted for US\$8.4 billion in 2011.<sup>38</sup> Mobile shopping is also increasing and forms almost 25 per cent of e-commerce.

4.2.53 There is very little e-commerce data available. Table 4.11 shows that the other B2C (Category C) transactions per capita are the highest in Kerala compared to its neighbouring states. The eBay Indian Census is used to indicate activity in this sector in Kerala. The eBay Indian Census tracked buying and selling transactions on eBay over 18 months between July 1, 2011 and December 31, 2012.<sup>39</sup> Its key findings are:

- Kochi is ranked twentieth in terms of value of transactions among the selected cities.
- Kerala is not included among the top ten e-commerce hubs.
- None of the top ten e-commerce companies (as of January 2013), such as Flipkart.com, Snapdeal.com, Jabong.com and so on have their headquarters in Kerala.
- Karthikappally, Chirayinkeezhu and Kunnathunad are among the top ten rural hubs of the country. Places where eBay users buy from or sell to are called rural hubs if they have been classified by the Census of India 2011 as 'rural locations'. Kerala's rural areas seem to have exhibited relatively better performance.

4.2.54 Kerala's IT Policy reflects dynamism to keep up with the latest technology and bring the maximum benefits of such technology to all stakeholders, including industry, business and government. Despite the State's best efforts, however, the policy has not been able to transform Kerala into one India's leaders in the ICT sector.

## Low in innovation

4.2.55 The R&D report 2007 has figures on R&D expenditure for only 21 states till 2005–06.<sup>40</sup> Kerala is ranked seventh, spending 5.3 per cent of all states total on R&D. It is ranked on par with Andhra Pradesh, below Karnataka (ranked second), Gujarat (third) and Tamil Nadu (fifth).<sup>41</sup> Maharashtra is the leader in this area, spending 12.3 per cent of the all states total on R&D.

4.2.56 There is a growing realisation that innovation is an important aspect of digitalisation. In order to promote innovation, Kerala has established an autonomous university — Indian Institute of Information Technology and Management in Technopark, Thiruvananthapuram. It focuses on computer science and IT, computational sciences, informatics and humanities and management. It is expected that its location in Technopark will help interaction between industry and academics, which, in turn, should foster invention and innovation.

## e-inclusion

4.2.57 It has been observed that the ICT sector has created employment opportunities for women and has offered them better economic prospects. Employment rates for women in Kerala were higher in the ICT industry (40 per cent) than Indian averages.<sup>42</sup> It is significant that micro units have been set up under the Kudumbashree programme. Approximately 780 women are members of the Kudumbashree IT units and 642 are on contract. A survey of 36 (out of 72) ICT-based micro units in Kerala under the Kudumbashree programme<sup>43</sup> during 2008–09 and 2009–10 reveals the following:

- A majority of the units' core activity was data-entry, which they received from the government sector. Other activities include providing IT manpower, providing IT training and, to a much lesser extent, Web designing and animation/designing jobs.
- A majority of the enterprises earn between Rs 20,000 and Rs 50,000 per month.
- The enterprises are heavily dependent on Kudumbashree to identify customers and get work.

4.2.58 These units are being touted as case studies for inclusiveness. This model needs an upgrade, both in terms of scale and business sustainability.

## 4.3 Strategic Framework

### 4.3.1 Vision

4.3.1.1 Kerala will be on par with the Nordic countries, which, according to the World Economic Forum ranking, are at the top in terms of ICT development. They are also the most successful across the globe at leveraging ICT. They have fully integrated ICT in their competitiveness strategies to boost innovation. ICT is present everywhere and in all areas of society such as education and healthcare.

4.3.1.2 Kerala will have a vibrant, innovative and sustainable ICT sector to drive an integrated knowledge economy and contribute to its sustainable prosperity. The State will be 100 per cent e-literate and digitised. In Kerala's knowledge economy, digital technology will be used to drive productivity and create new growth opportunities across the whole economy. It will catapult Kerala into the league of major knowledge economies by enabling digitisation of information.

### 4.3.2 Mission

“Accelerate development of ICT-enabled solutions to add value in economic sectors with significant global growth potential. The updated ICT strategy aims to help the ICT industry achieve a rate of growth that exceeds the GSDP rate of growth.”

### 4.3.3 Targets

- ICT infrastructure close to the Nordic countries' standards:
  - Hundred per cent of rural households with access to phones.
  - Hundred per cent of households with access to the Internet.
  - Hundred per cent of schools with functional computers.
  - Hundred per cent of colleges with access to functional computers on campus and Internet connectivity.
- Readiness to use ICT:
  - Hundred per cent of households with at least one person who is capable of using a computer.
- Industry:
  - Kerala's ICT exports to be 5 per cent of India's total ICT exports from the current figure of less than 1 per cent — Kerala's ICT exports will, therefore, have to touch Rs 53,825 crore by 2030.<sup>44</sup>
  - ICT readiness in MSMEs.
  - The share of ICT in GSDP to increase to 5 per cent from its current negligible share.
  - Global competitiveness in R&D capabilities.
  - Electronic delivery of services to residents and businesses across all departments and functions so as to achieve the objective of transparency and efficiency.
  - Enable 'SMART' (Simple, Measurable, Accountable, Responsive and Transparent) governance through digital workflow and automation systems.<sup>45 46</sup>

## 4. 3.4 ICT Strategies: Digital Kerala by 2030

4.3.4.1 The information economy is a significant enabler of other sectors. The use of digital technology and information is a key element of most parts of the economy, which means the strategy has the potential to make a real difference not only in Kerala's IT sector, but also across the whole economy. The broad approach will be to develop the 'ICT ecosystem'.

### Pillar 1: Technology

Capacity creation to build world-class ICT-related research capabilities while increasing the emphasis on commercially valuable research.

4.3.4.2 This is going to be a continuously evolving process. Given the current state of affairs, Kerala will need to focus on adapting technology. A few current examples include cloud computing and machine-to-machine computing. Kerala should build a repository of technology from around the world that can then be adapted in the State. However, over the long-term, Kerala should be thinking about developing technology, which can then be exported to other states in India and other countries. It does not have to be hardware technology, and can also be software solutions.

- R&D infrastructure: Kerala will create a globally competitive research and development environment by promoting suitable R&D infrastructure in those areas that offer the greatest value-added benefits to the economy. It includes both hardware and software solutions. It will also build a repository of technology from around the world that can then be adapted in the State. The government is already planning to create innovation zones and incubators. These facilities need to be planned in a comprehensive way after a careful analysis of the value chain.

- Patents: Since 2000, there has been a continuous increase in the number of patents in the IT sector in India. Until 2008, there were 558 patents filed from India. In 2007, 123 patents were filed, but thereafter the number declined. It is observed that a majority of the patents were filed by private industry (327) followed by individuals (60). The government sector had only 38 patents. Most of these patents are owned by Indian companies and the research centres of foreign companies, especially from the US, that operate in India to carry out R&D. One item on the government's agenda should be to attract research centres of foreign companies by offering them a critical mass of ICT researchers and a conducive environment for R&D. The proposed innovation zones could be used as the platform for attracting these research centres.
- Convergence of ICT with other areas: The convergence of various areas with ICT will trigger a 'revolution' of innovation, new markets and applications in the 21st century. The competitive ability of countries, regions and companies in the next 10–20 years will be influenced dramatically by the ability to realise these 'converging technologies'. These emerging opportunities need to be identified and research initiated to explore possibilities.
- Awards: Awards should be given to institutions located in Kerala, which file the maximum number of patents in a year.

## Pillar 2: e-governance Initiatives

4.3.4.3 A transparent smart e-governance with seamless access, secure and authentic flow of information crossing the inter-departmental barrier and providing a fair and unbiased service to all the stakeholders is the need of the hour. — A.P.J. Abdul Kalam.<sup>47</sup> Initiatives in e-governance include:

- Department-centric to citizen-centric e-governance: From isolated departments to integrated service providers to citizen-centric integrated government.<sup>48</sup>
- Kerala has made impressive achievements in e-governance. There is now a need to assess e-governance solutions for quality. The Department of Administrative Reforms and Public Grievances has issued detailed guidelines for Indian government Web sites. These guidelines need to be adhered to.
- The UN e-Government Development Index talks about the four stages of e-government evolution, from emerging information services to enhanced information services to transactional services to connected services.<sup>49</sup> The Republic of Korea (South Korea) was the best performer in e-government development in 2012 and is a good role model for Kerala (Box 4.2).
- Mobile services need to be integrated with e-services as is currently taking place. The key is coordination between various efforts. When a new service is offered, e and m-services should be part of the offering.
- Kerala has done stellar work on e-Districts and panchayats. It needs to extend that work to municipalities, especially census towns, which will require careful handling to manage their transition from rural to urban areas.
- Improved usage of social media to better deliver services.
- e-governance initiatives should be inclusive, such as further development of Malayalam computing, computing for linguistic minorities, computing for the disabled and so on.
- The government collects a lot of data from various areas. However, the current system is extremely tedious, as one has to go to various Web sites to get information. Therefore, data visualisation tools may be made available and also be used on Web sites. They will help immensely in research and analysis and also for transparency. In Germany, for instance, all data is made available on a centralised state Web site.

**Box No 4.2****World leader in e-government development 2012: Republic of Korea**

The government's main Web site has evolved into an integrated portal where citizens can find almost every service they want, at both the national and local level. The main government portal is a gateway to services through multiple channels, by theme and subjects. Citizens can also have a customised channel by inputting their own age, gender and services of interest. Back-office integration across many departments brings together a powerful search engine offering an advanced categorising function, which can list results by Web sites, services and news, including at the local level. A key reason for its continued leadership in world e-government progress is the significant development and provision of downloadable mobile applications that are available from its national portal. The cross sector mobile applications for citizens are both iPhone and Android compatible, including for e-learning, which allows students to learn on their mobile phone in areas such as social studies, maths and English. For employment opportunities, Jobcast provides information on the availability of jobs in the Republic of Korea along with the relevant legislation governing labour.

*Source: Department of Economic and Social Affairs. 2012. United Nations: E-Government Survey 2012, E-Government for the People. United Nations, New York, 2012*

**4.3.4.4 Pillar 3: e-readiness**

- Kerala is already e-ready. However, quality concerns remain. These concerns will be addressed to achieve world-class quality.
- Kerala's Akshaya e-services programme indicates that the highest number of computer users is in the rural areas of the State.<sup>50</sup> While acknowledging Kerala's achievements in e-readiness it is necessary to improve quality. The first step in this process is to define ICT literacy in the Indian context. Academic literature defines ICT literacy "as the set of skills and understandings required by people to enable meaningful use of ICT appropriate to their needs."<sup>51</sup> Box 4.3 shows the basic elements of ICT digital literacy defined by the state of California in the US. Further, any mass ICT literacy programme for India should include skills for using the mobile phone efficiently, that is, to be able to access and send messages. The second step is to set more specific standards within the ambit of the definition mentioned above. For instance, in Maryland in the US, digital literacy standards have been defined for the following elements — computer use, using and creating databases, spread sheets, visual organisers, Webpages, multi-media presentations, digital imaging, using e-mail, word processing and desktop publishing. Basic, intermediate and proficient levels are defined for each of these elements. The third step is monitoring and evaluation of outcomes. For instance, the European Union (EU) collects detailed data on the e-skills of individuals. It collects data on five elements — computers, Internet skills, way of obtaining e-skills, most recent training course in computer use and reasons for not having taken a computer course. The framework for a mass e-literacy policy is three-pronged — defining ICT literacy, setting standards and then monitoring outcomes.

**Box 4.3**  
**Basic Elements of Digital Literacy**

BASIC ELEMENTS OF DIGITAL LITERACY		
Elements	Definition	Competencies
Access	Knowing about and knowing how to collect and or retrieve information	Search, find and retrieve information in digital environments.
Manage	Applying an existing organizational or classification scheme.	Conduct a rudimentary and preliminary organization of accessed information for retrieval and future application.
Integrate	Interpreting and representing information summarizing, comparing and contrasting.	Interpret and represent information by using ICT tools to synthesize, summarize, compare and contrast information from multiple sources.
Evaluate	Making judgments about the quality, relevance, usefulness, or efficiency of information.	Judge the currency, appropriateness and adequacy of information and information sources for a specific purpose (Including determining authority, bias and timeliness of materials).
Creat	Generating information by adapting, applying, designing, intending or authoring information.	Adapt, apply, design, or invent information in ICT environments (to describe an event, express an opinion or support a basic argument, viewpoint or position)
Communicate	Communicate information persuasively to meet needs of various audiences through use of an appropriate medium.	Communicate, adapt, and present information properly in its context (audience, media) in ICT environments and for a peer audience.

Note: Existing international and national digital literacy frameworks and assessment instruments all share these common elements.

*Source: California ICT Digital Literacy: Assessments and Curriculum Framework. Prepared for California Emerging Technology Fund by Kempster Group.*

#### Pillar 4: Stimulate the Growth of the IT industry

4.3.4.5 Integrate IT hubs with health and education hubs: KPP 2030 proposes a hub and spoke model for education and health in Kerala, which may give a major boost to the IT sector. The IT hubs and spokes can be connected with the other hubs and clusters developed in the State. Ann Arbor in Michigan in the US is known as a university town. All major IT companies have offices in Ann Arbor. This is not just because of the talent that the University of Michigan offers, but also because of the huge domestic demand created by the university system. The university requires a massive amount of software development — not just for administrative purposes, but also for teaching and research. This gives a push to the ICT sector. The implication is that there needs to be dynamic linkages between education, health and IT in Kerala. This will be more sustainable and less vulnerable to global changes. In this dynamic scenario, Kerala will be able to build an innovative, entrepreneurial environment with start-ups. Unless these linkages are established in the State, 3,000 technology start-ups cannot be attracted by 2020 as envisaged in the IT Policy 2012. Further, Kerala with its natural advantages coupled with an innovative, dynamic and entrepreneurial environment can hope to attract the best minds from around the world to make the State their home, thereby having a multiplier impact on its economy. Kerala will need to develop niche areas such as software

applications and hardware related to health and education, since those are the government's focus areas for the future. A mutually reinforcing relationship between innovation in health and IT will spur innovation in ICT and will, in turn, spur dynamism for both sectors.

- Hub for free software and business development: Kerala has made major investments in ICT infrastructure and has also encouraged the development of free and open source software. Therefore, Kerala, especially Thiruvananthapuram, may be developed as a free software hub. The International Centre for Free and Open Source Software (ICFOSS), an autonomous institution under the Government of Kerala, can be the knowledge partner for this initiative. Along with other efforts, it should also open an innovation/incubation centre in this institute to foster entrepreneurship in the sector.
- SMART business rules: Promotion of start-ups requires SMART business rules. Google and Facebook were started by people from university campuses in the US and easing business regulations helped their growth. The state government recognises the power of creating a healthy environment for intellectual and innovative thinking. It needs to put in place rules that are simple, measurable, accountable, responsive and transparent. Singapore is a role model for this purpose.

## Pillar 5: Promotion of IT Content Across the Economy

4.3.4.6 The knowledge economy means an increase in the technology content of all types of industries. The government will need to be industry-specific and target the right audience. Since adopting ICT requires investment of both time and financial resources, the government will have to identify the early adopters. Exporting firms are the right candidates for this. They need to be given training and the right incentives to adopt IT. This will impact other firms through supply chains. Similarly, some industries are more likely to adopt ICT. For instance, the logistics industry and R&D companies can be encouraged in Kerala. This will also increase demand for IT workers. Further, e-commerce and m-commerce activities can be encouraged through the logistics industry. Direct policy interventions may also encourage firms to adopt ICT tools to meet policy requirements.

- ICT adoption can also involve building an industry or export portal. For example, Taiwan's Council of Agriculture launched several Web sites to provide a marketing channel for Taiwan's agricultural producers. AgExporter Web is a B2B Web site that connects importers to Taiwanese producers. Similarly, the Korean government created the Korean Marketplace Web site to showcase the products of Korean SMEs to global buyers. Local SMEs can easily connect to the global network by posting offers to buy or sell products. The site hosts over 20,000 homepages of SMEs and e-catalogues of over 120,000 products.
- Backward linkages between industry and services so that ICT manufacturing will be encouraged in Kerala. For instance, if Kerala develops a specialisation in wireless medical services, then industry can manufacture the devices required for these services.
- Some examples of ICT tools providing direct services in specific sectors are: e-education, e-learning, e-health, e-tourism, smart grids and CAD-CAM.

## Pillar 6: e-inclusion: Continue the Good Work

4.3.4.7 An e-inclusion policy needs to be an integral part of the ICT policy. It promotes the use of ICT to overcome social exclusion and improve economic performance, employment opportunities, quality of life, social participation and cohesion. ICT should be used as a tool to target the marginal groups in Kerala such as minorities, women and senior citizens. The current Kudumbashree programme has only a limited impact, with barely 1,700 women employed directly or indirectly. Some proposals for the future include:

- Promote rural call centres: The ICT micro units can be used as call centres. On a request from the Karnataka State Electricity Board to set up its call centres, Infosys set one up in a rural area, which has proved to be a fast growing call centre. With cost cutting by companies, these centres may turn into profitable ventures for them. The Kudumbashree programme can also be treated as an avenue for the Corporate Social Responsibility activities of IT parks.
- Kudumbashree and similar ventures can be integrated with small-scale industry to market products across India and abroad. As the economy expands in various ways, the marketing of specialty products can be enhanced with workers trained in ICT. For example, organic textiles, organic vegetables, organic rice, coir products and so on can all be marketed over the Internet or phone through Kudumbashree and similar organisations. This can be a win-win situation for all those involved. A project-based approach may be initiated to promote rural BPOs and call centres.
- The government can set up departmental call centres in rural areas to enable citizens to interact with it for accessing various services and to expedite the redressal of grievances.
- Special programmes need to be developed for senior citizens. They need more handholding while using ICT services. Community centres in urban and rural areas should be encouraged to train senior citizens, even allowing for repeated visits, at a low cost, to make them comfortable and confident in the use of computers.
- Libraries are a symbol of civilised societies. It is recommended that a library network be developed throughout Kerala. Kerala should think ahead in terms of a digital library. These libraries have proved to be a good place for ICT training in many developed countries. Case studies also show that ICT training is being given to women in such libraries in developing countries too (Box 4.4).

#### Box No 4.4

### Empowering women and girls through ICT in libraries

The Northern Regional Library in Tamale, Ghana established a programme that provides technology training on the Internet, Web 2.0 uses and search techniques, along with leadership development. The 3-month programme trained 125 young women. The library instituted training hours to make it easier for girls to attend the training while still working during the day. In addition to this training programme, the Northern Regional Library also provides general computer and Internet access for the community, hosts regular events on technology and creates a space for female patrons to participate in ICT-related activities.

A library in Bogota, Colombia offers girls aged 5-18 access to not only books and literacy programmes, but also to computers, the Internet and technology training.

Librarians in the southern Ukraine city of Zaporizhia saw an opportunity to help their community when they noticed that many girls were falling prey to drug abuse and other unhealthy choices. They launched a programme to provide girls with ICT training, career advice and an overall support network. The programme offers basic computer training, as well as more specialised technology training in professions of interest to the girls.

A library in Copán, Honduras offers technology training and digital literacy programmes to girls and women in the community. Many girls who have been trained at the library later became library volunteers themselves, training other people in the community — particularly girls and women — in ICT and digital literacy. The training has improved school performance and enhanced the education of many, encouraging more girls to stay in school and actively seek out more educational opportunities.

The National Library of Uganda has introduced an ICT training programme designed for female farmers. After conducting background research in local communities, the library found that female farmers have many unmet information needs and would benefit from access to weather forecasts, crop prices and planting information, particularly in local languages. This programme empowers women farmers and increases their economic well being through technology skills, even helping them set up online markets for their crops. In addition to in-person training, the programme also provides agriculture information to participating women through mobile phones and text messages.

Source: Libraries Powering Development Web site: <http://www.beyondaccess.net>.

## Pillar 7: Environment

4.3.4.8 Move from parks to integrated smart townships: The concept of IT/education/health parks should give way to smart townships. These townships will be managed with the aim of sustaining them as a place of vitality, liveability and spatial interactivity for residents. Further, the IT parks will be 'green' parks, with facilities such as water harvesting and recycling. Water bodies that flow through the townships will be cleaned regularly and green spaces for walks/bicycling can be built around them. The buildings themselves should be 'green', following the latest building management techniques to preserve energy. The parks should try and generate their own renewable energy. Waste management and waste recycling facilities need to be adopted. Selected areas within the parks can be used for organic farming, especially vegetables and flowers, with composting being carried out in the farming zones. This will give people working in the area access to fresh organic vegetables, while also giving a fillip to ICT applications in agriculture.

- E-waste management policy: This is especially important as Kerala has very little land and ICT is a focus area for the State's future development. The 'four R policy' of reduce, reuse, recycle and recover needs to be used to re-cycle electronic products. The E-waste (Management and Handling) Rules have been implemented from May 2012 onwards, but Kerala should try and improve on them with a State e-waste policy. Further, recycling of waste can become an industry in itself, like it has in Germany. For instance, recycling rare metal recovered from used computers can become an export avenue for Kerala.

## 4.4 Implementation

### 4.4.1 Institutions

- Implement central government laws such as the IT Act 2008, if they have not already been implemented.
- Create legislation/rules for Electronic Service Delivery Act.
- Fine-tune Data Policy: Given the significant on going digitisation, determine how data is going to be maintained and protected.
- Ensure that the privacy law protects the privacy of data, especially data relating to citizens.
- Implement a Cyber Security Policy.
- Extend the Knowledge Repository Policy: The Knowledge Repository Policy of the Secretariat needs to be extended everywhere.
- 'e' and m-enable Right to Information with an archival policy.

## 4.4.2 Monitoring and evaluation

4.4.2.1 The ICT indicators that may be collected by the government, and monitored and evaluated are outlined in Box 4.5. Kerala needs to maintain them on a continuous basis, at regular intervals, district wise. A corollary to this is the idea of impact evaluation. The 12th Five Year Plan at the central level has now made impact evaluation an integral part of any programme. Even the IT department of the central government has embraced this concept. The State's IT department should also make base line and impact evaluation studies an integral part of its various projects. While this will help assess the impact on stakeholders, it is more important as a learning process that will help deliver better services to the people of Kerala.

### Box No 4.5 ICT Indicators

#### ICT Sector

- Percentage of the ICT sector in GDP
- Percentage of personnel in ICT in total employment
- Revenue expenditure (BERD) of businesses in the ICT sector as a percentage of total revenue expenditure

#### Broadband and Connectivity

- Broadband connections to individuals and enterprises
- Telephone connections
- Computers
- Access to the Internet

#### ICT usage by individuals

- Individuals who have carried out Internet-related activities
- The purpose for which ICT is used
- Average time spent

#### ICT usage by enterprises

- Share of enterprises' turnover from e-commerce
- The type of usage

#### e-Public services

- E-government usage by individuals and enterprises

#### E-Commerce by individuals and enterprises

- Individuals having ordered/bought goods or services for private use over the Internet in the last three months

#### E-Skills of individuals

- The type of operations individuals can perform on computers based on how e-literacy is defined

## 4.4.3 Capacity Building

4.4.3.1 Government employees: Research by CDS (2010) points out that lack of capacity is one factor that hinders effective implementation of the e-governance programme in Kerala.

- If not mandated, rules may be changed to make minimum knowledge of ICT a prerequisite for hiring in government. This should be applicable for hiring right from the clerical level.
- Orientation sessions for new employees should include an ICT course so that all are brought to the same level.
- Regular ICT training for people from the clerical level to the leadership level, including those at the Principal Secretary and Secretary level.

- Regular ICT training for political leaders at the local level, including municipality and panchayat leaders. The training should include a module on e-governance. These courses will not be a one-time activity, but a regular initiative. Ideally, local representatives should be provided with laptops or tablets for official use, to be returned when they are no longer in office.
- Public and private universities should be able to offer courses (recognised by the government) in 'e' and m-governance.
- Course content should be regularly revised, especially given the changing nature of technology.
- The training programmes should be evaluated regularly. The quality of a programme will be assessed based on whether officials are able to fulfil the tasks that are expected of them. The courses can be developed accordingly.

4.4.3.2 ICT-enabled and embedded education, R&D and innovation initiatives should be strengthened within the economy. With its comparative advantage in capacity building programmes such as the e-governance diploma programme, Kerala can highlight its expertise to attract students from all over the country and the world to its educational institutions.

## 4.5 Conclusion

4.5.1 ICT is the cornerstone of the knowledge economy that Kerala aspires to build over the next twenty years. It will be integrated with every aspect of the State's economy. Kerala will need to improve on its e-readiness to match the standards of the Nordic countries. Citizen-centric, integrated e-governance activities will bring the people in the State a better quality of life. Kerala will focus on developing comparative advantages in newer areas, turning ICT and ICT-enabled goods and services into major exports of the State.

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- <sup>15</sup> Daman and Diu is the second in rank with barely 30 per cent of its villages with Internet café as per the ASER, 2012. This shows the tremendous achievement made by Kerala in making ICT infrastructure accessible to all its denizens and bridging the urban-rural digital divide within the state.
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- <sup>32</sup> This section is taken from the Kerala State IT Mission, Department of Information Technology, Government of India Web site. <http://www.itmission.kerala.gov.in/>.
- <sup>33</sup> The reference for the rest of the paragraph is from the Kerala State IT Mission Department Web site. <http://www.itmission.kerala.gov.in/e-district.php>.
- <sup>34</sup> The source for the information for this paragraph is from the Web site: Electronic Transaction Aggregation and Analysis Layer website. [www.etaal.gov.in](http://www.etaal.gov.in).

- <sup>35</sup> There is difference between implementing programs and the extent of its usage. For example, the Service and Payroll Administrative Repository (SPARK) for Kerala is an Integrated Personnel, Payroll and Accounts Information System for all the Employees in Government of Kerala which was rolled out in 2007. However, evidence based on a yet unreleased NCAER-DeitY survey suggests that less than 20 per cent of employees' salaries are deposited electronically and 100 per cent leave records are maintained electronically. No other employee record is stored electronically. This implies that quality of programs implemented need careful and constant monitoring.
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- <sup>48</sup> Ali-Khouri, A.M. 2011. An Innovative Approach for e-Government Transformation. *International Journal of Managing Value and Supply Chains*. 2(1). 22–43.
- <sup>49</sup> Department of Economic and Social Affairs. 2012. *United Nations: E-Government Survey 2012, E-Government for the People*. United Nations, New York, 2012.
- <sup>50</sup> The e-literacy program has been successful as evidence by the high degree of households having at least one person who knows how to use a computer in rural areas (ASER, 2011) but there is no consistent definition or standards on e-literacy in the State. Establishment of that will greatly ensure delivery of increased quality of the programme. The Akshaya Web site mentions e-Vidya certificate which gives practical oriented training in Microsoft Word, Microsoft Excel, Internet, Malayalam word processor, World Wide Web and Operating Systems. The Basic

*Computer Literacy course includes the following topics: computer fundamentals, Windows/Linux Operating Systems, word processing, Internet and e-mail (Akshaya Web site, <http://www.akshaya.kerala.gov.in/index.php/educational-programs/125-three>). Box 12.3 defines standards in skills rather than knowledge of various programs. This definition of standardised skills and its independent assessment is crucial in the discussion on e-literacy in Kerala.*

- <sup>51</sup> Oliver, R. and S. Towers. 2000. *Benchmarking ICT Literacy in Tertiary Learning Settings*. . In R. Sims, M. O'Reilly & S. Sawkins (Eds). *Learning to choose: Choosing to learn. Proceedings of the 17th Annual ASCILITE Conference* (pp 381–390). Lismore, NSW: Southern Cross University Press.

# INSTITUTIONS AND INNOVATIONS FOR SUSTAINABLE AGRICULTURAL GROWTH





## Institutions And Innovations For Sustainable Agricultural Growth

### 5.1 Introduction

5.1.1 Rapid growth of the economy is closely associated with, and indeed requires, a shift in economic structure from an agricultural base to a modern industrial base. Kerala is no exception, where the contribution of agriculture and allied services to the overall Gross State Domestic Product (GSDP) has fallen from about 30 per cent in 1990–91 to 10.6 per cent in 2010–11. However, globalisation, the emergence of integrated value chains, rapid technological and institutional innovation, livelihood and food security issues and environmental constraints have redefined the role of agriculture. A new paradigm has emerged that recognises agriculture's role in development in the context of sustainable development even while its overall share in GSDP declines. This paradigm requires traditional agriculture to transform rapidly into a modern sector, adopting innovation, thereby making a large contribution to overall economic growth along with environmental and social enhancement. Against this backdrop, the Perspective Plan outlines a roadmap for the development of Kerala's agriculture and allied sectors. The long-term strategy of Kerala's agriculture and allied sectors will be to shift to a new paradigm that embraces innovation.

### 5.2 Performance of Kerala's Agriculture

#### Diminishing share of agriculture in both GSDP and workforce

5.2.1 The estimates of annual trend growth rates of gross domestic product of agriculture, forestry and fishery sectors along with that of overall agriculture and allied sectors and non-agricultural sector in Kerala are presented in Table 5.1. These estimates show that agriculture (including livestock) exhibited a modest growth of 2.53 per cent during the 1990s, but displayed poor performance (0.27 per cent) during the decade after 2000. A similar deceleration in growth was noticed in the forestry and logging sector too, but the fishery sector experienced a slight improvement in growth from -0.37 per cent to 0.32 per cent. Overall, agriculture in Kerala experienced a slower growth during the last decade with all its sub-sectors losing growth momentum (except fishery, but the growth rates are fairly low), whereas the non-agricultural sector grew faster during this period.

**Table 5.1**  
**Trend Growth Rates in GSDP (2004–05 Prices) of Various Sub-sectors in Kerala (% per year)**

Sector	1990–91 to 1999–00	2000–01 to 2010–11	1990–91 to 2010–11
Agriculture*	2.53	0.27	1.28
Forestry and Logging	3.69	2.00	2.31
Fishery	-0.37	0.32	0.35
Agriculture and allied sectors	2.34	0.46	1.29
Non-Agriculture	6.24	9.41	7.53
All sectors	5.25	7.96	6.30

Note: \*GSDP Agriculture includes both crops and livestock.

Data Sources: National Accounts Statistics and Central Statistical Office

5.2.2 The relatively low growth of agriculture has resulted in the share of agriculture and allied sectors in GSDP declining steeply from 32.6 per cent in 1980–81 to 10.6 per cent in 2010–11. Agriculture alone accounted for about 8.3 per cent of total GSDP in Kerala in 2010–11.

5.2.3 The decline of agriculture has led to a fall in the share of the workforce in agriculture. Although there are some fluctuations, the long-term trend is one where the share of the workforce engaged in agricultural operations has demonstrated a steep decline over the years (Table 5.2). A reduction is seen in both number and share of cultivators and agricultural labourers. In 1981, nearly 13 per cent of the workforce was engaged as cultivators, but this share went down to 7.2 per cent by 2011. Similarly, agricultural labour as a share of main workers declined from 28.2 per cent to 16.1 per cent during the same period. In total, the share of the population that depended on agriculture as a source of livelihood went down from 41.1 per cent in 1981 to 23.3 per cent in 2011.<sup>1</sup>

**Table 5.2**  
**Profile of Workers in Kerala**

Particulars	1981	1991	2001	2011
No. of main workers ('000 nos.)	6,790.1	8,299.4	8,237.0	8,236.7
As share of total population (%)	26.68	28.53	25.87	24.67
Number of cultivators ('000 nos.)	887.5	1,015.8	586.5	740.4
As share of main workers (%)	13.07	12.24	7.12	7.20
Agricultural labour ('000 nos.)	1,916.8	2,119.7	1,021.4	1,653.6
As share of main workers (%)	28.23	25.54	12.40	16.1

Source: Devi, P.I. 2012. *Dynamics of Farm Labour Use-An Empirical Analysis. Agricultural Economics Research Review*. 25(2). 317–326. July–December

5.2.4 Notwithstanding this, agriculture still forms the backbone of Kerala's economy as approximately one-fourth of the workforce is in the primary sector, directly dependent on agriculture and allied services. It also forms the resource base for a number of agro-based industries and agro-services.

## Increasing value of product

5.2.5 Between 1990–91 and 2010–11, per capita income (GSDP, based on 2004–05 prices) in Kerala increased from Rs 19,502 per capita to Rs 56,107 per capita, an increment of 187 per cent within a period of two decades. But such an improvement did not happen in the case of income from the agricultural sector (Table 5.3). It increased from Rs 4,187 to Rs 4,674, which is a mere 11.6 per cent. On the other hand, value of product (VOP) from agriculture per hectare of net sown area increased considerably in the State. Improvement in agricultural productivity is a major reason for this upswing

of VOP from Rs 54,231 per hectare (ha) to Rs 97,200 per ha between 1990–91 and 2010–11. A similar enhancement in VOP from agriculture was noticed at the national level also during the same period, but at a slower pace.

**Table 5.3**  
**Income from Agriculture: Kerala versus India**

Particulars	Kerala		India	
	1990–91	2010–11	1990–91	2010–11
Per capita income in Rs (2004–05 prices)*	19,502	56,107	15,865	40,752
Per capita agricultural income in Rs (2004–05 prices)*	4,187	4,674	4,007	5,084
Value of Product from agriculture/ha in Rs (2004–05 prices)*#	54,231	97,200	21,116	32,929
Share of Agriculture in GDP (%)*	21.5	8.3	28.7	12.3
Share of Agriculture and allied sectors in GDP (%)*	26.9	10.6	31.4	14.6

Note: \*GDP Agriculture includes both crops and livestock; GSDP in the case of Kerala \*# Corresponds to the year 2008–09

Source: Agricultural Statistics at a Glance, 2012, <http://agricoop.nic.in/agristatistics.htm>

## Rising yield per acre

5.2.6 Increase in VOP is essentially due to rising yield per acre in most crops. Table 5.4 shows the performance of selected crops during the periods under consideration in terms of the trend growth rates in their area, production and yield. Taken together, these crops account for 82 per cent of Gross Cropped Area (GCA) in Kerala. The key trends are:

**Table 5.4**  
**Trend Growth in Area, Production and Yield of Major Crops in Kerala (%)**

Sector	1990–91 to 1999–00			2000–01 to 2010–11			1990–91 to 2010–11		
	A	P	Y	A	P	Y	A	P	Y
Rice	-5.55	-4.74	0.87	-4.55	-2.79	1.84	-4.92	-3.64	1.34
Coconut	0.34	1.61	1.26	-1.92	-0.11	1.85	-0.49	1.12	1.62
Rubber	1.41	7.35	5.85	1.31	3.37	2.04	1.10	4.51	3.38
Tapioca	-2.30	-0.09	2.26	-4.19	0.15	4.54	-3.17	-0.30	2.96
Arecanut†	2.92	3.48	1.26	0.73	2.11	1.27	2.83	2.63	-0.13
Cashew nut	-3.12	-6.91	-3.91	-7.48	-6.52	1.03	-3.99	-4.31	-0.33
Banana‡	3.31	10.04	6.51	0.01	1.04	1.04	3.30	4.25	0.92
Pepper	0.52	2.46	1.93	-2.65	-5.26	-2.69	0.26	-0.26	-0.51
Ginger	-1.55	-0.36	1.21	-5.60	-2.63	3.15	-3.75	-1.86	1.96
Cardamom	-0.83	7.97	8.87	-0.05	-0.54	-0.50	-0.35	5.38	5.75
Tea	0.36	0.92	0.56	-0.05	-1.65	-1.59	0.30	-0.97	-1.27
Coffee	0.59	12.61	11.95	0.04	-1.44	-1.48	0.25	4.02	3.76

Notes: A: Area, P: Production, Y: Yield

† The growth rates shown above are exponential growth rates. However, the numbers are counterintuitive as the growth rate for the whole period 1990–91 to 2010–11 is smaller than either of the two sub-periods. We calculate average annual growth rate for the three periods: 0.73 per cent between 1990–91 and 1999–2000, -0.1 per cent between 2000–01 and 2010–11 and 0.3 per cent 1990–91 and 2010–11. This shows significant decrease in yields of the arecanut in the second sub-period of 2000–01 to 2010–11.

‡ Similar to arecanut we calculate the average annual growth rate of banana: 12.24 per cent in the period 1990–91 to 1999–2000, -1.2 per cent in the period 2000–01 to 2010–11 and 5.2 per cent for the whole period. This shows significant fall in yield of bananas in the second sub-period.

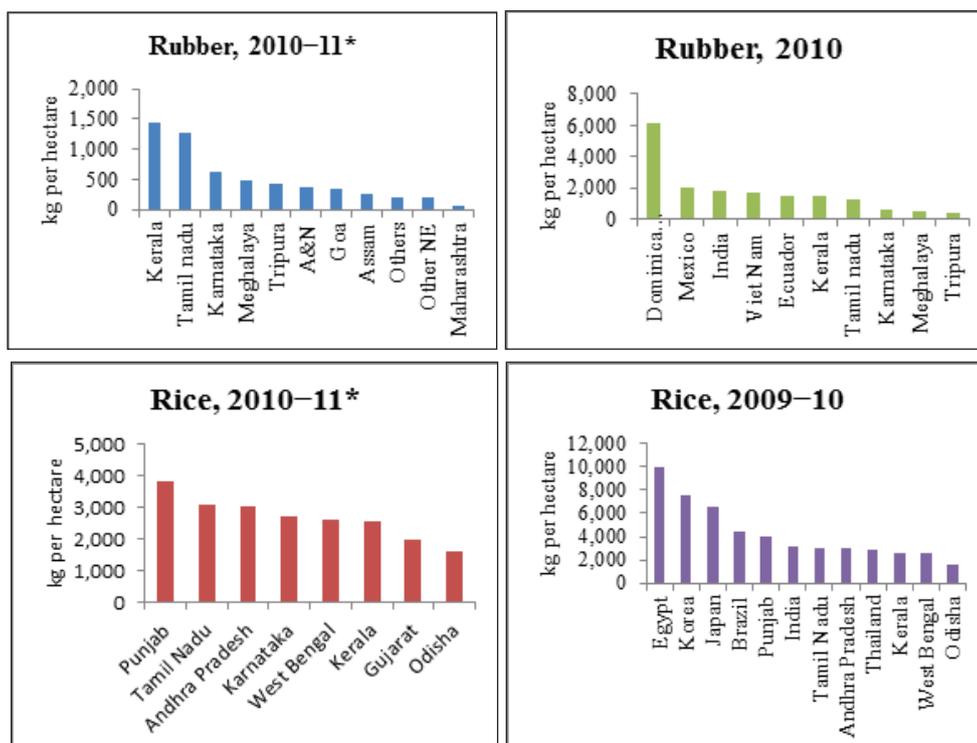
Sources: Farm Guide, 2012, Farm Information Bureau, Government of Kerala and Department of Economics and Statistics

- Only three major crops — rubber, banana and arecanut — displayed impressive performance with both area under them and yield per hectare growing impressively over the past two decades (better than the average growth in agriculture).
- Rice and, to some extent, ginger have experienced conspicuous decline in area and production throughout the 1990s and 2000s despite increase in yield per acre. Area under paddy declined although there have been attempts to conserve paddy area through measures such as the Kerala Conservation of Paddy and Wetland Act, 2008. Cashew nut experienced decline in productivity in the 1990s, but showed signs of improving in the 2000s.
- In the case of coffee and cardamom, production growth was high in the 1990s due to the growth of productivity. However, yield decreased in the 2000s. Pepper also shows a similar pattern, although the rate of increase in yield in the 1990s was below 2 per cent per year. Production of tea stagnated during the 1990s and 2000s.

5.2.7 A general pattern that can be discerned from the above analysis of crops is that agriculture in Kerala has suffered a considerable setback in the recent years, particularly in terms of loss in area. The declining productivity in some niche crops such as pepper, tea, coffee and, to some extent, cashew nut is a cause of concern. It must, however, be observed that most crops have managed to improve their productivity (except cashew nut) even while losing share in area under cultivation.

5.2.8 Inter-state and international comparisons of two major products of Kerala, rice and rubber, however, show that there is vast scope for an increase in productivity in Kerala (Figure 5.1).

**Figure 5.1**  
Yield for Rice and Rubber in Countries and Indian states (kg/hectare)



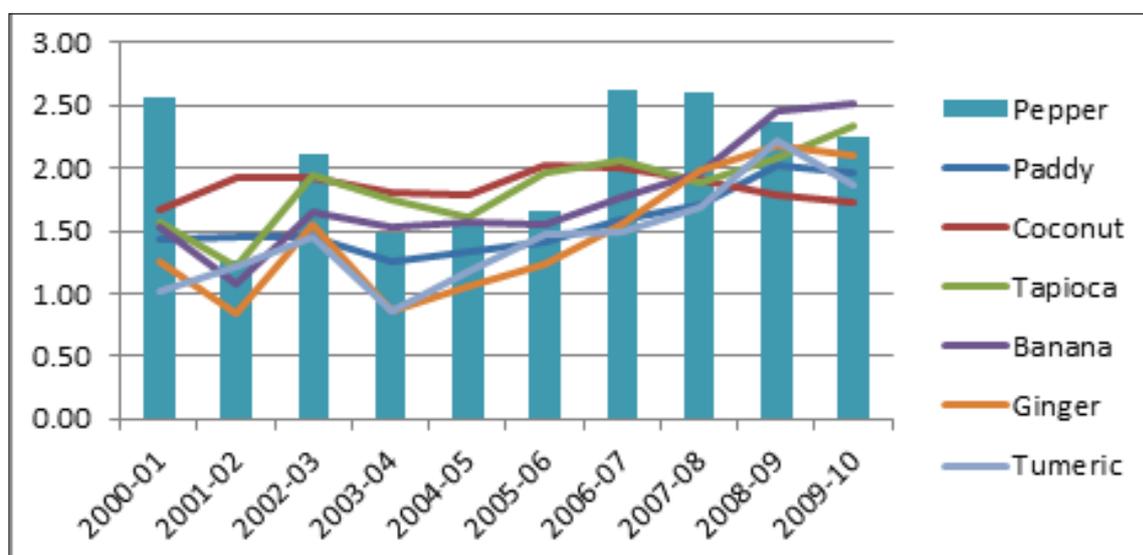
Note: \* These figures are provisional.

Sources: Rubber Board via National Multi Commodity Exchange, 2012-13, FAO Statistical Database, Directorate of Economics and Statistics, Department of Agriculture and Cooperation & FAO, Regional Office for Asia and the Pacific, Bangkok and Department of Agriculture and Cooperation (Horticulture Division)

## Increasing profitability

5.2.9 The ratio of VOP to Cost A (both at current prices) was worked out for Kerala's major crops for the period 2000–01 to 2009–10 and is depicted in Figure 5.2. Cost A, corresponds to all paid-out costs — the cost the farmer meets with liquid cash. The results suggest that except in the case of coconut and pepper, the increase in value of output has steadily outpaced increase in paid-out costs for all other crops. While the ratio increased from 1.33 in 2000–01 to 1.96 in 2009–10 for paddy, the rate of increase was even more pronounced in the case of tapioca (1.56 to 2.33). A similar sharp improvement in the ratio from 1.53 to 2.50 was noticed for banana during the same period. The increase was perceptible for ginger and turmeric also, but with higher inter-year fluctuations. For coconut, even though there was a slight improvement in the ratio in the initial years, a steady deterioration was noticed in the years after 2005–06. In the case of pepper, there were larger fluctuations, but the last few years showed a declining trend.

**Figure 5.2**  
VOP-Cost A ratio for Major Products



Source: *Agricultural Statistics at a Glance, 2011*

5.2.10 In the last decade, although there were improvements in productivity of crops together with an increase in farm prices relative to the rise in costs, both net sown area (NSA) and gross cropped area (GCA) in Kerala have declined. Land use statistics published by the Ministry of Agriculture, Government of India, show that NSA of Kerala in 1990–91 was 22.47 lakh ha; in a span of two decades, NSA has declined by 7.5 per cent. The GCA has declined by 11.6 per cent. In a growing economy, the area under agriculture may decline as demand for land for other uses intensifies. The decline in area must be compensated by a corresponding rise in productivity to ensure healthy growth in agriculture. In Kerala, too, productivity rose, but it was not high enough to ensure a significant rate of growth in agriculture and agricultural income.

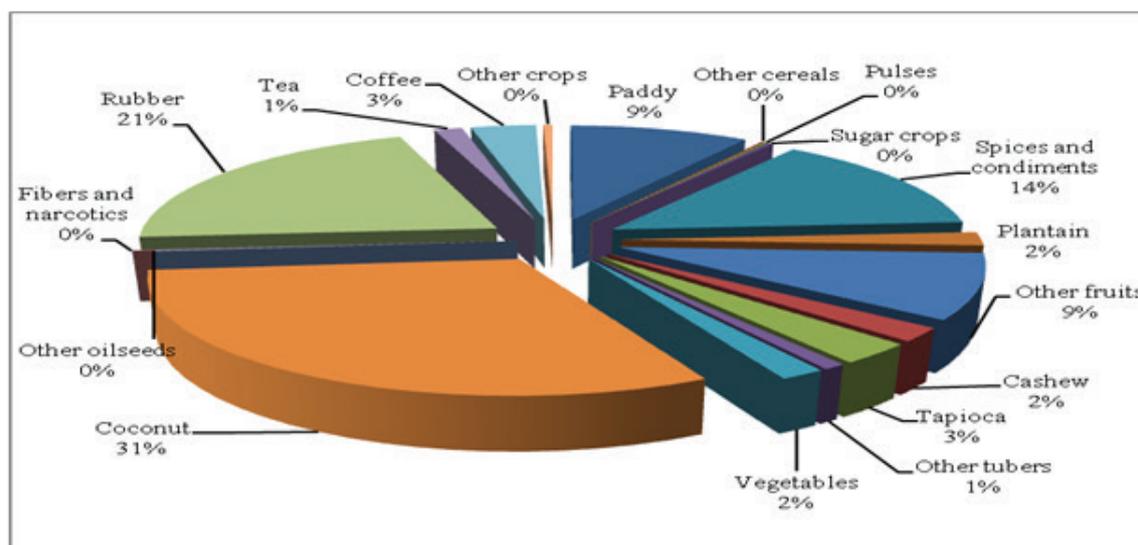
## 5.3 Challenges

### 5.3.1 Structural challenges

#### Highly skewed cropping patterns

5.3.1.1 Agriculture in Kerala is distinct from that of the rest of India in terms of cropping pattern. The geographical distribution of area under major crops of Kerala is presented in Figure 5.3. Coconut occupies the largest area among all the crops in Kerala, with a share of 31 per cent of the total area. This is followed by rubber (21 per cent), which has gained considerable area under it in recent years. Spices and condiments that include pepper, cardamom, turmeric, ginger, cinnamon, clove, vanilla, nutmeg and so on claim a share of 14 per cent, whereas paddy, Kerala's staple food, accounts for only 9 per cent area under cultivation. Banana and other fruits together account for an area of 11 per cent, while all other crop-groups together have less than 14 per cent area under them.

**Figure 5.3**  
Distribution of Cropped Area under Various Crops in Kerala: 2009–10



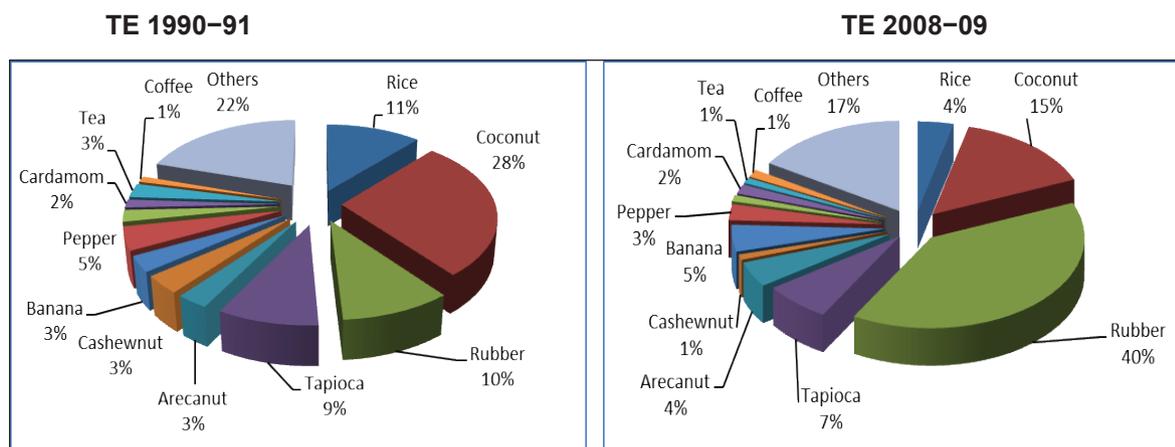
Source: *Agricultural Statistics at a Glance, 2011*

#### Structural shift in the composition of agricultural output

5.3.1.2 The differential performance of crops in terms of area, production and prices over the last two decades has resulted in significant alteration in the composition of VOP from crops. These variations are depicted in Figure 5.4. During the Triennium Ending (TE) 1990–91, coconut topped the list of crops with the highest share of 28 per cent in total VOP from crops. Other major contributors to output were rice (11 per cent), rubber (10 per cent) and tapioca (9 per cent) with other crops contributing 5 per cent or less individually. However, by TE 2008–09, the scenario underwent a major change with the share of VOP from rubber rising to 40 per cent and the contribution of coconut declining to 15 per cent. The share of rice got squeezed to a mere 4 per cent while that of tapioca to 7 per cent. The share of pepper also decreased to 3 per cent from 5 per cent during this span of time. Other minor crops such as tea, cashew nut and so on also lost their share, to a smaller extent. On a different note, banana improved its position with a share of 5 per cent in TE 2008–09 from 3 per cent in the previous period.

5.3.1.3 A general point emerging from the crop shift outlined above is that agriculture in Kerala has witnessed a decline in net area sown and also the increasing importance of commercial crops such as rubber.

**Figure 5.4**  
**Shares of VOP of Major Crops in Kerala: TE 1990–91 and TE 2008–09**



Source: Agricultural Statistics at a Glance, 2011

### Ownership patterns are highly skewed

5.3.1.4 In Kerala, marginal and small holders dominate agriculture. As per the Agricultural Census 2005–06, a total of 6,904,300 farm holdings were operating in Kerala. Of them, marginal farmers accounted for 95.6 per cent of holdings, followed by small farmers constituting 3.11 per cent. The other three holding categories, semi-medium, medium and large holdings, accounted for the remaining 1.3 per cent (Table 5.5).

**Table 5.5**  
**Distribution of number of Holdings and Operated Area in Kerala Agriculture: 2005–06**

Particulars	Marginal	Small	Semi-medium	Medium	Large	All
Number of operational holdings ('000 nos)	6,602.4	214.8	69.7	14.8	2.5	6,904.3
Share in total (%)	95.63	3.11	1.01	0.22	0.04	100.00
Area operated ('000 ha)	895.8	284.8	178.6	78.8	116.9	1,554.8
Share in total (%)	57.61	18.32	11.49	5.07	7.52	100.00
Average size of holdings (ha)	0.14	1.33	2.56	5.30	47.73	0.23

Notes: Marginal: Below 1 ha; Small: 1.0-1.99 ha; Semi-medium: 2.0-3.99 ha; Medium: 4-9.99 ha and Large: 10 ha and above.

Source: Agricultural Census, 2005–06

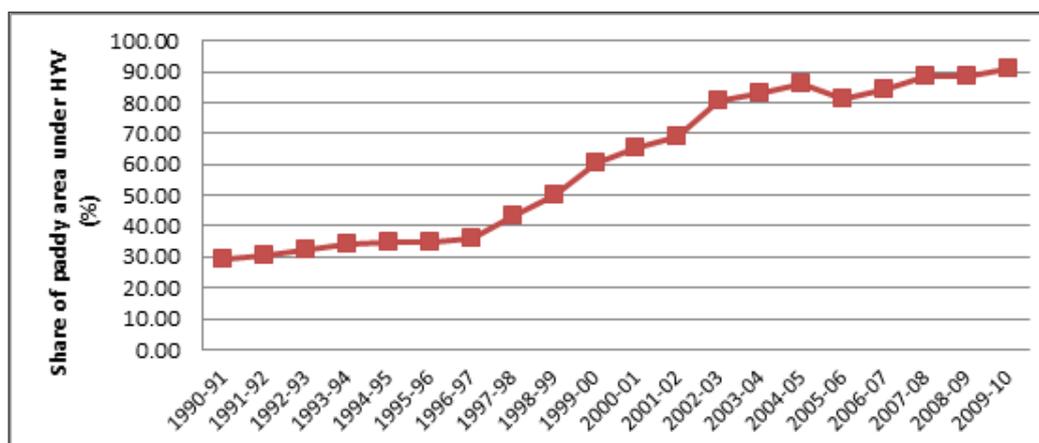
5.3.1.5 It is to be noted that 95.6 per cent of holders operated only 57.6 per cent of the total farm area. On the other hand, 3.1 per cent of land holders, constituting small farmers, took possession of 18.3 per cent area and the 1.3 per cent constituting other holding categories shared the remaining 24.1 per cent land area. On an average, marginal farmers operated on a land holding size of 0.14 ha. The average size of holdings of small farmers was 1.33 ha and that of semi-medium, medium and large farmers were 2.56 ha, 5.30 ha and 47.73 ha respectively. The relatively larger size of holdings under large farmers is due to the presence of commercial estates devoted to cultivation of crops such as tea, coffee, cardamom and so on. Taking all categories, the average size of operational holdings is as low as 0.23 ha, which is one of the lowest in the country.

## 5.3.2 Gap between Requirements and Availability

### Adoption of high yielding varieties of seeds

5.3.2.1 The level of adoption of high yielding varieties (HYVs) has been rather high for paddy. The level and pace of spread of HYVs of paddy in Kerala has been phenomenal. As a result of the concerted efforts of the government and various private stakeholders involved, area under HYV paddy has increased at an exponential rate in the State during the last two decades. The share of HYV paddy area in total paddy area was a meagre 29 per cent in 1990–91, which shot up to 91 per cent by the year 2009–10 (Figure 5.5).

**Figure 5.5**  
Growth in Area Under High Yielding Varieties of Paddy, 1990–91 to 2009–10



Source: Farm Information Bureau. Farm Guide 2012. Government of Kerala.

5.3.2.2 Along with an increase in area under HYV, there has been steady improvement in yield levels of HYVs. Table 5.6 substantiates this point by depicting the improvement in yield of HYVs of paddy between two periods, TE 2002–03 and TE 2009–10 corresponding to three cropping seasons. In contrast, the average yields of local varieties of paddy were seen to be declining, perhaps due to lower interest from farmers in cultivating them.

**Table 5.6**  
Yield of High Yielding and Local Varieties of Paddy in Different Cropping Seasons:  
2002–03 and 2009–10

Particulars	TE 2002–03	TE 2009–10
Yield of HYV paddy (kg-ha)		
i. Autumn	2,137	2,367

ii. Winter	2,345	2,591
iii. Summer	2,671	2,724
Yield of local paddy (kg-ha)		
iv. Autumn	1,781	1,485
v. Winter	1,849	1,748
vi. Summer	1,838	1,645

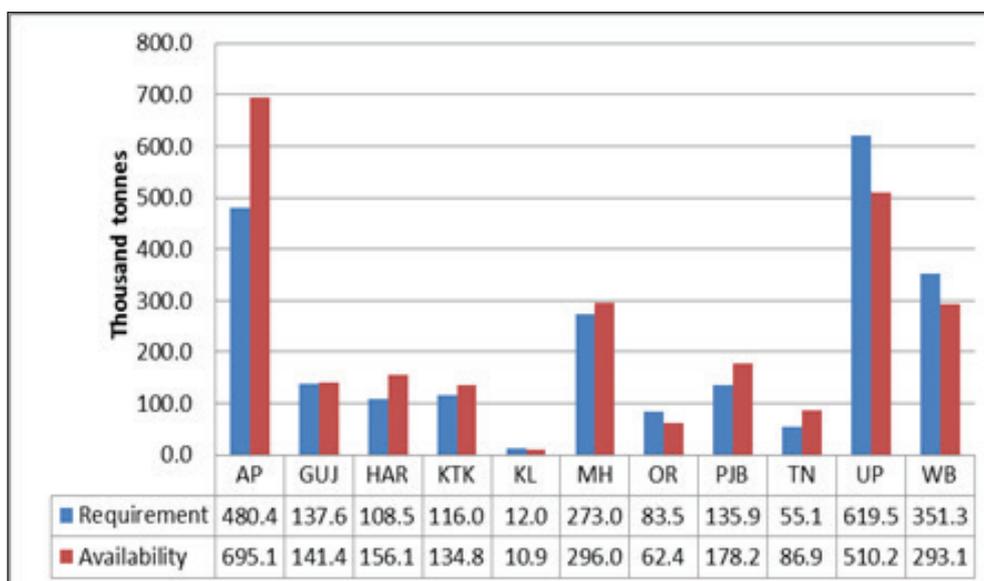
Source: Farm Information Bureau. Farm Guide 2012. Government of Kerala

### Seeds: Gap between the supply and requirement

5.3.2.3 Realising the potential of quality seeds and planting material in securing productivity gains, the Government of Kerala has been striving hard to develop a good network for seed production and distribution. Certified seed production in Kerala is almost entirely from the government sector, unlike in other states. More than half the certified seeds are sourced from the state Department of Agriculture, whereas the rest are met from National Seeds Corporation or other government-approved agencies. At present, there are 33 state seed farms, 10 district farms, 10 special farms, and 8 coconut nurseries functioning in Kerala with the purpose of delivery quality seeds and planting material to farmers (GoK, 2012).<sup>2</sup> The major share of certified seeds are of improved paddy varieties, vegetables and other minor crops. The state government also produces and distributes coconut and arecanut seedlings, rooted pepper cuttings, cashew grafts, tissue culture banana plants, grafts of other fruit crops and so on through Krishi Bhavans and other seed outlets.

5.3.2.4 For Kerala, the annual seed requirement worked out to be 12,000 tonnes, whereas the actual availability was 10,900 tonnes. This means actual availability fell short of the requirement. The other states where availability falls short of requirement are Odisha, Uttar Pradesh (UP) and West Bengal. In a majority of other states, however, seed availability exceeds requirement, indicative of the dynamic role played by seed producers and distributors in these states.

**Figure 5.6**  
Requirement and Availability of Quality-certified Seeds in Major States: 2011–12

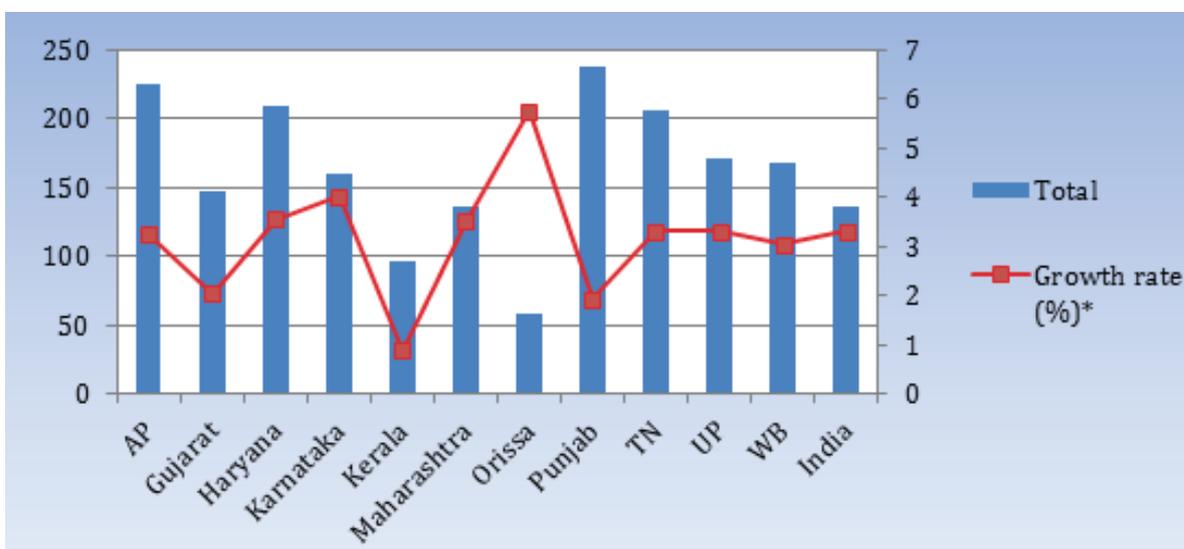


Source: Lok Sabha un-starred question accessed through Indiatat.com, 2012

## Fertilisers: Gap between demand and supply

5.3.2.5 Kerala is a relatively low fertiliser consuming state in relation to other major agricultural states in the country. Organo-phosphorous chemicals are banned in the State. In 2009–10, the total consumption of NPK (Nitrogen-Phosphorus-Potash) in Kerala was estimated to be 95.9 kg per ha of NSA (Figure 5.7). This was much lower than the levels consumed in neighbouring states such as Tamil Nadu (205.8 kg per ha), Karnataka (159.5 kg per ha) and Andhra Pradesh (225.6 kg per ha). Odisha (57.6 kg per ha) was the only major state where fertiliser consumption was found to be lower than that in Kerala. The growth rate in fertiliser consumption during the last two decades (1990–91 to 2009–10) was also the lowest (0.88 per cent per year) in Kerala, while other states registered an annual rate of growth between 2–6 per cent. One reason why Kerala consumed less could be that its cropping pattern is dominated by plantation crops, which require relatively lower amounts of fertilisers. The general preference of people towards organic food could have also contributed to this pattern. What is worrisome is that despite low consumption, there remains a gap between demand for and supply of fertilisers (Table 5.7). In 2011–12, Kerala required<sup>3</sup> around 649,000 tonnes of fertilisers. Out of this, 565,000 tonnes were made available by the state government and the total sales realised were 531,000 tonnes. This suggests that, there was a gap of around 118,000 tonnes of fertilisers to be met during this period.

**Figure 5.7**  
Fertiliser Consumption in Major States (kg per ha): 2009–10



Source: Agricultural Statistics at a Glance, 2011; \*corresponds to the period 1990–91 to 2009–10

**Table 5.7**  
**Requirement, Availability and Sales of Major Fertilisers in Kerala:**  
**2011–12 ('000 tonnes)**

Item	Requirement	Availability	Sales
Urea	182	150	149
MOP	45	44	41
DAP	175	151	142
Complex	247	220	199
Total	649	565	531

*Note: MOP: Muriate of Potash; DAP: Di-ammonium Phosphate*  
*Source: Lok Sabha un-starred question accessed through Indiatat, 2012*

### Low irrigation

5.3.2.6 Out of the total gross cropped area of 2,695,000 hectares in Kerala, an area of 458,000 hectares was found to be irrigated in 2009–10 (Table 5.8). This share of nearly 17 per cent area under irrigation is far below the all India figure of 45.3 per cent. Among the various crops, sugarcane leads with the highest share of irrigated area (97.3 per cent), followed by paddy (72.0 per cent), vegetables (39.3 per cent), banana (35.8 per cent) and arecanut (34.5 per cent). Coconut, whose productivity is highly linked to irrigation, has only 19.5 per cent of its area under irrigation. Surprisingly, predominant annual crops such as spices and tubers also fall under the category of 'under-irrigated' crops. Over the years, area under irrigation has hardly improved in the State. Trend growth rates during the period 1990–91 to 2009–10 show that irrigated area increased at a slow pace of 1.5 per cent per annum.

**Table 5.8**  
**Area under Irrigation of Major Crops in Kerala: 2009–10**

Crop	Gross area irrigated ('000 ha)	Gross cropped area ('000 ha)	Share irrigated (%)
Coconut	151.9	778.6	19.5
Spices	18.8	351.6	5.3
Paddy	168.6	234	72
Tubers	13.1	101.3	12.9
Arecanut	34.2	99.2	34.5
Banana	35.5	99.1	35.8
Vegetables	17	43.4	39.3
Sugar cane	2.9	2.9	97.3
All crops	458	2,695	16.9

*Source: Farm Information Bureau. Farm Guide 2012. Government of Kerala*

5.3.2.7 Of the total potential area under micro irrigation methods in India, only about 9.2 per cent is covered under this system. Andhra Pradesh tops in the use of micro irrigation, with almost 50 per cent of the potential area already covered under the system. It is followed by Karnataka, Tamil Nadu, Maharashtra and Haryana<sup>4</sup> (Table 5.9).

**Table 5.9**  
**Potential and Actual Area under Micro Irrigation in Different States:**  
**31s October 2008**

State	Drip			Sprinkler			Total		
	P ('000 ha)	A ('000 ha)	%	P ('000 ha)	A ('000 ha)	%	P ('000 ha)	A ('000 ha)	%
Andhra Pradesh	730	363.1	49.7	387	200.9	51.9	1,117	564	50.5
Gujarat	1,599	169.7	10.6	1,679	136.3	8.1	3,278	305.9	9.3
Haryana	398	7.1	1.8	1,992	518.4	26	2,390	525.5	21.9
Karnataka	745	177.3	23.8	697	228.6	32.8	1,442	405.9	28.2
Kerala	179	14.1	7.9	35	2.5	7.2	214	16.6	7.8
Maharashtra	1,116	482.3	43.2	1,598	214.7	13.4	2,714	697	25.7
Orissa	157	3.6	2.3	62	23.5	37.9	219	27.1	12.4
Punjab	559	11.7	2.1	2,819	10.5	0.4	3,378	22.2	0.7
Tamil Nadu	544	131.3	24.1	158	27.2	17.2	702	158.5	22.6
Uttar Pradesh	2,207	10.7	0.5	8,582	10.6	0.1	10,789	21.2	0.2
West Bengal	952	0.2	0	280	150	53.6	1,232	150.2	12.2
India	11,659	1,428.50	12.3	30,578	2,442.40	7.9	42,237	3,870.80	9.2

Sources: Raman, S. 2010. *State-wise Micro-Irrigation Potential in India-An Assessment*, unpublished Paper. Natural Resources Management Institute, Mumbai cited in Palanisamy, K., Kadiri, Mohan, Kakumanu, K.R. and Raman, S. 2011. *Spread and economics of micro irrigation in India: Evidence from nine states. Economic and Political Weekly, Vol. XLVI (26&27): 81-86 and www.*

*indiastat.com*

## Low farm mechanisation

5.3.2.8 Farm mechanisation has also been abysmally low in Kerala. Even though labour availability for agricultural operations has decreased in Kerala over the years, a commensurate improvement in mechanisation did not take place. The numbers of major implements used for agricultural purposes in Kerala, based on the Livestock Census 2003, are presented in Table 5.10 (This is the latest available data on agricultural implements at the state level).

**Table 5.10**  
**Number of Agricultural Implements Used for Agricultural Purposes in Kerala:**

Type of Machinery	Rural	Urban	Total	Number – 1000 ha of GCA
<b>Power operated implements</b>				
Power tillers	1,702	603	1,765	0.60
Tractors	2,061	77	2,138	0.72
Mouldboard Plough	153	8	161	0.05
Cultivator	274	5	279	0.09
Disc harrow	254	17	271	0.09
Rotavator	35	1	36	0.10

Animal operated implements				
Cultivator	934	5	939	0.32
Disc harrow	672	16	688	0.23
Seed-fertiliser drill	610	4	614	0.21
Leveller	7,453	248	7,701	2.61
Wetland puddler	378	3	381	0.13
Sugarcane crusher	69	1	70	0.02

Source: Livestock Census, 2003

5.3.2.9 On a per hectare basis, the density of implements was found to be very low in Kerala. This was much lower compared to other states. For instance, the density of use in the case of power tillers and tractors were 0.60 and 0.72 respectively. These were much lower than those for Haryana (30.3 for tractor, 4.1 for tiller), Punjab (37.8 for tractor, 4.5 for tiller) and southern states such as Tamil Nadu (9.4 for tractor, 1.9 for tiller) and Karnataka (5.3 for tractor, 2.4 for tiller). The relatively smaller size of farm holdings in Kerala, decreasing area under paddy and other field crops, predominance of plantation crops and so on could be the key reasons for this observed pattern. A disaggregated analysis indicates that the marginal and small holders that comprise about 98 per cent of the total farm households in Kerala have much lower intensity of farm mechanisation. Considering that the agricultural wage rates are rather high and that there is a shortage of agricultural labour, low levels of mechanisation have constrained productivity growth.

### Peculiar challenges in the plantation sector

5.3.2.10 Kerala's agriculture is different from the rest of India as it is dominated by the plantation sector. The Kerala State Economic Review 2012 states that the State "has a substantial share in the four plantation crops of rubber, tea, coffee and cardamom. These four crops together occupy 7.02 lakh ha, accounting for 34.4 per cent of the net cropped area in the State. Kerala's share in the national production of rubber is 87.3 per cent, cardamom 79 per cent, coffee 22 per cent and 7 per cent in tea during the year 2011–12."<sup>5</sup> Of course, coconut, which can be had in several forms, is the notable exception.

5.3.2.11 Joseph and George (2011) list some of the major challenges in the plantation sector<sup>6</sup>:

- Acute labour shortage.
- Domination of small land holders in rubber production.
- Land tenure systems that do not encourage crop diversification.
- A multitude of taxes that are higher in Kerala than in neighbouring states. For example, plantation tax is 50 per cent in Kerala. It does not even exist in Karnataka and Tamil Nadu. Land revenue tax is Rs 100 per hectare versus Rs 5 per acre or Rs 12.5 per hectare in Tamil Nadu.

### 5.3.3 Financing patterns

#### Gaps in agricultural credit

5.3.3.1 There has been tremendous growth in institutional financing in the agricultural sector in Kerala over the last two decades:

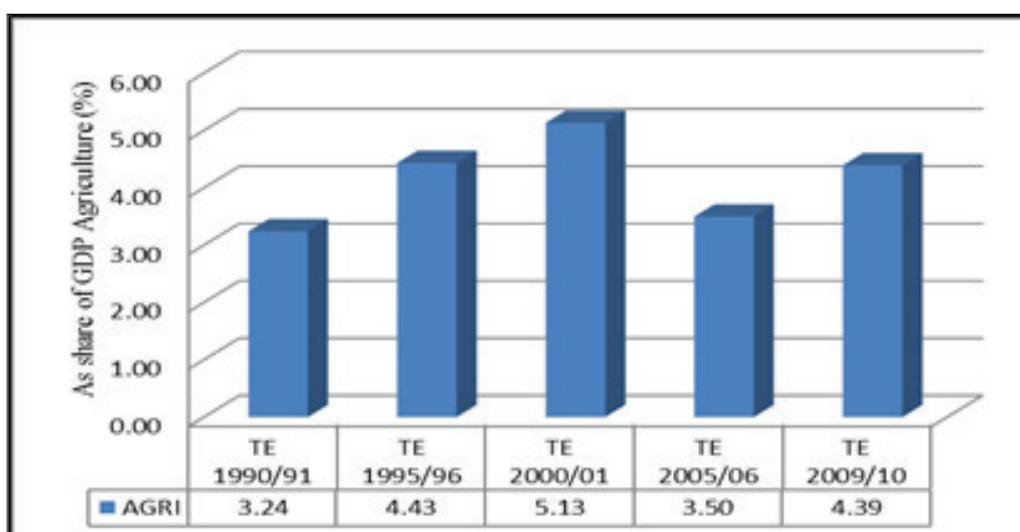
- According to data for 2010–11, the highest share (65.8 per cent) of the total advances outstanding was contributed by scheduled commercial banks (SCBs). Cooperative banks, including Kerala State Co-operative Agricultural and Rural Development Bank (KSCARDB), contributed 24.5 per cent, whereas Regional Rural Banks (RRB) accounted for 9.7 per cent. The share of Kerala Finance Corporation (KFC) towards agricultural credit was a negligible (0.01 per cent).
- Between 1990–91 and 2008–09 the disbursement of direct credit through Scheduled Commercial Banks (SCBs) shot up several times from Rs 678 crore to Rs 10,866 crore. Indirect credit also experienced a similar boost from Rs 46 crore to Rs 1,196 crore. This corresponds to an annual growth of 6.6 per cent in direct and 8.1 per cent in indirect credit at 2004–05 prices. In terms of disbursements per hectare of gross cropped area, direct credit increased from Rs 2,400 per ha to Rs 40,300 per ha and from Rs 200 per ha to Rs 4,400 per ha in the case of indirect credit during the same period. Like commercial banks, the cooperative credit sector consisting of State Cooperative Banks, District Central Cooperative Banks (DCCBs) and Primary Agricultural Credit Societies (PACs) also play an active role in disbursing agricultural credit in Kerala.

5.3.3.2 However, since then, several developments have taken place in this area, including the growing adoption of Kisan Credit Cards (KCCs), increased percolation of micro-finance through self-help groups (SHGs) and so on. The role of KCCs in widening credit delivery among farm households during the last decade has been substantial. As of October 2011, a total of 38.9 lakh KCCs have been issued in Kerala. Assuming that one card is issued to a farm household, this translates to around 56 per cent coverage and speaks of the contribution of this new tool towards improving ground level credit delivery in the State. Even then, there is vast scope for further improving the credit delivery system, given the relatively higher literacy status among the people of Kerala.

### Declining government expenditure

5.3.3.3 Government expenditure as a share of GDP from agriculture in Kerala has been between 3–5 per cent over the last two decades (Figure 5.8). The corresponding all India figure was in the range of 6–10 per cent during the same period.

**Figure 5.8**  
**Government Expenditure in Agricultural Sector as a Share of GDP Agriculture in Kerala (%): 1990–91 to 2009–10 (TE)**

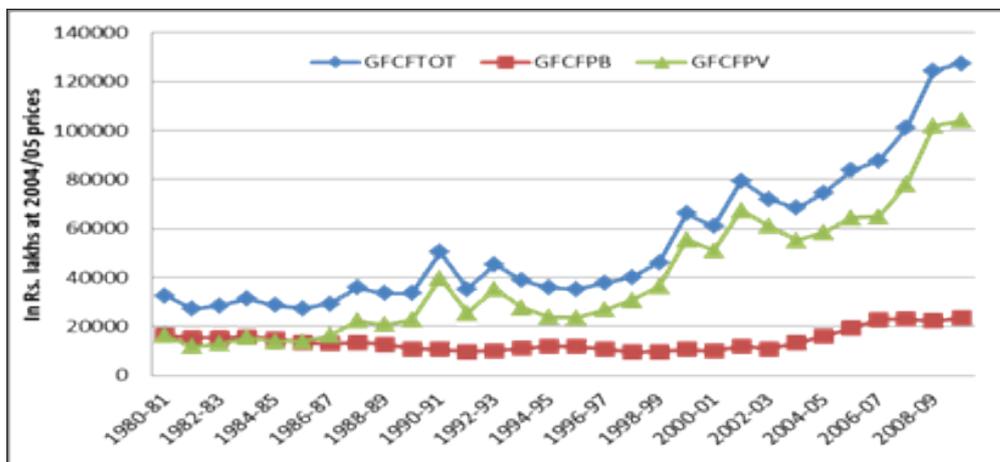


Source: Centre for Monitoring Indian Economy, Online database, 2012

## Low share of capital formation in agricultural GSDP

5.3.3.4 The long-term trends in estimated public, private and total capital formation in agriculture<sup>7</sup> are plotted in Figure 5.9. It is observed that public capital formation in agriculture remained more or less stagnant for a very long time in Kerala, before experiencing a boost sometime in the early 2000s. On the other hand, private capital formation started picking up in the 1990s itself and grew substantially in the following years.

**Figure 5.9**  
Trends in Public, Private and Total GFCF in Agriculture in Kerala

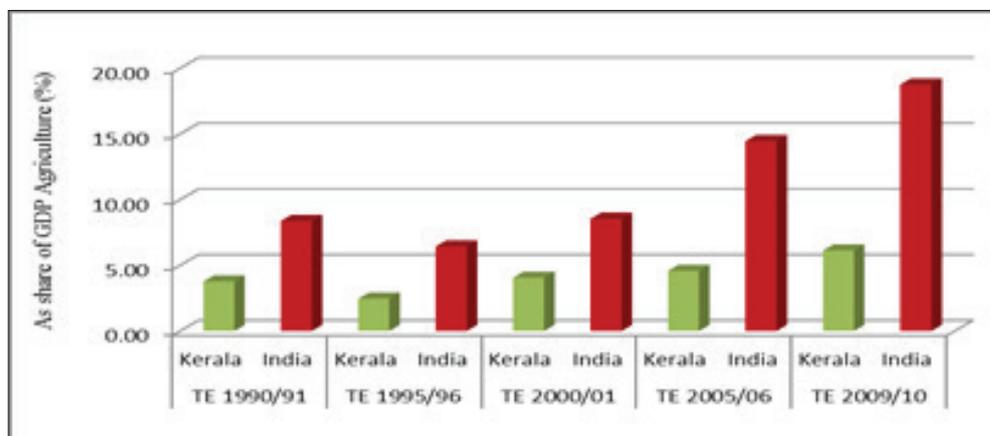


Note: Total Gross fixed capital formation (GFCFTOT); public capital formation (GFCFPB); private capital formation (GFCFPV).

Source: Computed by NCAER based on national figures on capital formation

5.3.3.5 Kerala's share of GFCF (gross fixed capital formation) in GDP agriculture remains much lower than the corresponding all India figures (Figure 5.10).

**Figure 5.10**  
Total GFCF as share of GDP agriculture in Kerala and all India: TE 1990-91 to TE 2009-10



Source: Computed by NCAER based on national figures on capital formation

## 5.3.4 Agricultural marketing

5.3.4.1 Agricultural marketing in Kerala is relatively unregulated.<sup>8</sup> Unlike in most other states of India, the Agricultural Produce Marketing (Regulation) Act, 1966 (APMC Act) that was later modified into the Agricultural Produce Marketing (Development and Regulation) Act, 2003 is not operational in Kerala. The state government and local self-government institutions provide infrastructure for the agricultural markets. Currently, six wholesale agricultural markets function in the State. These include three urban wholesale markets and three rural wholesale markets. All these markets are government-owned and were constituted in 1999–2000 under the Kerala Agricultural Market Project (KAMP) with financial assistance from the European Union.

5.3.4.2 Apart from the above-mentioned wholesale markets, there are 1,290 local self-government governed markets in Kerala. These include 129 municipality markets, 85 municipal corporation markets and 1,076 rural primary markets (Table 5.11). In terms of numbers per administrative unit, these turn out to be 1.07 rural primary markets per panchayat, 17 urban wholesale markets per municipal corporation and 2.43 wholesale markets per municipality.<sup>9</sup> The functioning of these markets is not uniform and their rules on market cesses, rents, other charges and so on vary.

**Table 5.11**  
**Number of Agricultural Markets in Kerala**

Type of market	Number	Number per Administrative unit
Rural primary markets (Panchayat markets)	1076	1.07
Urban wholesale markets		
(a) Municipal corporation markets	85	17
(b) Municipality markets	129	2.43
Total markets	1290	–

*Source: Report of Survey of Markets in Kerala, 2005–06, DES, Kerala*

5.3.4.3 Besides markets, a number of organisations are involved in the procurement and marketing of agricultural commodities in Kerala. Most of them are government owned. A list of organisations involved in the procurement and marketing of agricultural commodities in Kerala has been provided in Box 5.1.

### Box 5.1

#### List of organisations involved in the procurement and marketing of agricultural commodities in Kerala

Vegetable and Fruit Promotion Council Keralam (VFPCCK)

A registered company that operates with the objective of developing the vegetable and fruit sector in Kerala. The company operates through the intermediation of self-help groups (SHGs) of farmers that work as the base units and undertake activities ranging from group marketing, extension, facilitation of credit delivery, value addition, exports and so on.

Public sector agencies

Kerala State Co-operative Marketing Federation (MARKETFED), Kerala State Horticultural Products Development Corporation (HORTICORP), Kerala Kerakarshaka Shahakarana Federation (KERAFED), Kerala State Co-operative Rubber Marketing Federation Ltd (Rubber Mark), Oil Palm India Ltd, Plantation Corporation of Kerala, Kerala Agro Machinery Corporation Ltd, State Farming Corporation of Kerala, Kerala State Warehousing Corporation, Small Farmers' Agribusiness Consortium and commodity boards such as Coconut Development Board, Rubber Board, Spices Board and Coir Board.

*Source: Compiled by NCAER*

## 5.3.5 Agricultural research

5.3.5.1 Agricultural research and education in Kerala is primarily led by the Kerala Agricultural University (KAU) situated at Vellanikkara, Thrissur. Under the university, there are six Regional Research Stations (RARS) and 17 specialised stations for conducting crop-specific and issue-based research. Besides, five colleges also function under KAU, with the primary responsibility of imparting agricultural education. Apart from this, several Indian Council of Agricultural Research (ICAR) institutes and sub centres, Krishi Vigyan Kendras (KVKs), commodity boards and other central and state government institutions are involved in research, education and extension activities related to agriculture in Kerala.

5.3.5.2 In addition, the Kerala Department of Agriculture (KDoA) coordinates quality control activities through a network of laboratories. At present, there is one Pesticide Testing Laboratory, two Fertiliser Quality Control Laboratories, two Seed Testing Laboratories and 23 Soil Testing Laboratories. To ensure grading and standardisation of food products, the department also operates 10 AGMARK Grading Laboratories spread across the State. It also undertakes capacity building and technology dissemination activities through two Farmers' Training Centres. For promoting development and release of bio-control agents, a State Bio-control Laboratory was established in the year 2000. Pest surveillance activities in the State are carried out by the Operational Research Project (Pest Surveillance Unit), at Mancombu. Finally, there are five Regional Agricultural Technology Training Centres in Kerala.

5.3.5.3 A well-established institutional framework for agricultural research, with balanced regional distribution, is the strength of Kerala's agriculture sector. However, despite the extensive R&D infrastructure, Kerala's agriculture remains dominated by a few traditional crops. Further, despite being endowed with rich biodiversity and dedicated R&D infrastructure in medicinal plants, Kerala lags behind in the production of a variety of medicinal plants when compared to the rest of India (Table 5.12). This is revealed in a state-wise comparative study conducted by the Chhattisgarh government.

**Table 5.12**  
**Medicinal and Aromatic Plants by State: 2006**

S. No.	Name of State	No. of Species Produced	% of Species Produced	Amount of MAPs produced (in MT)	% of MAPs produced
1.	Chhattisgarh	42	59.15	87065	67
2.	Andhra Pradesh	10	19.72	6116	4.7
3.	Himachal Pradesh	3	4.23	599	0.46
4.	Karnataka	11	15.49	5933	4.5
5.	Kerala	8	11.27	1699	1.3
6.	Madhya Pradesh	37	52.11	16789	12.9
7.	Odisha	5	7.04	9528	7.3
8.	Uttarakhand	6	3.45	2024	1.55
9.	Manipur	2	2.82	88	0.06

Source: <http://cgvanoushadhi.gov.in/export.pdf> Chhattisgarh State Medicinal Plants Board. Assessment of Export Potential of Medicinal Plants and its Derivatives from Chhattisgarh and its Policy Implications. <http://cgvanoushadhi.gov.in/export.pdf>. Raipur.

## 5.3.6 Food security in Kerala

5.3.6.1 At present, Kerala depends on Andhra Pradesh for a considerable part of its requirement for rice, on Tamil Nadu for vegetables and Karnataka for meat and milk. Lately, there have been concerns brewing over this increasing dependence on other states for essentials. The emerging concern about importing food from other states is the quality of food, especially that it may, perhaps, be laced with pesticides. Table 5.13 presents the per capita consumption of major food items in Kerala for three points of time — 1999–2000, 2004–05 and 2009–10. The data pertains to reports of the National Sample Survey Organisation (NSSO) for the 55th, 61st and 66th rounds, respectively. The estimates indicate a slow shift in the preferences of Keralites from rice-based food preparations to wheat-based preparations such as chapattis and bread. The consumption of pulses remained more or less the same during the three periods, whereas consumption of edible oil increased perceptibly. In the case of fruits and vegetables, the increase in consumption has been rather steep.

**Table 5.13: Trends in Per Capita Consumption of Major Food Items in Kerala**

Commodity	Per capita consumption (Kg-capita-annum)		
	1999–00	2004–05	2009–10
Rice	105.4	100.2	90.6
Wheat	12.5	11.9	12.7
Pulses	7.1	7.3	7.4
Edible oil	5.2	5.3	6.6
Vegetables	43.7	45.7	58.3
Fruits	NA	32.4	39.1
Spices	4.9	4.1	7.1
Milk	37.7	36.9	40.2
Egg*	33.3	30.4	42.1
Meat	3.4	4.4	5.6

Note: Per capita demand of egg expressed in numbers

Source of Data: Reports of NSSO for the 55th, 61st and 66th rounds of surveys

5.3.6.2 Based on the latest estimates of per capita consumption, the total demand, at given price level, for major commodities at the state level was computed and is presented in Table 5.14. The total demand consists of both household demand (direct demand) as well as indirect demand. Indirect demand arises mainly from consumption outside households, industrial uses, use on account of seed, feed, wastage and so on. The estimates of indirect demand were arrived at based on similar calculations undertaken by past studies. Detailed forecasts, methodology used and forecasts under various scenarios are available in Appendix A.5.1.

**Table 5.14: Base-year Demand for Major Food Items in Kerala: 2009–10**

Commodity	Total demand ('000 tonnes)	Production# ('000 tonnes)	Balance (production – demand)	Level of sufficiency (Production/Demand)%	Demand	Required annual growth rate if sufficiency to be 25%
						Projections for 2030
Rice	3,558.9	594.3	-2964.6	17.0	3,789.7	2.4
Wheat	524.2	Negligible	-524.2	0	627	188.2

Pulses	428.8	3.3	-425.5	0.1	488.7	19.8
Edible oil	296.4	NA	NA	NA	395.5	-
Vegetables	2,713.2	993.2	-1720	37	3,551.4	-
Fruits	1774.2	2398.1	623.9	135	2,639.2	-
Spices	282.5	100.4	-182.1	36.0	445.1	0.5

Note: \*Per capita demand of egg expressed in numbers and total demand in million numbers  
# Corresponds to BE 2009–10.

Source: Computed by NCAER

5.3.6.3 Production in Kerala fell short of demand for almost all food commodities, except fruits. In terms of production as a per cent of demand, food grains such as rice, pulses and so on, fared poorly. The level of self-sufficiency for rice was only 16.7 per cent, with the rest of the demand being met through imports from neighbouring states such as Andhra Pradesh and Tamil Nadu. Since Kerala doesn't produce wheat, but consumes it in reasonable quantities, the entire wheat demand was met from north Indian states through inter-state trade; the case of pulses was no different. Self-sufficiency in vegetables was to the level of 36.6 per cent. Kerala produced more fruits than it consumed, with the major share coming from fruits such as banana, mango, papaya, pineapple, jack fruit and so on. However, it depends on imports to meet the demand for other types of cool-season fruits, even as it exports considerable quantities of what it produces to other states.

5.3.6.4 In order to secure a sustainable path for a prosperous and abundant agricultural sector for Kerala, it will be necessary to adopt a multi-pronged approach. Such a strategy is outlined in the remaining sections of this chapter.

## 5.4 Strategic Framework

### 5.4.1 Vision

5.4.1.1 Agriculture will be prosperous, socially inclusive and environment-friendly. There will be a paradigm shift from low-technology peasant farming to highly knowledge-intensive, innovation-embracing, competitive farming. Agri-Entrepreneurs will be encouraged and their performance will be driven by how they acquire, organise and process their knowledge. Agriculture will be viewed not as a means to livelihood alone, but as a means of economic prosperity also. The younger generation will take pride and dignity in agriculture as an occupation and sector. The traditional farming community will be supported to transition from vulnerability to sustainability by providing welfare measures simultaneously.

### 5.4.2 Targets

- The average agricultural growth rate will be a minimum of 2 per cent per annum.
- Improved farming efficiency will be achieved despite the expected drop in agricultural area.
- The expenditure allocation towards agricultural research and education will be raised to 1–2 per cent of GSDP of agriculture by 2030.

### 5.4.3 Mission

- Foster global competitiveness, growth and profitability in the sector in order to attract new investment.
- Build lasting partnerships between public, private and other community stakeholders.
- Increase creation of wealth in agriculture and rural areas.
- Improve investor confidence leading to increased investment in agricultural activities and rural areas.
- Promote sustainable use of agricultural resources.

The focus will be on increasing competitiveness and productivity in agriculture so as to raise incomes and well being of stakeholders and bring prosperity, not only for this generation, but for future generations too.

#### 5.4.4 Strategic framework

The strategic framework encompasses plantation and non-plantation crops. Special recommendations for the plantations sector will be mentioned under the relevant heading. The strategic framework will have three main pillars:

- (i) Agricultural prosperity
- (ii) Social inclusiveness: Food security, livelihood, rural area development
- (iii) Natural resource conservation

#### Pillar 1: Increasing Productivity and Competitiveness

Action Plan 1: Shift from livelihood (subsistence) approach to entrepreneurial (competitiveness) approach in agriculture and moving forward to entrepreneurial farming

5.4.4.1 The new strategy will focus on transforming agriculture into a high value-added sector through a focus on acquisition, organisation and application of knowledge. There will be a shift from low value-added to high value-added crops, application of suitable technology and restructuring of production and distribution systems. Sustained global competitiveness in the agriculture sector requires efficient input supply, primary production, agro-processing and agri-marketing industries, which, in turn, calls for a change in the structural approach towards agriculture. In this scenario, farmers will have to develop new skills to be competitive. A pre-requisite for this transformation will be a change in the organisational structure of farming. Alternative organisational forms have been discussed in what follows:

#### Farm producer companies

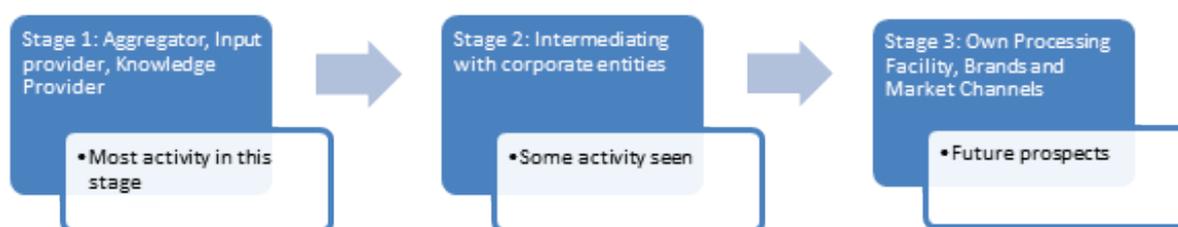
5.4.4.2 Kerala's agricultural scene has been dominated by marginal farmers with an average holding of less than 0.5 acre. In this scenario, group farming is one form of organisation that enables farmers to organise themselves as collectives and move up the value chain, while owning and operating their own land holdings. Due to lack of managerial capabilities, their success has been limited. Collective farming is another form of farming practised, in particular, by women's SHGs for livelihood purposes. The emphasis has been on welfare and livelihood rather than efficiency.

5.4.4.3 Realising that extremely small holding size is no longer viable, the Government of India initiated the concept of 'producer companies' in 2002. These are an emerging entrepreneurial form of cooperative farming. In order to upgrade cooperatives into commercial entities without changing the underlying principle of group farming, the concept of 'producer companies' was introduced by incorporating a new Part IXA into the Companies Act. This enabled incorporation of cooperatives as companies and conversion of existing cooperatives into companies. The objective is to integrate the unique elements of cooperative business models with a regulatory framework similar to that of companies. In India, Madhya Pradesh has tested several models of producer companies and has emerged as the state with the largest number of such companies. The Government of Madhya Pradesh, under the 'District Poverty Initiatives Programme' (DPIP), has promoted a large number of producer companies in various parts of the State. It provides various incentives to promote these companies including hand-holding support for three years. Other incentives include:

- Debt-linked start-up support based on business plan.
- Viability gap support for establishment costs.
- Treatment on par with industries.
- Performance-linked, back-ended interest subsidy.
- Support price preference and infrastructure development.

5.4.4.4 There is an evolutionary process for producer companies (Figure 5.11). In India, most existing producer companies perform the function of providing technical services and inputs to farmers or pooling produce for collective marketing. This is the first stage of evolution. In the second stage, more activity is seen in the emergence of producer companies, such as those promoted by FabIndia, where corporates come together with farmers to share prosperity with the farming community through commercial farmer-corporate/retailer partnerships. Producer companies with their own processing infrastructure and developing their own identity, brands and supply chain is the third stage. Only then, will the producers be able to directly connect with and have command over the markets and, thus, have a greater share of the retail pie.

**Figure 5.11**  
**Evolutionary Process of Producer Companies in India**



*Source: Conceptualised by NCAER*

## Development of special agri-zones

5.4.4.5 Cluster development is revolutionising business, prompting economic development, and increasing productivity across the globe. The key to success in a global, dynamic, knowledge-based economy is innovation. Innovation is most likely to occur where talent, skills, technology and businesses are clustered and organised in a manner to respond to competitive forces and opportunities.

5.4.4.6 The new strategy proposes the creation of 'special agri-zones'. These will be voluntarily set up by agri-preneurs with state support. They are different from the agri-export zones, which are state-promoted. These zones will not only focus on exports, but also on domestic markets.

## Plantations

5.4.4.7 Plantations in Kerala need special attention to regain their productivity. Unfortunately, states such as Tamil Nadu and Maharashtra have gained quite an edge, which Kerala with its relatively higher wages and limited land will find difficult to compete with. Its comparative advantage lies in selling higher-value-added products in the same category. For example, selling organically grown tea, cashew nuts, coconut and so on and agro products made out of them using sustainable labour practices. Certifications such 'organically grown' or 'produced using sustainable labour practices' can be used to create a 'Made in Kerala' brand for agro products. Similarly, the mono-crop culture is no longer viable in Kerala. Of course, recommendations that already exist such as replanting of plants and rejuvenating them will have to be implemented. Modern irrigation methods like micro irrigation have to be adopted. Increased mechanisation of plantations and crop management are some recommendations to improve the sector's productivity. Along with this, as mentioned earlier, producer companies may help establish complete value chains in the plantation sector, from selling raw materials to high-value-added products.

## Promote high-tech precision farms

5.4.4.8 Land under agriculture is bound to shrink over the next 20 years. Enhancements in productivity will, hence, be the key to prosperous agriculture. High-tech farming is an alternative to derive high incomes from small sized holdings due to the attractive crop productivity they offer. Several vegetables and flowers can be raised economically under protected cultivation. In cognisance of this fact, it is suggested that innovative precision farming practices be popularised, which will increase agricultural productivity both in quality and quantity. These practices involve farming under controlled conditions such as greenhouses, shade net houses and plant protection nets. A number of different technologies for high-tech precision farms have emerged:

5.4.4.9 **Tunnel technology:** The construction of high tunnels for horticulture can protect plants and promote earlier ripening of the crop. A high tunnel, although resembling a greenhouse, is an entirely different technology and price range. A tunnel delivers better fruit quality, bigger yields and higher profit. Tunnels are non-permanent structures that can promote urban agriculture. Indeed, the state government has introduced programmes to encourage high-tech agriculture in Kerala, but they are yet to get the attention of prospective investors. So far, pilot studies and innovative experiments in farmers' fields have given encouraging reviews for this method of high-productive agriculture. Proper government support in terms of technical know-how for developing greenhouses, training programmes, maintenance, financial and insurance support, marketing support and so on are necessary to encourage farmers to take up such innovative initiatives. The produce from greenhouses and poly houses will be relatively costlier than that from traditional farms. Proper marketing of these products will, therefore, be of utmost importance for long-term sustainability of such ventures. High-tech farming may be viewed as a potential channel to effectively utilise foreign remittances and income from the non-farm sector for the benefit of Kerala's agricultural sector and to encourage a number of educated young people to take up entrepreneurial activities within the State.

5.4.4.10 **Hydroponics farming:** Hydroponics, also known as 'soilless gardening', is a method of growing plants using mineral nutrient solutions instead of soil. It can be used in places where in-ground agriculture or gardening is not possible. Hydroponics has been practiced in Singapore, Japan and now in Karnataka and Gujarat in India. The main features are:

- No soil needed
- Efficient in energy and water
- Stable and high organic production
- Immune to weather
- Pests and diseases easier to get rid of than in soil because of container mobility
- Easier to harvest

5.4.4.11 **Vertical farming:** Singapore is taking local farming to the next level, with the opening of its first commercial vertical farm. Based on technology known as 'A Go-gro', these are vertical urban farms or 'farmscapers'. Trays of vegetables are stacked inside an aluminium A-frame and a belt rotates them so that the plants receive equal light, good airflow and irrigation. In a land-scarce state like Kerala this may be the way forward. This technology is yet not licensed, but Kerala may develop its own version.

5.4.4.12 **Terrace cultivation and rooftop gardening:** Growing vegetables in terraces has become increasingly popular in Kerala especially in urban areas. The Kerala government is even supporting schemes to encourage urban farming through terrace cultivation.<sup>10</sup> Terrace cultivation is not only to be encouraged in homes, but also in office areas such as techno-parks, industrial zones and so on. This type of agriculture is especially suitable for vegetables. Urban community farming may also be encouraged here. For example, an employee of a technology park in Kerala has started his own Web site (<http://theyoungfarmer.com/>) to sell seeds online.<sup>11</sup> This is the kind of entrepreneurship that Kerala needs to build over time and re-vitalise the agricultural sector.

## Action Plan 2: Promote Knowledge-intensive Agricultural Practices

### Adoption of revolutionary technology

5.4.4.13 There has been a technological explosion in agriculture to counter the social and economic constraints that it has been facing across the globe. In the knowledge economy, conventional methods will be discarded and the best methods available adopted, instead. Technologies that have changed agriculture forever are biotechnology and genetics, which are discussed below.

5.4.4.14 **Plasticulture:** It has revolutionised agriculture. Plasticulture is the use of plastics in agriculture, horticulture, water-management, food grains storage and related areas. A variety of plastic material and end products are deployed in plasticulture applications — for water conservation, irrigation efficiency, crop and environment protection, as well as end product storage and transportation. Plasticulture technology involves plastic mulches, drip irrigation, fertigation, soil sanitation, windbreaks, stand establishment technology, season extension technology-row covers and high tunnels, pest management, weed, insect and disease control and disposal of plastic bags.

5.4.4.15 **Soil and crop sensors:** Farm equipment is being fitted with smart sensors that can read everything from plant health and water needs in the crop to nitrogen levels in the soil. The newest area of sensor use is in irrigation, where they measure water needs. Sensors help optimise water use and avoid yield loss.

5.4.4.16 **Farm machinery:** Manufacturers have been investing substantial engineering time and money in machinery designing, to create machines that are more effective, comprehensive and smokeless.

### Leverage ICT

5.4.4.17 **Mobile computing:** Portable computers and smartphones are destined to be a part of farm tractor cabs, pickups and offices in the future. Some companies have recently introduced new Windows Mobile rugged handhelds with enhanced features, which can be used more efficiently. As the literacy rate of farmers in the State is so high, SMS-based programmes specific to Kerala can be developed to advise farmers. Plus, farmers should be able to phone-in questions. Computing and being able to send SMS in Malayalam will help a lot. Being able to access land records using the phone will also help farmers.

5.4.4.18 **4G applications:** Farmers will find themselves in the Internet fast lane in the next couple of years because of 4G (fourth generation) cellular communications networks. Although a variety of technology will be harnessed, the new 4G networks will be the most important in deploying high-speed Internet services in rural areas.

5.4.4.19 **Pest control:** ICT may be used to monitor pests. A few examples from around the world include:

- Global System of Mobile Communication (GSM) module monitors (and forecasts) fruit flies' population dynamics and provides real-time information to farmers and the government in Taiwan.<sup>12</sup>
- USAID's Famine Early Warning System provides information for governments to manage food security risk.<sup>13</sup>
- MTT Agrifood Research, Finland is piloting a project called EVISENSE to provide 24-hour disease forecasts to Finnish farmers using a combination of tools such as weather sensors, databases, mobile phone SMS, GPS and online management systems.

- Satellite data allowed the International Livestock Research Institute (ILRI) and its partners to overcome data limitations and create an index-based livestock insurance (IBLI) programme in which damage is assessed through remote sensing as part of a plan to improve resilience in the pastoral system (Mude et al. 2010).

#### 5.4.4.20 ICT used for precision farming:<sup>14</sup> Some examples from around the world:

- A Web-based GIS system in rural Malaysia is helping farmers with paddy lot cultivation with more access to printable maps and data on fertiliser application.
- Nitrogen management is reducing costs and environmental damage thanks to a pilot test in Mexico's Yaqui Valley, organised by the International Maize and Wheat Improvement Centre.
- Satellite technology has helped identify weed infestations and water stress in areas where crop pest levels are high, according to a study on behalf of the International Development Research Centre.
- PoiMapper is a mobile application being tested in Kenya that could possibly collect information about entire routes and systems such as water and irrigation.
- The London Knowledge Lab has produced a scholarly paper on designing wireless sensing networks and highlights several novel design mechanisms around the world.

5.4.4.21 **Knowledge economy:** There should be links with the knowledge economy so that more innovative ICT applications in agriculture can be invented or adapted to the particular needs of Kerala's agriculture sector.

## Farmers' training and entrepreneurial skills development

5.4.4.22 Entrepreneurship development in agriculture requires special skills such as knowledge of technological changes, knowledge of markets and knowledge of global conditions for the successful growth of farming businesses. A major challenge for the agricultural sector will be to enable farmers to develop their entrepreneurial skills. Farmers of all types will require economic support and greater emphasis on education and training. Courses in agricultural management and entrepreneurship will be offered to the younger generation. In addition, 'Comprehensive Entrepreneurship Development Programmes' for agriculture are proposed to be developed for those who adopt agriculture as their occupation. Career Development Events (CDEs) are being set up for students to develop the ability to think critically, communicate clearly and perform effectively in a competitive job market. In the US, the National Future Farmers of America offers 24 CDEs, covering job skills in everything from communication to mechanics. Such moves will change the younger generation's perceptions of agriculture as a vocation.

## Promotion of R&D and interactive links with the knowledge economy

5.4.4.23 Even though Kerala has a strong network of research and extension institutions and infrastructure, there is extensive scope to improve the functioning of its agricultural research and extension system. The system is presently languishing, with inadequate funding, human resources challenges, lack of focus on key areas of future importance, limited interactions with other centres of excellence and so on. The share of expenditure on agricultural research and education in GDP agriculture in Kerala was about 0.38 per cent in 2009–10. This has to be gradually raised, at least to the present national level of 1–2 per cent in the next two decades. Sufficient expenditure allocations should be set apart to strengthen research in frontier areas such as genetics and plant breeding, biotechnology and tissue culture, nanotechnology, precision farming and so on to bring about perceivable outcomes that contribute to sustained improvements in crop productivity. The science and technology department may initiate a scheme to fund innovation projects.

**5.4.4.24 Revitalise R&D:** R&D has mostly been supply-driven. Scientists in the public sector create new technology, which is then disseminated by extension officers to the farmers. Apart from token consultations, farmers are seldom involved in the governance of research organisations, particularly in setting priorities for R&D. Farmers organisations will have to play a critical role in voicing demands for technology research and development, especially in the context of some significant informal research (see Box 5.1). Important questions need to be asked about accountability, outcomes and governance of R&D organisations. Revitalising research institutions as genuine learning and partnership organisations requires changes in both organisations and individuals. Action is needed on several fronts:

- Promoting theme-based and location-based research projects based on sharing of ideas and reflections from working with farmers.
- Initiating joint programmes with farmers' organisations and producer companies through field visits and workshops.
- Shifting mindsets through new forms of agricultural education (embracing diverse sources of knowledge and knowledge systems) and professional rewards (incentives, awards, promotions).
- Establishing strong networks of practitioners, encouraging mentoring and pushing partnership approaches into mainstream research.
- Universities may open incubation centres in order to encourage invention, innovation and marketing of agricultural products. It's not just the product itself; design and packaging are also important elements of a product.

#### **Box 5.2 RRII 105 and Njallani**

Two significant developments in Kerala's agriculture sector over the past five decades were the arrival of RRII 105 variety of natural rubber and Njallani variety of cardamom. These high yielding varieties of planting material revolutionised the cultivation of rubber and cardamom respectively, in Kerala. In rubber, India moved to the top in productivity with the adoption of the variety by small holders. In cardamom, India, which was facing stiff competition from Guatemala could withstand it with the adoption of Njallani that resulted in a five-fold increase in productivity. The story of the development of these two varieties is also interesting. While the premier research institute under the Ministry of Commerce developed RRII 105, the cardamom variety was developed by a farmer in the cardamom belt.

**5.4.4.25** In addition, Kerala should set up two Biotech parks. The first, dealing with plant biotechnology, with an emphasis on genetic improvement and mass multiplication of planting material and the second, dealing with animal biotechnology, primarily focused on animal genetic enhancement, vaccine development and mass production, disease diagnostics and other related activities.

**5.4.4.26 Demand-driven extension services:** Kerala has a very strong agricultural extension system in terms of density of Krishi Bhavans, Krishi Vigyan Kendras (KVKs), veterinary poly clinics, artificial insemination centres and so on. However, the field level dissemination of new technology is still weak in the State. There are a number of promising technologies that are shelved without popular acceptance. The scope of agricultural extension in bringing about a transformation in Kerala's agricultural sector is vast and appropriate policy interventions are required to fill the gaps. Drivers for change include:

- Concerns to make services more accountable to users.
- The emergence of multiple extension providers:

- i. Establishing Frontier Agricultural Technology Training Centres (FATTC) in every district with a special focus on — high-tech/protected agriculture and livestock rearing; resource conservation and precision farming technology; bio-control; use of modern agricultural implements; micro propagation; organic agriculture; and certified seed production.
  - ii. Establishing High-tech Farming Facilitation Centres (HTFFC) with a dedicated corpus for encouraging high-tech farming that includes protected cultivation, commercial dairy and poultry farms, goat farms, hatcheries and so on at the district level. This fund has to be used for providing various back-end and support services to kick start high-tech farming in the State.
  - iii. Linking subsidised credit with prospective investors through the interface of HTFFCs.
  - iv. Outsourcing the dissemination of specific promising technologies from research stations through private service providers with benefit sharing contracts.
- User fee for services.

**5.4.4.27 Develop agriculture consultancies:** Graduates in agricultural sciences will be encouraged to start consultancy firms in agri-businesses and agri-clinics. Agri-businesses can offer a comprehensive range of agricultural and rural business consultancy and regeneration services to both private and public sector clients. There will be highly specialised firms as well. For instance, some firms can help with farm paperwork: accounts, cattle and sheep records, field records and keep clients up-to-date on statutory legislation and farm assurance or grant/subsidy applications. Other firms can focus on marketing, technology and investment. This will call for the adoption of a business approach towards agriculture, with the institutional requirement of the adoption of best practices. “Agriclinics are envisaged to provide expert services and advice to farmers on cropping practices, technology dissemination, crop protection from pests and diseases, market trends and prices of various crops in the market and also clinical services for animal health and so on, which would enhance productivity of crops/animals.”<sup>15</sup>

### Action Plan 3: Address factor market constraints

**5.4.4.28** Factors of production refers to availability and quality of natural resources; level of input prices such as labour, diesel, pesticides, machinery, knowledge; and infrastructure. These factors are necessary for the sector to be globally competitive and profitable.

### Creation of rural employment centres

**5.4.4.29** Solutions like bringing cheap labour from neighbouring states, isolated efforts to organise agricultural labour through cooperatives, channelising labour through MGNREGA to undertake agricultural activities and so on have met with limited success so far. One of the experiments in this direction was a ‘labour bank’, which was created for regularising employment of farm labourers and for smoothening out work patterns over the farm year. It involved establishing a ‘labour army’ under the aegis of the local panchayat, with pre-determined wage rates, fixed work schedule and norms, recruitment of registered labourers, purchase of machinery and implements, sub-contracting of public work, training of members and so on with a certain level of guaranteed employment and subsidised services. The services and resources of these centres will be utilised to undertake public projects related to agriculture as well as operations in private homesteads. It can bring together scattered labourers and give them professional, state-sponsored organisational backing, with a certain level of assurance of employment and other benefits.

The agro service and farmer service centres in the State need to be expanded to all panchayats.

## Improving farm mechanisation

5.4.4.30 Farm mechanisation is another solution to the problem of labour shortage. It is also a cost effective way to improve crop productivity to a considerable extent. Agricultural machinery such as tractors, combine harvesters, planters, cultivators, power operated harrows, ploughs, laser levellers and so on have limited use in Kerala due to their plantation crop orientation and the small size of holdings.

## Developing certified seed supply chains and seed villages

5.4.4.31 Barring a few private nurseries, certified seed production in Kerala is completely within the realm of the public sector. While this limits the scale of quality seed production in the State, it also throws open a huge opportunity to develop this sector. There is vast potential in crops such as rice, vegetables, roots and tubers, ornamental plants and so on for developing a viable seed supply chain. With effective tie-ups between research institutes, KVKs and farmers' collectives such as cooperative societies and producer companies, SHGs and NHGs, innovative models for certified seed production can be developed without much effort. Along with encouraging the production of seeds, proper backward linkages with research stations for supplying breeders and forward linkages with distribution channels have to be developed to ensure the success of the programme. Besides being a medium for improving livelihood opportunities for the farmers involved, such initiatives can simultaneously improve crop productivity in the State considerably.

## Irrigation

5.4.4.32 It is recommended that Kerala places more importance on minor and micro irrigation. With a decade-long stagnation in major and medium irrigation and excessive dependence on groundwater, which, in turn, leads to ecological imbalance, this is the most sensible strategy. This can even be applied to plantations. Drip, sprinkler and rain gun irrigation methods place more emphasis on conservation of water. Plus, they may be more suitable for homestead farming. Small farmers can be given financial help to acquire these systems. In this context, the Chapter on Water discusses, in detail, the need for watershed appraisal and planning at the block level. The importance of developing watershed-oriented agriculture, which broadly fits into the concept of agro-ecology and integrated farms, is also examined later.

## Action Plan 4: Productivity of food crops through hybrid seeds

Substantial increase in productivity is possible in food crops, especially vegetables, through the adoption of hybrid seeds. Hybrid seeds have been adopted in some areas of the State in vegetables. Polyhouse-based cultivation further promoted hybrids. There is an acute shortage of vegetables in the State and a comprehensive project has been initiated to achieve self-sufficiency in vegetable production over a period of time. Popularisation of suitable hybrids — after appropriate trials in various agro-ecological zones — should be taken up on a large scale to achieve self-sufficiency in vegetable production. The possibility of promoting hybrid rice also needs to be examined to increase its production.

## Action Plan 5: High-value-added products Horticulture and floriculture

5.4.4.33 As seen above, the cropping patterns of Kerala are highly skewed. A few traditional crops dominate agriculture. Under the Horticulture Mission, new products will be identified, which fetch a high value in the international market and their cultivation will be promoted in the State. New products and new domestic and international markets should be identified. Exports of flowers (especially roses), orchids and foliage plants should be explored and linked to international markets such as the Netherlands, for flowers.

## Organic farming

5.4.4.34 **Promotion of export of organic products:** The demand for organic products is growing at a very fast pace across the world. The majority of organic products consumed in the European Union and other developed country-markets is imported. Being a leading exporter of many agricultural products such as spices, tea, coffee and so on, Kerala can capitalise on the huge demand-supply gap existing in international markets for organic products. By developing a niche organic supply chain for the most sought after exported products, Kerala can substantially improve its competitiveness in global markets as other competing countries are still in the process of shifting to organic agriculture. However, compliance with international certification procedures and quality norms is extremely important to stay in this market. There is, therefore, a need to build an inspection and certification system for organic products. The future thrust should also be to create extensive training and demonstration programmes that enable producers to meet global quality standards so that they can take advantage of the price premium being offered for such products.

5.4.4.35 **Enhance consumption of organic products:** Apart from global markets, there is a gradually enlarging pool of domestic consumers for organic produce, in the State and the country. In this case, the advantage is that there is a wider range of both perishable and non-perishable commodities that can be organically produced and sold within the State. Therefore, while planning for developing organic agriculture, both global and domestic consumers and their specific requirements need to be taken care of.

## Harnessing biotechnology

5.4.4.36 Kerala has so far not been successful in harnessing the multi-faceted benefits of biotechnology on a perceivable scale. As in other biological fields, biotechnology has tremendous potential in agriculture and veterinary science, especially in developing high yielding varieties/breeds of crops and animals, mass culture of improved planting material, manufacture of bio-pesticides, food additives and vaccines, developing disease and stress tolerance in plants and animals and so on. The Kerala Biotechnology Policy was unveiled in the year 2003 following the setting up of the Kerala Biotechnology Board and the Kerala Biotechnology Commission. Under the policy, the plan is to establish world-class educational and R&D institutions in the field, and to put in place an administrative, regulatory, legal and financial framework conducive for investment in and growth of biotech-related enterprises. There is a strong perceived need to implement the policy in letter and spirit, so that Kerala can capitalise on its educational dividend, invest the money generated from other thriving businesses and foreign remittances and effectively utilise the entrepreneurial skills of its labour force to realise benefits from agriculture.

## Medicinal plants

5.4.4.37 Globally, the demand for medicinal plant-based raw material is growing at the rate of 15–20 per cent annually, and by 2050 this demand is likely to grow to US\$5 trillion. In 2007–08, India's share of exports in herbal medicine was 0.5 per cent globally, compared to that of China which had a share of 55 per cent. In this scenario, and given the flora and fauna of Kerala, the State can make concerted efforts to contribute to global exports of medicinal plants. Kerala can develop linkages between cultivation and primary processing through sub-contracting, in collaboration with manufacturers and other market arrangements. Such linkages can make sustainable development of medicinal plants possible. Forest dwellers, especially, can be roped in to grow these plants, therefore bringing them higher incomes. They can also be grown in the Western Ghats, which are ecologically sensitive. An important aspect should be to link the farming of medicinal plants with Kerala's ayurveda industry and to the proposed medical hubs. Similarly, products made from these medicinal plants should also be marketed. It is imperative to develop the entire value chain within Kerala, as it will benefit all stakeholders.

## Action Plan 6: High-value-added activity

**5.4.4.38 Agro-processing:** Agro-processing is gaining importance with the rapid increase in the demand for processed food products, and is going to be an important activity for micro-enterprises in the future. This is especially beneficial for Kerala due to the large number of plantation crops that it produces. Kerala should determine its comparative advantage in the whole value chain or at least one part of the value chain and develop related expertise. Creating better linkages between producers and agro-processing firms will motivate entrepreneurs to initiate new agro-processing ventures, while also encouraging farmers. Encouraging food processing will increase profitability of crops, as perishable commodities can fetch better prices in the presence of a thriving processing sector. There is vast potential to process locally grown crops such as coconut, cashew, arecanut, tapioca, banana, other tuber crops, fruits and vegetables and so on. There are a number of value-added products such as coconut milk powder, vinegar, preserved tender coconut water, coconut chips, coconut cream, coconut ice-cream, tapioca chips, banana chips, banana ice-cream and wine that have markets within and outside the State. It is important to recognise the reciprocal relationship between crops and the processing industries that depend on the inputs from these crops to promote new industries based on these agro products. In India, two major initiatives in this direction are: food parks and mega food parks and agri-export zones.

**5.4.4.39 Mega food parks and food parks:** These are exclusive parks that seek to add value to various major crops. They are industrial estates dedicated to agro-processing and are being set up in the public-private partnership mode. In Kerala, KINFRA is setting up these parks. The objectives are to facilitate:

- i. Backward integration of these parks with primary producers through buy-back arrangements, extension support, input delivery facilitation and so on.
- ii. Forward integration of the products with the markets by establishing supply contracts with domestic retail chains, restaurants, hotels and so on, and through export facilitation measures.

**5.4.4.40 Agri-export zones in India:** The government has established 60 fully equipped agri-export zones (AEZs), in addition to food parks, to provide a boost to agricultural and food processing exports. There are two AEZs in Kerala, for horticulture and medicinal plants. These projects have met with limited success due to their macro-management. It is expected that implementation of the proposed action plans will give a major push to these zones as well.

5.4.4.41 Improving linkages with big retailers will have a positive impact on growers. Big retailers can have a beneficial impact on farmers as they share the latest knowledge with the growers so as to enable easy transportation.

## Action Plan 7: Strengthening agricultural marketing systems

5.4.4.42 There has been tremendous improvement in agricultural marketing infrastructure in Kerala during the last decade. According to a study by National Institute of Agricultural Marketing (NIAM), Jaipur, between 2005-06 and 2010-11, investment in agricultural marketing infrastructure witnessed a surge of 265 per cent in Kerala. Several new initiatives and innovative institutions such as VFPC and HORTICORP brought about considerable improvement in the agricultural produce supply chain in the State. But there is tremendous scope for improving agricultural market infrastructure, market information and intelligence systems and the post-harvest management sector in Kerala. Renovation of existing wholesale markets and establishing state-of-the-art wholesale and retail outlets for both agricultural and livestock commodities is called for. To realise long-term development, several initiatives such as fostering public-private partnerships, improving governance of local self-government markets, developing warehousing and cold chains, periodic training and awareness drives for various stakeholders and so on need to be explored. Together with this, the government can also encourage innovative marketing models such as contract farming and farmers' markets (like

*uzhvar sandhais* of Tamil Nadu and *rythu bazar* of Andhra Pradesh) so that the farmers of Kerala can also become equal stakeholders in market development initiatives.

5.4.4.43 It is recommended that every local self-government market have adequate cold storage; modern weighing, grading and packaging facilities; warehousing infrastructure; computerised record-keeping facilities; waste management solutions; and other modern amenities by 2030.

## Involvement of local governments in marketing initiatives

5.4.4.44 A research project on farmers' collective marketing initiatives reveals that the strength of the classic cooperative model is increasingly being undermined by the growing scale of operation of food supply chains and the concentration of processing and retailing industries. Most initiatives have moved beyond the cooperative model. The new collective marketing initiatives apply a diversity of strategies. A differentiating factor is the nature of skills and incentive structures required for such strategies. Of special importance is the need to create coherence between different categories of actors along the food chain, irrespective of the specific strategic orientation of the initiative. Against this backdrop, it is proposed that local governments must take initiatives to develop models for collective marketing based on the assessment of local conditions.

## Direct sales to consumers leveraging ICT

5.4.4.45 There have been paradigm shifts in agricultural marketing with the emergence of a 'direct sales system'. Direct contact with consumers has been developed through direct delivery of the product to consumers' homes. This system can be managed by private companies or farmers' collectives (producer companies and others), which buy these products from the members and are in charge of the packaging and delivery of the orders. New enterprises are emerging that focus on agricultural marketing by leveraging IT. In Switzerland, for instance, a company called Bio-Direct has been founded by three organic farmers and two IT specialists who have launched a Web-shop for agri-products. It links producers directly with consumers. In addition, the farmers working in this initiative have assumed further supply chain activities. They have, thus, enlarged the scope of their activity from only producing, to trading and marketing.

5.4.4.46 Brand building of Kerala food ('Made in Kerala') products, starting from primary food products to agro-processed goods, is a must. Further, it has been proposed in the Chapter on Transport that the rail network be built up for freight, and connected to the shipping and inland water transport systems. There are efforts on to attract freight traffic to railways. Southern Railways has agreed to regularly carry Vazhakulam pineapples on its passenger trains to North India.<sup>16</sup> There will be an exclusive wagon on the Duronto Express for the pineapples. In order to promote the product, the wagon will have banners announcing it is carrying 'Vazhakulam Pineapple'. In addition to fresh pineapple, processed pineapple variants such as canned and tinned pineapple and pineapple ice-cream from Vazhakulam should also be carried to the bigger markets. For that, the railways also need to have cold storage facilities.

## Pillar II: Social development

### Action Plan 1: Food safety

5.4.4.47 The issue of food safety is generally identified as a matter that is related to exports. However, in recent years, it is also emerging as a major concern among domestic consumers in Kerala. With a rapid increase in food demand and failure of internal supply to keep pace with it, merchants and middlemen are resorting to rampant adulteration. Recently, there have been several reports of food poisoning in the State that resulted from faulty practices of suppliers and inadequate enforcement mechanisms to check them. At present, matters related to food safety are governed by the Food

Safety and Standards Act, 2006 and the Office of the Commissioner of Food Safety, Kerala, is the implementing agency in the State. The agency is already working to strengthen the food safety regime by introducing licensing procedures, grading of businesses, classification of food items, setting of hygiene and safety standards and so on based on scientific principles. Given the importance of ensuring food safety of a population that is increasingly aware of the risks of complacency, the future development agenda for Kerala will be highly weighed towards establishing a foolproof food safety regime.

## Promote Good Agricultural Practices (GAP) in food production

5.4.4.48 Quality and safety of food commodities can be ensured by encouraging farmers to adopt GAP and follow the recommended package of practices in cultivation. Promoting GAP compliance can be done by the following:

- i. Develop a compendium on GAP for all major food commodities (both agricultural and livestock) produced in the State. Kerala Agriculture University can participate in this.
- ii. Set GAP guidelines for the production of rice, vegetables, fruits, spices, roots and tubers, milk, egg, meat and so on by 2015.
- iii. Set domestic quality standards (on minimum residue limits for pesticides, allergens, natural toxins, micro-biological contaminants and so on) for fresh agricultural commodities, in conformity with the existing legal framework and based on emerging requirements.<sup>17</sup>
- iv. Launch awareness drives among producers on GAP guidelines and among consumers on the need to demand safe and healthy food through mass media, Krishi Bhavans, SHGs, cooperatives, farmers' associations, NGOs and through regular training programmes.
- v. Promote organic farming by designating identified villages as 'organic villages' for production of specific agricultural products under organic cultivation practices.
- vi. Encourage reputed certifying agencies with adequate expertise to start operations in the State.

## Check adulteration/contamination in the food supply chain

5.4.4.49 The enforcement mechanism for preventing food adulteration will be strengthened by:

- i. Identifying the major adulterants/contaminants used in agricultural and livestock products, both fresh and processed, and developing/adapting testing protocols to detect them.
- ii. Developing a network of analytical laboratories for testing quality of both fresh and processed food, and also for adulterants as well as chemical/physical contaminants. These may be developed in the private sector or on a public-private partnership basis. Given the concerns about the quality of food coming from other states, Kerala may even establish these laboratories at the State's borders, randomly conducting food quality checks for pesticides and fertilisers. Returning food found laced with pesticides and fertilisers also may change incentives.
- iii. It is also important to invest in logistics industries, especially devoted to food imports, as this may ensure better quality of food products delivered to Kerala. The problem is that food from other states cannot be banned.
- iv. Developing a cadre of food safety, biochemistry and microbiology experts, who are well trained to undertake quality testing of food samples.

5.4.4.50 The roadmap involves:

- Developing an elaborate network of biochemical laboratories: Every district must have at least one fully functional, quality testing laboratory, with advanced facilities by 2020 and every laboratory needs to be provided with adequate numbers of trained personnel.

- Setting up of regulatory protocols by 2015.
- Initiating capacity building measures: A pool of well-trained food safety, biochemistry and microbiology experts will be created.

## Action Plan 2: Farm insurance

5.4.4.51 Crop/livestock insurance has not received due attention in Kerala, as is evident from the available statistics. In the year 2010-11, nearly 40,400 hectares of area under crops were covered under insurance schemes, which benefitted an estimated number of 44,400 farmers (CMIE, 2012). In terms of share of area covered, this amounts to a mere 2 per cent of the net sown area in the State. The figures are worse in case of livestock insurance. This means, a majority of marginal and small farmers in Kerala, who are already under pressure from various agrarian crises, are unprotected against weather, price and other types of risks and uncertainties. Though State Crop Insurance Scheme and National Agricultural Insurance Scheme (NAIS) are improving their coverage each year, a major impetus has to be given to this important area in the future. Private insurance companies that are present in other states may be given a chance to enter this field in Kerala too. Beyond cultivators, other small farm/micro entrepreneurs involved in agriculture-related activities also need to be brought under the ambit of the insurance schemes. Such initiatives will considerably increase farmers' confidence to stay in the farming profession and will pay rich dividends in terms of enhanced farming activity in the future.

Improve accessibility to and affordability of basic food by upgrading the public distribution system (PDS)

5.4.4.52 Some of the objectives of the policy will be:

- Reduced leakages from the PDS.
- Targeting the most needy.
- Higher efficiency and reduction in the economic cost of distribution.

5.4.4.53 This will be achieved through a technological upgrade of the PDS by:

- i. Introducing biometric cards for foolproof identification of PDS beneficiaries.
- ii. Enabling GPS tracking of vehicles that carry PDS grains from the warehouses to Fair Price Shops (FPS).
- iii. Sending regular SMS alerts to beneficiaries on stock position, entitlement status and so on.
- iv. Enabling end-to-end computerisation and networking of the PDS channel.

## Action Plan 3: Boosting micro-enterprises in agriculture

5.4.4.54 Kerala has been successful in nurturing a variety of micro-enterprises related to agriculture, which have a proven track record of providing livelihood opportunities to a large number of rural households. They include agro-processing, bee-keeping, crop nurseries, vermicomposting, small-scale dairy and poultry units, hatcheries, vegetable farming, mushroom cultivation, coir units, agri-marketing units and so on. In recent years, micro-enterprises received a further fillip under the Kudumbashree programme. At present, there are more than 15,000 neighbourhood groups (NHGs) functioning across the State that are involved in the above-mentioned activities and more. A major reason for the success of such enterprises is that they work under the principles of collective farming and benefit sharing, with collective resource pooling. The proactive role taken by women in Kerala in making these initiatives a huge success and, in turn, gaining social acceptance is also worth noting. However, there are still many unsolved constraints that hinder the progress of these micro-enterprises. As these small-holder initiatives will undoubtedly occupy a place in the future of Kerala's agriculture

sector, case-specific remedies for their day-to-day problems need to be developed. Accordingly, the state government should take special care in allocating sufficient resources in successive plan programmes for enhancing and protecting these enterprises.

## Pillar III: Environment

### Action Plan 1: Resource conservation

5.4.4.55 Given the fast pace of urbanisation in Kerala, the pressure on natural resources such as soil and water will possibly increase. Therefore, special attention to conservation technology and strategies is of utmost importance to the future of agriculture in Kerala. Several proven resource conservation approaches including micro-irrigation, precision farming, conservation agriculture<sup>18</sup> and System of Rice Intensification (SRI) can markedly improve resource use efficiency and sustainability of farming.<sup>19</sup> Departmental schemes will be launched to give an impetus to faster adoption of identified conservation methods in each potential location, with a special emphasis on:

- Training farmers through the proposed Frontier Agricultural Technology Training Centres (FATTCs).
- Targeting collective farming groups to adopt identified technologies.
- Placing special emphasis on implements and tools required for adopting resource saving technologies through the proposed RCTPF.
- Conserving common property resources (CPRs), especially water bodies, based on a participatory action approach with collective responsibility through initiatives such as Water Users' Associations (WUA) at the gram panchayat level. This is based on the Participatory Irrigation Management (PIM) concept for managing local water bodies and irrigation systems with collective responsibility. WUAs are to be set up at the panchayat level in selected locations.

### Action Plan 2: Agro-ecology: Principles and strategies for designing sustainable farming systems

5.4.4.56 Sustainable agriculture will, however, go beyond the adoption of technology. Agro-ecology has emerged as the discipline that provides the basic ecological principles on how to study, design and manage agro-ecosystems that are productive, conserve natural resources, are culturally sensitive, socially just and economically viable. According to this science, a field is a complex ecosystem that can be manipulated to improve production and to produce more sustainably, with fewer negative environmental or social impacts, and fewer external inputs. The design of such systems is based on the application of the following ecological principles:

- Enhancing the recycling of biomass, optimising nutrient availability and balancing nutrient flow.
- Securing favourable soil conditions for plant growth, particularly by managing organic matter and enhancing soil biotic activity.
- Minimising losses due to flows of solar radiation, air and water by way of microclimate management, water harvesting and soil management through increased soil cover.
- Ensuring species and genetic diversification of the agro-ecosystem in time and space.
- Enhancing beneficial biological interactions and synergies among agro-biodiversity components, thus resulting in the promotion of key ecological processes and services.

5.4.4.57 This requires increase of plant species and genetic diversity in time and space, enhancement of functional biodiversity (natural enemies, antagonists and so on), enhancement of soil organic matter and biological activity, increase of soil cover and crop competitive ability and elimination of toxic inputs and residues. The strategies have the following components:

5.5.4.58 **Watershed-oriented agriculture:** One particularly relevant example of agro-ecology is watershed-oriented agriculture.<sup>20</sup> Micro planning is the first step. This can be integrated with watershed-oriented agriculture too, because different crops have different water requirements. Integrated farms and community participation are all key elements of this strategy. Plus, implementation involves the following:

- Tree-based farming
- Livestock development
- Fisheries
- Other skilled activities
- Processing and marketing

5.4.4.59 **Crop rotations:** Temporal diversity incorporated into cropping systems, providing crop nutrients and breaking the lifecycles of several pests, diseases and weed life cycles.

5.4.4.60 **Polycultures:** Complex cropping systems in which two or more crop species are planted within sufficient spatial proximity to result in competition or complementation, thus enhancing yields.

5.4.4.61 **Agroforestry systems:** Agricultural systems where trees are grown together with annual crops and/or animals, resulting in enhanced complementary relations between components and increased multiple use of the agro-ecosystem.

5.4.4.62 **Cover crops:** The use of pure or mixed stands of legumes or other annual plant species under fruit trees for the purpose of improving soil fertility, enhancing biological control of pests and modifying the orchard microclimate.

5.4.4.63 **Animal integration:** Animal integration in agro-ecosystems aids in achieving high biomass output and optimal nutrient recycling.

5.4.4.64 **Pest regulation:** Promoting pest regulation through enhanced activity of biological control agents achieved by introducing and/or conserving natural enemies and antagonists.

5.4.4.65 **Regular supply of organic matter:** Ensure regular supply of organic matter through the addition of organic matter (manure, compost and promotion of soil biotic activity).

### Action Plan 3: Organic waste management

5.4.4.66 In recent times, popular media in Kerala have highlighted a number of reports and analyses on the problems and implications of waste management. A considerable part of garbage consists of recyclable biological waste that includes kitchen disposal, remnants from poultry and meat abattoirs, fish markets, farm organic waste, hospital waste, effluent from processing units and so on. In the absence of proper disposal mechanisms, the waste is not only not properly recycled, but also allowed to decay in common water bodies and along highways causing great public discomfort and degradation of common property resources. On the other hand, the demand for farmyard manure and compost for agricultural purposes is rising without proper reciprocation from the supply side. To convert this challenge into an opportunity, a detailed roadmap that outlines initiatives such as separation of organic from non-organic waste by households, collection and transport of waste by civic bodies, establishment of recycling plants by local self-governments and production and distribution of organic manure by public and private entrepreneurs, is required. In order to avoid public resistance to the opening and functioning of large dump yards, a decentralised collection and handling system needs to be worked out, with the interface of the most advanced technological solutions. Public-private partnerships in all spheres of waste management can also be explored.

5.4.4.67 The recycling system must be realised by integrating the agri-food supply chain and good garbage management chain. The food industry also has to make efforts to reduce damage to the environment caused by its operations, through waste reduction and recycling. A certain mechanism needs to be developed so that the food industry, farmers, consumers and national and local governments can work together in a socio-economic system founded on cyclical use of resources with proper role sharing. This mechanism should:

- i. Incentivise and popularise biogas plants in households, farms, food processing units, slaughter units and so on to enable onsite management of biological waste.
- ii. Encourage production and use of compost from household and farm waste. Decentralised waste treatment-cum-recycling plants are to be established in suitable locations in every district under the PPP mode.
- iii. Make biogas plants mandatory for every farm, household, processing unit, slaughter unit and so on that produce waste beyond a certain agreed quantity.
- iv. Develop supply chains to link the compost-producing units with organic farms through regular supply arrangements.

#### Action Plan 4: Integrated farming systems (IFS)

5.4.4.68 Integrated farming has revolutionised the concept of farming. It refers to agricultural systems that integrate livestock, crop production and fisheries and may sometimes be known as 'integrated biosystems'. These integrated farms are a combination of traditional knowledge and modern scientific techniques. Essentially, it is combining the prevalent homestead style of farming in Kerala with scientific techniques. In this system, an inter-related set of enterprises are used so that the 'waste' from one component becomes an input for another part of the system, which reduces cost and improves production and/or income. Homesteads are widely prevalent in Kerala, and need to be developed further for different socio-economic environments as integrated farms for livelihood improvement.

5.4.4.69 The ancient combination of livestock and crop activities has helped farmers in the past, almost all over the world, use the manure as fertiliser for crops and crop residues as feed for livestock. However, most of the manure usually lost up to half its nitrogen content before it became nitrate and was readily available as fertiliser to plants. This led to constrained productivity growth, resulting in increasing use of chemical fertilisers and artificial feeds. The latest technological changes have made it possible to return to these systems once again, and maximise production without adversely affecting ecosystems. The recent integration of fish with livestock and crops has further augmented the system. The crops-livestock-fish system was initially practised in China, but is now being promoted all over the world. The basic principles are:

- **Mixed crop systems:** Various crops such as grains, root crops, coconut, fruit trees, fodder and vegetables crops are systematically integrated into crop rotation in such a way that they are mutually compatible and complementary, minimise the occurrence of pests and diseases, reduce the use of fertilisers and energy, decrease the rate of soil erosion and incidence of climatic fluctuations.
- **Conservation tillage:** Traditional tillage is replaced by more scientific methods. Some of the emerging concepts are:
  - i. 'Pig tractor' systems where the animals are confined in crop fields prior to planting and 'plough' the field by digging for roots.
  - ii. 'Chicken tractor'.
  - iii. Poultry used in orchards or vineyards after harvest to clear rotten fruit and weeds while fertilising the soil.
- **Ecological compensation zones:** Provision of natural spaces such as green dividers, hedges and woodlands. These spaces have multiple functions of weed and soil management.

- **Livestock — pigs, cattle, poultry and small ruminants — management:** Cattle or other livestock are allowed to graze cover crop between crops on farms that contain both cropland and pasture.
- **Use of animal waste:** Animal waste is utilised as a resource. It not only eliminates waste, but also ensures overall increase in productivity for the whole agricultural system. Environmental impacts caused by waste from intensive activities such as pig farming are also avoided. The most significant innovation is the introduction of the 'digester and basin' in the waste treatment processes of the integrated farming system. One big problem with livestock waste, which contains very unstable organic matter, is that it decomposes fast and consumes oxygen. In digesters, digestion of the livestock waste under closed anaerobic conditions is followed by oxidation in open shallow basins, with natural algae providing the free oxygen through photosynthesis. This can convert almost 100 per cent of the organic matter into inorganic matter, which will not consume any oxygen. The daily increase in readily usable nutrients can be beneficial to the system, provided they are totally utilised in both fish and crop cultures. Theoretically, it is possible to increase the quantity of waste ten-fold in the pond without any risk of pollution after its processing. Increased fertiliser and feed supplies, plus the high market value of fish as feed and/or food has increased incomes substantially.
- **Integration of fisheries:** Processed livestock waste is added to ponds as fish feed. And a second cycle of nutrients from fish waste is used as soil nutrients, which enhances the integration process.

## Action Plan 5: Climate smart agriculture

5.4.4.70 The FAO has developed the concept of climate smart agriculture as a way forward for crop production and food security in a changing climate regime. This aims to improve food security, helps communities adapt to climate change and contributes to climate change initiatives by adopting appropriate practices and developing enabling policies and institutions. Increase in mean temperature, changes in rainfall pattern reported in Kerala, increased variability both in temperature and rainfall pattern, changes in water availability, the frequency and intensity of extreme events, sea level rise and so on will have a profound impact on agriculture. A climate change action plan has been prepared by the State. In order to further develop climate smart agriculture, interventions have to be identified to suit Kerala's agriculture sector. To a great extent, increasing resilience can be achieved by reducing vulnerabilities and increasing adaptive capacity. Increasing soil carbon improves both efficiency and resilience. Improving land management, soil fertility and so on have long term benefits. Implementing climate smart agriculture can be a major driver of a green economy and a concrete way to operationalise sustainable development. It is a new approach, a way to guide the changes needed in the agricultural system (FAO 2013).

5.4.4.71 A detailed action plan for different agro-ecological zones and units of the State has to be prepared. This can be done with the help of central and state initiatives on climate smart agriculture for sustainable development of agriculture and allied sectors in Kerala.

## 5.4.5 Implementation issues

5.4.5.1 In-field implementation of the new agricultural paradigm will be a daunting task for the State. This will require a change in the mindset and institutional reforms. Entrusting all these tasks to the existing institutions and departments may be challenging. As governance is a key factor in the success of any new programme, the State has to think of establishing innovative institutions and introducing innovative governance mechanisms to effectively implement the proposed programmes. Achieving each of these goals further depends on ensuring result-oriented action in a number of related areas.

## Strengthening the database for monitoring

5.4.5.2 Strengthening the agricultural database in Kerala is one of the focus areas of the future. This is because an up-to-date and comprehensive centralised data warehouse is of utmost importance to support policy studies that provide inputs to the plan process. A few areas that require attention are — data on crop-wise input use, number and distribution of various agricultural implements, area under high yielding varieties for major crops, production and productivity of minor crops, imports and exports (across state border) of agricultural commodities, area under protected cultivation, precision farming and other resource saving cultivation practices, details of various micro-enterprises involved in agriculture and related activities, assessment of meat production, animals slaughtered and productivity in unorganised sector, infrastructural details on wholesale and retail markets dealing with agricultural commodities, indices on input prices, sector-wise demand and supply of irrigation water, indicators on R&D and data on the performance of extension services.

5.4.5.3 To conclude, the future of Kerala's agriculture will depend considerably on how the scarce resources of the State are put to best use and the way in which a judicious balance between the competing sectors is achieved.

## 5.5 Conclusion

5.5.1 Improvement in the productivity of agriculture to match international standards is the critical goal for the next fifteen years. Increased adoption of technology, investments in physical infrastructure and improved marketing techniques are a virtuous-cycle that Kerala can benefit from and, indeed, use to show the rest of India the path to attaining a developed economy status. Agro-entrepreneurs should be encouraged to show the way forward. Training is required at every stage, because business as usual may not be sustainable. Training of the trainers and senior administration is also required for out of the box thinking to deal with out of the box challenges.

## Appendix A.5.1: Forecasts

### A.5.1: Methodology for Computation of Total Factor Productivity (TFP) of crops

TFP measures the amount of increase in the total output, which is not accounted for by increases in the total inputs. TFP is defined as the ratio of an index of aggregate output to an index of aggregate input. One of the most defensible methods of aggregation in productivity measurement is Divisia aggregation. Divisia indices have two important attractive properties: (i) They satisfy the time reversal and factor reversal tests for index numbers, and (ii) It is a discrete of the components, so that the aggregate could be obtained by the aggregation of sub-aggregates. For discrete data, the most commonly used approximation to the (continuous) Divisia index is the Tornqvist approximation. The Divisia Tornqvist or translog index of TFP which is used in the present study for computing the total output, total input and TFP indices by commodity/farm system/sector, etc., under different locations is as given below:

Total output index (TOI)

$$TOI_t / TOI_{t-1} = \prod_j (Q_j / Q_{j,t-1})^{(R_j + R_{j,t-1})/2}$$

Total input index (TII)

$$TII_t / TII_{t-1} = \prod_i (x_i / x_{i,t-1})^{(S_i + S_{i,t-1})/2}$$

where,

$R_{jt}$  is the share of 'j'th output in total revenue,  
 $Q_{jt}$  is the output of 'j'th commodity,  
 $S_{it}$  is the share of 'i'th input in total input cost,  
 $x_{it}$  is quantity of 'i'th input, and  
 $t$  is the time period

The cost estimates and other data on the quantity and value of inputs provided by the Department of Economics and Statistics, Government of Kerala corresponding 2000/01 to 2009/10 were used for TFP estimation. The estimated growth rates in TFP were subsequently used for supply projections.

### A.5.2. Estimation and future projection of demand

The estimation of future demand of major agricultural commodities is an essential pre-requisite to setting realistic production targets for these commodities. This involves estimation of demand for the base-year of projection, estimation of income elasticity of demand for the specific commodity in question and projecting the future demand for the period for which the plan is to be framed. The base-year total demand for the commodity is generally estimated from the sample survey estimates on household per capita consumption. National Sample Survey Organisation (NSSO) collects and compiles household data on consumer expenditure and consumption pattern by conducting nationwide surveys in India. The latest NSSO data on household consumption for Kerala is available for the year 2009–10. This data was utilised to estimate base-year demand of major food commodities such as rice, pulses, vegetables, fruits, milk and so on. Projected population is shown in Table A.5.1. The income elasticities of demand for these commodities were collected from published literature and are given in Annexure 6 (Table A.5.2). Finally, the projected demand for the commodity for the future period (2030 in this case) was estimated using the following formula:

$$d_t = d_{t_0} (1 + Y_g \times e_i)$$

$$D_t = d_t \times N_t$$

Where,  $d_t$  is the per capita consumption at projected year  $t$ ,  $d_{t_0}$  is the per capita demand for the base-year,  $y_g$  is the growth in income and  $e_i$  is the income elasticity of demand.  $D_t$  is the total demand at the projected period and  $N_t$  is the projected population for the future year  $t$ .

**Table A.5.1**  
Projected Population and Per Capita Income in Kerala, 2010–2030

Year	Rural ('000 nos)	Urban ('000 nos)	Total ('000 nos)	Annual growth rate (%)	Per capita income (Rs. at 2004/05 prices)	Annual growth rate (%)
2010	25,539	8,778	34,317	0.75	56,107	8.33
2015	26,475	8,998	35,473	0.61	76,859	5.71
2020	27,250	9,160	36,410	0.47	97,674	4.45
2025	26,560	10,572	37,132	0.35	1,18,485	3.64
2030	24,557	13,152	37,709	0.27	1,39,296	3.08

Source: Report of the Technical Group on Population Projections, Office of the Registrar General & Census Commissioner, Government of India. Per capita income was projected using ARIMA model.

**Table A.5.2**  
Income Elasticity of Demand Used for Demand Projections

Commodity	Income elasticity of Demand	
Rice	0.02	-0.06
Wheat	0.08	0.12
Pulses	0.22	0.05
Edible oil	0.29	0.29
Vegetables	0.26	0.26
Fruits	0.36	0.46
Spices	0.52	0.55
Milk	0.43	0.20
Egg	0.88	0.52
Meat	0.54	0.60

Sources: All India elasticities were taken from Kumar et al. (2011); Shinoj and Mathur (2007) and Gandhi and Zou (2010). Kerala specific elasticities were derived through calibrations based on NSSO consumption data for Kerala.

### A.5.3: Projection of production/supply

Supply projections were undertaken for all major agricultural commodities, for which cost of cultivation data was available. The cost estimates and other data on the quantity and value of inputs provided by the Department of Economics and Statistics, Government of Kerala were used for supply projections. This data was used to estimate supply growth of the commodities for the past 10 years. Other than inputs/price driven growth, crop area (AREA) and total factor productivity (TFP), are the major sources of supply growth. The following framework was used to estimate supply growth.

The supply growth equation for commodity can be expressed as:

$$S_g = P_g + \sum_i \epsilon_{i, S} g_i + \text{AREAg} + \text{TFPg}$$

Where,

$S_g$  = Supply growth for the commodity

$\epsilon_{i, S}$  = Output supply elasticity with respect to the product price, and

$P_g$  = Output price growth

$\epsilon_{i, S}$  = Elasticity of factor demand for  $i$ th input

$g_i$  = Input price growth of  $i$ th input

AREAg = Acreage growth of the commodity

TFPg = TFP growth of the commodity

The supply growth equations given above were used to predict the supply of various commodities under the base line assumptions of input-output price growth, area, and TFP growth. The supply growths were estimated under the following scenarios:

- (i) Base-line Scenario: The growth in area, TFP and price-driven growth of supply to be continued at the same rate as that corresponding to the period 2000–01 to 2009–10.
- (ii) Pessimistic Scenario: Area growth to continue as the same and TFP growth at half of the base-line scenario; Price-driven supply growth to continue as earlier.
- (iii) Interventionist Scenario: Decline in area arrested and growth in TFP maintained at the current level if positive and reduced to half if negative. Price-driven supply growth to continue as earlier.
- (iv) Optimistic Scenario: Area to grow at a rate at which the crop area is restored to the level as that of TE 2000–01 by the year 2030. TFP growth maintained at the current level if positive and brought to zero if negative. Price-driven supply growth to continue as earlier.

The average production during 2007–2010 (TE 2010) was used as the base year domestic supply. The domestic supplies of major commodities were projected till 2030 using the following formula;

$$S_t = S_0 * (1+S_g)^t$$

where,

$S_t$  is the supply for a commodity at future period  $t$ ,  $S_0$  is the base year production and  $S_g$  is the predicted supply growth under various scenarios.

Assumptions of annual growths in area, TFP, Price driven growth and supply growth under alternative scenarios of supply projections for major crops in Kerala (Table A.5.3).

**Table A.5.3**  
**Supply Projections**

(Per cent)

Crop	Scenario	Area growth	TFP growth	Price driven growth	Supply growth
Paddy	Pessimistic	-4.29	0.90	-0.07	-3.46
	Base-line	-4.29	1.80	-0.07	-2.56
	Interventionist	0.00	1.80	-0.07	1.73
	Optimistic	1.88	1.80	-0.07	3.61

Coconut	Pessimistic	-1.86	0.38	1.52	0.04
	Base-line	-1.86	0.76	1.52	0.42
	Interventionist	0.00	0.76	1.52	2.28
	Optimistic	0.50	0.76	1.52	2.78
Tapioca	Pessimistic	-4.12	1.80	1.01	-1.31
	Base-line	-4.12	3.60	1.01	0.49
	Interventionist	0.00	3.60	1.01	4.61
	Optimistic	1.75	3.60	1.01	5.35
Banana	Pessimistic	-1.00	0.41	0.23	-0.37
	Base-line	0.00	0.81	0.23	1.04
	Interventionist	1.00	0.81	0.23	2.04
	Optimistic	2.00	0.81	0.23	3.04
Pepper	Pessimistic	-2.62	-10.17	3.85	-8.99
	Base-line	-2.62	-6.78	3.85	-5.60
	Interventionist	0.00	-3.39	3.85	0.41
	Optimistic	0.58	-1.69	3.85	2.69
Ginger	Pessimistic	-5.05	-1.15	3.07	-3.13
	Base-line	-5.05	-0.77	3.07	-2.75
	Interventionist	0.00	-0.38	3.07	2.69
	Optimistic	2.35	0.00	3.07	5.44
Turmeric	Pessimistic	-3.37	0.25	1.21	-1.92
	Base-line	-3.37	0.49	1.21	-1.67
	Interventionist	0.00	0.49	1.21	1.70
	Optimistic	1.50	0.49	1.21	3.20

Source: Computations by NCAER

## Reference

- <sup>1</sup> This number is derived by adding percentage share of cultivators and agricultural labourers out of main workers.
- <sup>2</sup> Government of Kerala. 2012. Kerala Economic Review – Agriculture and Allied Sectors, State Planning Board, Government of Kerala.
- <sup>3</sup> Requirement is as reported by the respective state departments of agriculture based on the assessment of farmers demand for fertilisers.
- <sup>4</sup> As per the latest statistics available from [indiastat.com](http://indiastat.com), the total land that is now under the scheme of National Mission of Micro Irrigation in Kerala is 12 thousand hectares (July, 2012).
- <sup>5</sup> State Planning Board. 2012. Economic Review 2012. <http://www.spb.kerala.gov.in/images/pdf/er12/Chapter2/chapter02.html#Agriculture>. Government of Kerala, Thiruvananthapuram, Kerala.
- <sup>6</sup> Joseph, K.J. and P.S. George. 2011. Structural Infirmities in India's Plantation Sector: Natural Rubber and Spices. Report Prepared for the Ministry of Commerce, Government of India. National Research Programme on Plantation Development. Centre for Development Studies, Thiruvananthapuram.
- <sup>7</sup> As there are no direct estimates available on capital formation in agriculture in Kerala, these were estimated based on reported incremental capital output ratio (ICOR).

- <sup>8</sup> Tea, Coffee and Rubber are regulated through their respective autonomous commodity Boards in India, which fall under the Ministry of Commerce, Government of India. [http://commerce.nic.in/aboutus/aboutus\\_autonomousbodies.asp#b2](http://commerce.nic.in/aboutus/aboutus_autonomousbodies.asp#b2).
- <sup>9</sup> There are five municipal corporations and 60 municipalities. Out of that 12 are first grade, 22 second grade and 26 third grade councils as per Census 2011. "The Kerala Municipalities Act do not prescribe any criteria for constitution of Municipalities. However Government as per G.O MS 108/67/HLD dated 2nd March 1967 had laid down the following standards for the constitution of new Municipalities: (i) the locality should predominantly be urban i.e. at least 3/4th of the adult population of the area should be engaged in pursuits other than agriculture, (ii) the population of the locality should not be less than 20,000 and the density of population should not be less than 4000 per 2.59 sq.km. except in hilly areas and (iii) Per capita revenue resources of the locality should not be less than Rs 5".
- <sup>10</sup> Department of Town and Country Planning, Government of Kerala. 2012. State Urbanisation Report Kerala: A Study on the Scattered Human Settlement Pattern of Kerala and its Development Issues. March.  
Department of Agriculture Web site. [http://www.keralaagriculture.gov.in/pdf/wj\\_39.pdf](http://www.keralaagriculture.gov.in/pdf/wj_39.pdf).
- <sup>11</sup> Technopark Web site. <http://www.technoparktoday.com/young-farmer-com-website-techie-vegetable-garden/>.
- <sup>12</sup> e-Agriculture Web site. <http://www.e-agriculture.org/content/ict-based-remote-agro-ecological-monitoring-system-%E2%80%93-case-study-taiwan>
- <sup>13</sup> ICT in Agriculture Web site. <http://www.ictinagriculture.org/content/pests-disease-and-natural-disasters>.
- <sup>14</sup> ICT in Agriculture Web site. <http://www.ictinagriculture.org/content/pests-disease-and-natural-disasters>.
- <sup>15</sup> Bank of India Web site. <http://www.bankofindia.co.in/english/agriclinics.aspx>.
- <sup>16</sup> Business Line. 2013. Vazhakulam pineapple set to go places by train  
<http://www.thehindubusinessline.com/news/states/vazhakulam-pineapple-set-to-go-places-by-train/article4784623.ece>. June 5.
- <sup>17</sup> AGMARK quality standards are already available for processed food products.
- <sup>18</sup> Includes a set of farming practices that focuses on minimum soil disturbance, conserving the top soil, crop rotation, etc.
- <sup>19</sup> Cornell University Web site. <http://sri.ciifad.cornell.edu/index.html>.
- <sup>20</sup> Farming Systems in Watershed. PPT Presentation. [http://www.icrisat.org/what-we-do/agro-ecosystems/CA\\_Watersheds/farming%20in%20watershed.pdf](http://www.icrisat.org/what-we-do/agro-ecosystems/CA_Watersheds/farming%20in%20watershed.pdf).

# ANIMAL HUSBANDRY AND DAIRY SECTOR: LIVESTOCK FOR BETTER LIVES





## Animal Husbandry And Dairy Sector: Livestock For Better Lives

### 6.1 The Background

6.1.1 Livestock have been an integral component of agriculture and rural economies across the world. They supply energy for crop production in terms of draught power and organic manure and, in turn, derive their own energy requirements from crop by-products and residue. Livestock are valued as a source of food and other raw material or by-products such as hides and skin, blood, bone, fat and so on. The rate of increase in global demand for animal products is higher than for most food items and consumption is projected to double by 2050. The livestock sector is a major source of livelihood for the world's poor. Dairying has become an important secondary source of income and employment for millions of rural families and requires sustained growth. In India, animal husbandry and dairying is a state subject and the state governments are primarily responsible for the growth of this sector.

### 6.2 Contribution to the economy

6.2.1 The livestock sector covers breeding and rearing of animals and poultry, production of milk, slaughtering, preparation of meat, production of raw hides and skins, eggs, dung, honey and increment in livestock.<sup>1</sup> The share of the livestock sector in the value of output of agriculture and allied services at the national level was 25.4 per cent in 2010–11 at constant 2004–05 prices.<sup>2</sup> The corresponding figure for Kerala was lower at 21.7 per cent. There is considerable variation across the states. The share of livestock in “the value of output of agriculture and allied activities is less than 20 per cent in Assam, Goa, Karnataka, Maharashtra, Odisha, Sikkim, Tripura, West Bengal, Daman and Diu and Lakshadweep; between 20–25 per cent in Arunachal Pradesh, Gujarat, Manipur and Dadra and Nagar Haveli; 25–30 per cent in Himachal, Madhya Pradesh, Mizoram, Rajasthan, Tamil Nadu, Uttar Pradesh, Puducherry, Jharkhand and Uttarakhand; and more than 30 per cent in Andhra Pradesh, Bihar, Haryana, Jammu and Kashmir, Meghalaya, Nagaland, Punjab, Andaman and Nicobar Islands, Chhattisgarh, Chandigarh and Delhi,” says a Planning Commission report.<sup>3</sup> At the national level, in 2010–11, the share of livestock in GDP was 3.9 per cent and in agricultural GDP 26 per cent at constant prices (2004–05).<sup>4</sup>

6.2.2 The animal husbandry sector provides large self-employment opportunities. According to the State Poverty Eradication Mission or Kudumbashree, in Kerala, 5 out of 70 lakh families depend solely on livestock for their livelihood, while another 5 lakh depend on livestock as a subsidiary means of supporting their livelihood. More than 55 per cent of cattle farmers maintain 2–3 cow units, while about 32 per cent maintain one-cow units. A significant share of livelihood enterprises set up by Kudumbashree are in the animal husbandry sector, especially dairy farming. Out of 37 lakh women on the margin of the poverty line, 70 per cent opted for enterprises in the animal husbandry sector, as the major basis of livelihood.<sup>5</sup> It indicates that further progress in the livestock sector will be directly reflected in the balanced development and upliftment of the rural economy.

## 6.3 Government support

6.3.1 Livestock are an important element of the livelihoods of rural households and much of the state government's economic development efforts have focused on the livestock sector. The government has created an elaborate administrative and research infrastructure to promote the sector. The Department of Animal Husbandry in Kerala spearheads developmental activities related to this sub-sector. The major activities of the department are veterinary services; animal healthcare; disease eradication; development of cattle, goat, pig and poultry; control of zoonotic diseases; conducting and coordinating extension activities and training programmes for farmers and veterinarians; and production of biologicals.<sup>6</sup> At present, about 2,698 institutions, spread across the State, operate under the department, including artificial insemination centres, disease control and diagnostic laboratories, epidemiological cells, breeding farms, hatcheries, feed testing labs, veterinary clinics and dispensaries, veterinary hospitals, poly clinics, training centres and so on.

6.3.2 Kerala also has a separate Department of Dairy Development, which functions as the nodal agency for rural dairy extension, fodder resource development and rural milk marketing in the State. Units currently functioning under the department include 152 dairy extension service units, 14 district offices, five dairy extension centres, 14 quality control units and two fodder farms. Other government bodies in the sector include Kerala Livestock Development Board, Meat Products of India and Kerala Feeds Limited and Kerala Cooperative Milk Marketing Federation.

6.3.3 The Kerala State Poultry Development Corporation (KSPDC) is primarily responsible for the promotion and development of the poultry sector in the State.<sup>7</sup> It has implemented many projects to increase the domestic production of poultry products and reduce the import dependence on other states. Poultry has emerged as the fastest growing sub-sector of agriculture, contributing sizeable output to the State's economy. Modernising the poultry sector is the major thrust of the KSPDC's corporate strategy.

6.3.4 KSPDC farms include a holding farm in Pettah, Thiruvananthapuram to hold layer and broiler birds before they are sold to farmers, a duck farm at Kottiyam, a feed mixing plant at Kottiyam and a meat processing plant at Pettah, Thiruvananthapuram. Two layer breeding farms in Kottayam and Mala have also been started. Further, the KSPDC intends to establish more infrastructure including:

- A high-tech layer farm and meat processing plant at Kudappanakunnu in Thiruvananthapuram.
- A layer breeding farm at Kuriyottumala in Kollam.
- A poultry feed mill at Mala in Thrissur district.

6.3.5 The KSPDC has introduced backyard and small-scale poultry projects to enhance food security and contribute to poverty reduction through income and employment generation. The organisation has also introduced 'integration farming'.<sup>8</sup> Farmers with sheds that are 2,000 square feet or larger can apply to rear chickens under this scheme. Once approved, they will be supplied chicks and feed and will rear the birds under a strict protocol of vaccination and healthcare. In the case of layer birds, the birds reared are procured at 35–40 days and issued to selected beneficiaries of the local body through veterinary institutions of the panchayat or for various schemes. This provides backward and forward linkages to poultry farming. The evidence suggests that it has been successful in the sense that production costs have come down and productivity has increased.

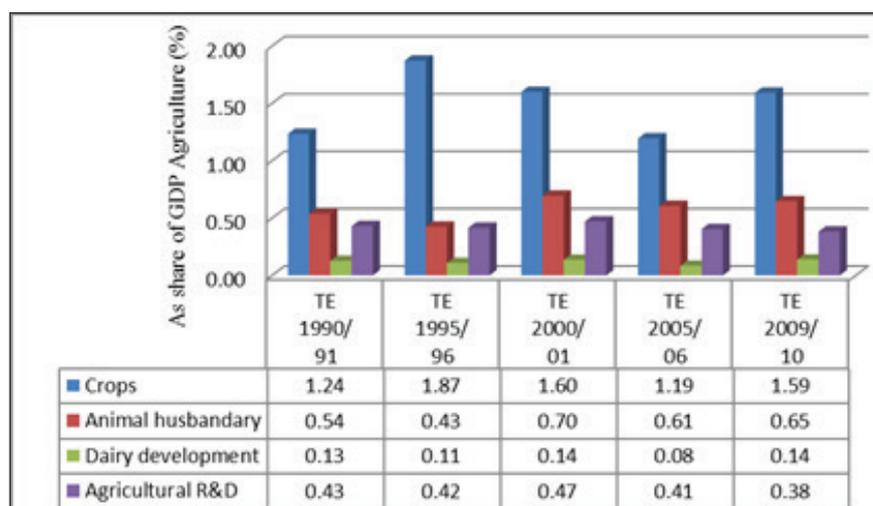
6.3.6 The Kerala Veterinary and Animal Sciences University (KVASU), established in December 2010, undertakes education, research and extension services in the field of veterinary and animal sciences. Located in Pookode, Wayanad, the university comprises two veterinary colleges at Mannuthy and Pookode respectively (Colleges of Veterinary and Animal Sciences); College of Dairy Science and Technology at Mannuthy; 15 research stations/units/farms; and two veterinary hospitals in different parts of Kerala.<sup>9</sup> The Directorate of Entrepreneurship, functioning under the

university, promotes innovation for enhancing farm income through entrepreneurship. It also focuses on research, outreach and extension activities.

6.3.7 Under the State Poverty Eradication Mission or Kudumbashree, the government has been trying to prioritise dairying and goat farming with a view that these are occupations preferred by the less affluent people in the community. In 2008, the state government initiated the Samagra project under Kudumbashree to develop a comprehensive production and marketing network of agriculture and livestock products.<sup>10</sup> This was also to help attain self-sufficiency in the production of eggs, milk and vegetables within the State. There are two livestock projects operating in this programme: one for milk in Ksheerasagaram (Idukki) and the other, a 'goat village' in Kannur.<sup>11</sup> While these are poverty eradication programmes, an element of professionalism and technology has been built into them in order to increase the returns from and sustainability of these programmes. Intensive training is organised in collaboration with the animal husbandry department and the Kerala Livestock Development Board. Production protocols have also been developed and propagated and an extension system has been made operational, under the Samagra project.

6.3.8 Government expenditure on animal husbandry has also improved over the years. Government expenditure on dairy development received a share of around 0.13 per cent of the overall GDP agriculture during TE (Triennium Ending) 1990–91. It has improved marginally and remained almost the same, except for a dip during TE 2005–06 (Figure 6.1).

**Figure 6.1**  
**Government Expenditure in Major Sub-sectors of Agriculture as a Share of GDP agriculture in Kerala**



Source: Centre for Monitoring Indian Economy, Online database, 2012

## 6.4 Performance of the sector

### Declining livestock population

6.4.1 Kerala is home to a range of livestock species. The livestock in Kerala are raised both in backyards and commercial farms. Cattle, buffaloes, goats, pigs, ducks and fowl and rabbits are the main livestock categories raised for milk and meat in the State. As per the 2007 Livestock Census, there were around 1,740,000 cattle in Kerala, of which 1,621,000 were crossbred and the rest indigenous breeds (Table 6.1). However, in relation to the corresponding figures for 2003, the total cattle population in Kerala suffered a drop of around 18 per cent. The decline was higher in indigenous

breeds (69.3 per cent) than in crossbred (6.6 per cent) cattle. The population of buffaloes and pigs also declined by 10.7 per cent and 22.3 per cent, respectively. On the other hand, the population of goats and fowl and ducks increased during the same period by 42.5 per cent and 30.6 per cent respectively. Over the same period, the combined cattle and buffalo population at the national level increased — from 283.1 million (185.2 million cattle and 97.9 million buffalo) to 303 million (198.3 million cattle and 104.7 million buffalo) — by approximately 7 per cent. One of the major causes for the trend in Kerala is the declining agricultural sector in the State and the rapid crop shift to natural rubber and coconut. Such a change reduces the availability of fodder for feeding cattle. The dependence on feedstock subjects livestock farming to market fluctuations of feedstock prices.

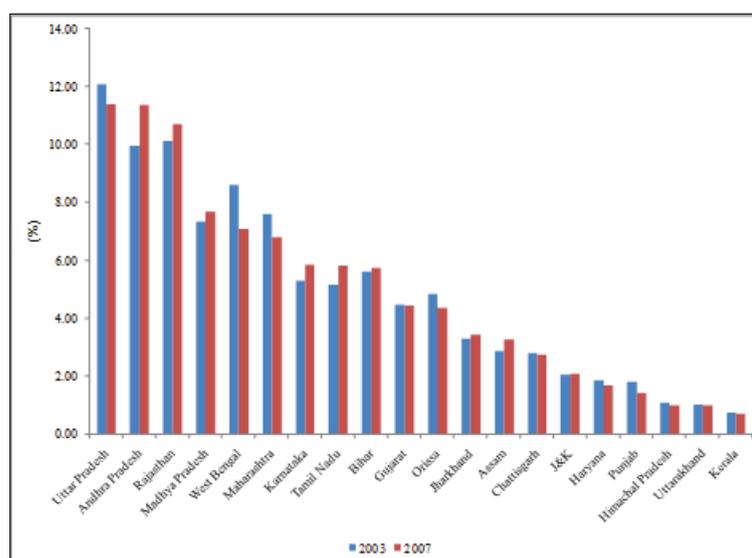
**Table 6.1**  
Trends in livestock population in Kerala

Animal	Type	Number in thousands		Per cent change (%)
		2003	2007	
Cattle	Crossbred	1,735	1,621	-6.6
	Indigenous	387	119	-69.3
	Total	2,122	1,740	-18
Buffalo	All	65	58	-10.7
Goats	All	1,213	1,729	42.5
Pigs	All	76	59	-22.3
Fowls and ducks	All	11,653	15,214	30.6

Source: Basic Animal Husbandry Statistics, 2010

6.4.2 Between 2003 and 2007, Kerala's share of the national livestock population has declined. Its share in the total cattle population was slightly above 1 per cent in 2003, which declined to 0.8 per cent in 2007 (Figure 6.2). In terms of the share in total livestock, Kerala's is the lowest among the Indian states, excluding the North-Eastern states. Its position is, however, better in poultry where the share was above 2.5 per cent.

**Figure 6.2**  
Percentage Share in National Livestock Population: 2003 and 2007 (%)



Source: Livestock census, 2003 and 2007

## Highly skewed distribution of livestock ownership

6.4.3 Like land ownership, the pattern of livestock possession in Kerala is also highly skewed, but skewed towards marginal farmers who own less than one hectare (ha) of land. Marginal farmers in Kerala owned nearly 87.7 per cent of the total cattle in the State, followed by small farmers (8.4 per cent). The other three holding categories owned the remaining 4 per cent of cattle (Table 6.2). A similar pattern was seen in the ownership of buffaloes as well. Goats, as is the case elsewhere, were found to be the property of small and marginal farmers in Kerala too. Marginal farmers owned a substantial proportion (92.6 per cent) of goats in the State. While marginal farmers possessed 57.5 per cent of the pigs, the rest was more or less equally divided among other categories of farmers, except large farmers. Marginal farmers also predominantly owned poultry (93.5 per cent), followed by small farmers (4.55 per cent).

**Table 6.2**  
**Farm Size-wise Ownership of Livestock in Kerala: 2006–07 (%)**

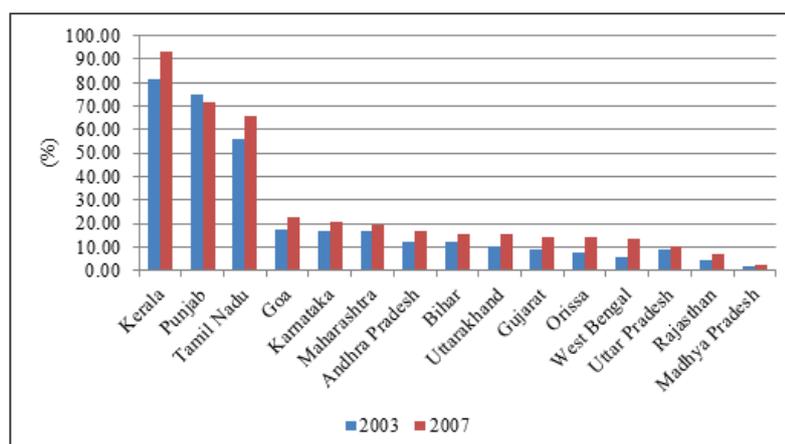
Farm category	Cattle	Buffalo	Goats	Pigs	Poultry
Marginal (below 1.0 ha)	87.70	86.57	92.62	57.48	93.54
Small (1.0 – 1.99 ha)	8.41	8.35	4.99	17.63	4.55
Semi-medium (2.0 – 3.99 ha)	3.09	3.95	1.85	10.28	1.54
Medium (4.0 – 9.99 ha)	0.72	1.02	0.47	14.60	0.34
Large (10 ha and above)	0.08	0.11	0.07	0.00	0.03
All groups	100.00	100.00	100.00	100.00	100.00

Source: Input Survey, 2006–07

## Top position among major states in terms of the quality of livestock

6.4.4 While the State is at the bottom in terms of the cattle population, it is at the top in terms of the quality of livestock. In 2003, over 82 per cent of the State's cattle population was crossbred, which increased further to 94 per cent in 2007, which is higher than all other states and union territories. The productivity of the crossbred cows is also high in Kerala; at 9.02 litres per day Kerala ranks third behind Punjab (10.95 litres) and Chandigarh (9.03 litres).<sup>12</sup>

**Figure 6.3**  
**Share of Crossbred livestock in total livestock population**



Source: <http://www.dahd.nic.in/dahd/WriteReadData/7>. Part IV Livestock Census BAHS 2012. pdf Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India. Basic Animal Husbandry Statistics 2012. April.

6.4.5 “Organised dairy development in Kerala commenced in 1951 through the Key Village Scheme (KVS). This scheme aimed at improving the genetic potential of cattle by crossbreeding local cattle with superior indigenous breeds. The Department of Animal Husbandry was the implementing agency of the KVS. This was followed by the Key Farm Scheme in 1952 and 1954. In 1955, crossbreeding with exotic breeds was initiated. In 1963, the Animal Husbandry Department started the Hill Cattle Development Scheme. The Indo- Swiss Project Kerala (ISPK), a joint venture of the Government of India and Swiss Development Corporation started in 1963, which has played a major role in the genetic improvement of the cattle of the State. The project, located in Mattupetty on the high ranges of Idukki, aimed at developing a breed of dairy cattle suited to the local conditions. Frozen semen technology for artificial insemination (AI) was introduced for the first time in Asia through this project,” says a study on India’s dairy industry.<sup>13</sup>

6.4.6 In 1967–68, the Intensive Cattle Development Project (ICDP) was initiated to implement the crossbreeding programme envisaged by the state government.<sup>14</sup> In accordance with the proposal, nine project offices, 37 Regional Artificial Insemination Centres (AI), and 1,482 ICDP sub-centres were established throughout the State.

6.4.7 The dairy development department, which was formed in 1962, undertook a state-level crossbreeding programme in 1972.<sup>15</sup> About 950 AI centres were opened in 721 panchayats and trained matriculate youth were deployed to deliver the service at the farmers’ doorstep for the first time. The adoption of AI spread dramatically over the 1970s and 1980s because of the need to enhance animal productivity in the face of rising input costs.

6.4.8 In 1976–77, a Special Livestock Breeding Programme was started as a 100 per cent centrally sponsored programme.<sup>16</sup> The aim of the scheme was to provide female crossbred calves below six months of age, supply good quality feed to ensure their health and to also provide insurance coverage.

6.4.9 Currently, the Kerala Livestock Development Board is involved in designing and implementing planned breeding programmes for cattle throughout the State. The Board supplies frozen semen to 2,971 AI centres covering the entire State and is the largest producer of frozen semen in the country.<sup>17</sup> Besides, it is also involved in activities such as training programmes in various disciplines, promotion of fodder cultivation, research in cattle/goat/pig breeding, fodder development and so on. The technological developments in the field of livestock production and fodder development are conveyed to the implementing agencies. The cattle population in the State is mostly crossbred and these animals are highly prone to diseases. Due to diseases, the farmers incur losses. In order to compensate for these losses, the department, in association with United India Insurance Company, came up with a highly subsidised insurance programme titled the ‘Gosuraksha Insurance Scheme’.

## Declining value of product

6.4.10 As with the population, livestock products also experienced a slump in growth during the 2000s compared to the 1990s. This is demonstrated by a decline in growth of Value of Product (VOP) (total livestock) from 3.87 per cent per annum to 0.55 per cent per annum (Table 6.3). Major livestock products — milk and milk products and meat and meat products — exhibited negative growth rates of –1.84 per cent and –4.16 per cent respectively in the latter period. VOP of eggs also suffered a reduction in growth momentum during this decade. Only minor products such as wool and hair and other miscellaneous products showed positive growth, with negligible effects on the overall performance. In terms of physical units, milk production in Kerala increased from 1.89 million tonnes in the Triennium Ending (TE) 1992–93 to 2.52 million tonnes in TE 2000–01 and declined thereafter to 2.41 million tonnes in TE 2009–10. In a similar fashion, egg production increased from 1,774 million in TE 1992–93 to 2,044 million in TE 2000–01 and then decreased to 1,508 million in TE

2009–10 (Gol, 2010). A major part of the meat in Kerala is produced in the unorganised sector and there is little data available on this. However, available data from the Animal Husbandry Department shows that meat production, including that from the unorganised sector, increased from 0.18 million tonnes in 2002–03 to 0.32 million tonnes in 2009–10.

**Table 6.3**  
**Trend of Growth in Value of Output (2004–05 prices) of Major Livestock Products in Kerala: 1990–1991 to 2008–09, (%)**

Sector	1990–91 to 1999–00	2000–01 to 2008–09	1990–91 to 2008–09
Milk and milk products	4.82	-1.84	1.56
Meat and meat products*	3.01	-4.16	-2.14
Egg	5.23	2.56	3.42
Wool and hair	0.72	7.24	2.87
Others	-0.38	2.47	-0.34
Total livestock	3.87	0.55	1.64

Note: \*meat production from organised sector only is accounted for.

Source: National Accounts Statistics, Central Statistical Organisation.

## High productivity

6. 4.11 Much of the decline in VOP could be due to the decline in the cattle population. However, the value of livestock product per adult cattle unit (productivity) in Kerala was found to be higher than that at the national average level. It was Rs 69,294 in 2010–11 in Kerala as against the corresponding all India average of Rs 9,872. Several programmes (sponsored by the central and state governments and local self-governments) are being implemented by the animal husbandry department, dairy department, Kerala Livestock Development Board, Kerala Poultry Development Corporation and others to increase productivity. Programmes in the animal husbandry sector have also been initiated by other departments such as the rural development and SC/ST departments to improve the health and productivity of livestock. Following the interventions of the animal husbandry department, which came into existence in 1956, there has been a uniform spread of veterinary institutions and milk cooperatives for procurement of milk. Every panchayat has a veterinary dispensary with a qualified veterinarian. Basic infrastructure for an animal healthcare system has been set in place. The animal husbandry department in Kerala has also initiated programmes for fodder development, among which the Fodder Mini Kit Demonstration Programme is implemented through the Integrated Cooperative Development Project (ICDP). The objective of this programme is to supply 'fodder mini kits' of various fodder seeds in the *rabi* and *kharif* seasons to the farmers in the State through ICDP sub-centres and veterinary dispensaries/hospitals.

## Increasing consumption of livestock products

6. 4.12 Kerala's food consumption pattern has experienced a clear diversification towards high value commodities as has happened in the rest of India. Among livestock products, milk consumption was to the tune of 37.7 kg per capita in 1999–2000, which improved to a level of 40.2 kg per capita by 2009–10. Similarly, egg and meat consumption also increased appreciably during the reporting period (Table 6.4).

**Table 6.4**  
Per capita Consumption of Major Livestock Products in  
Kerala:1999–2000 to 2009–10

Commodity	Per capita consumption (Kg/capita/annum)		
	1999–00	2004–05	2009–10
Milk	37.7	36.9	40.2
Egg*	33.3	30.4	42.1
Meat	3.4	4.4	5.6

*Note:*\* Per capita demand of egg expressed in numbers  
*Source:* Reports of NSSO for the 55th, 61st and 66th rounds of surveys

## High levels of self-sufficiency

6. 4.13 Based on the latest estimates of per capita consumption, the total demand for major commodities at the state level was computed and is presented in Table 6.5. The total demand consists of both household demand (direct demand) as well as indirect demand. Indirect demand arises mainly from consumption other than from households — from industrial uses, use on account of seed, feed, wastage and so on. It is found that the demand for milk in Kerala was relatively high at the level of 2,794.5 thousand tonnes and that for egg and meat were 2,188 million units and 456.6 thousand tonnes respectively.

**Table 6.5**  
Base-year Demand for Major Animal Proteins in Kerala:2009–10

Commodity	Per capita household consumption (kg/capita)	Total demand ('000 tonnes)	Indirect demand ('000 tonnes)	Total demand ('000 tonnes)	Production# ('000 tonnes)
Milk	40.2	1,369.3	1,425.2	2,794.5	2489.0
Egg*	42.1	1,433.0	755	2188.0	1571.2
Meat	5.6	191.8	264.8	456.6	333.2

*Notes:* \*Per capita demand of egg expressed in numbers and total demand (household, indirect and total) in million numbers.

# Corresponds to BE 2009–10.

*Source:* Computations by NCAER

6. 4.14 It was observed that production fell short of demand in all major livestock product categories. In comparison to crops, Kerala has been at a higher level of self-sufficiency in livestock products. However, it sourced nearly 11 per cent of its milk, 27 per cent of its meat and 28 per cent of its egg demand from other states in 2009–10.

## 6.5 Demand and Supply Projections and Future Scenarios of Self-sufficiency<sup>18</sup>

### Milk

6.5.1 Growth rates in VOP by livestock products are projected for the period up to 2030. These projections are based on four alternative sets of assumptions regarding the growth rates of in-milk' animal population and milk yield per animal. These assumptions are provided in Table 6.6.

**Table 6.6**  
**Alternative Growth Scenarios in the Number of In-milk Animals and Milk Yield per Animal in Kerala (%)**

	Scenario	Assumed trend growth rates (%) in		
		Number of in-milk animals	Milk yield/ animal	Total supply
Crossbred cows	Base-line	-3.32	2.31	-1.01
	Interventionist	0.00	2.31	2.31
	Optimistic	1.22	2.31	3.53
Non-Descript cows	Base-line	-5.54	0.77	-4.77
	Interventionist	0.00	0.77	0.77
	Optimistic	2.90	0.77	3.67
Buffalo	Base-line	-6.34	-0.07	-6.41
	Interventionist	0.00	-0.03	-0.03
	Optimistic	2.99	0.00	2.99
Goat	Base-line	-2.06	1.81	-0.25
	Interventionist	0.00	1.81	1.81
	Optimistic	0.85	1.81	2.66

Source: Computations by NCAER

6.5.2 The projections suggest that if the current growth trend in the number of in-milk animals and milk yield continues, total milk production will decline to 1,913.7 thousand tonnes by 2030 from the present level of 2,489 thousand tonnes. The main reason for this will be the declining number of animals in all the categories, the pace of which would mask the prospective improvement in milk yield. By countering the reduction in animal population and maintaining the yield dividends through various institutional and technological improvements, milk supply in the State can be elevated to a considerable extent as shown under the interventionist scenario. It is, therefore, possible to expand production to 3,917.8 thousand tonnes if this scenario prevails and even to 5,145.2 thousand tonnes if the assumptions under the optimistic scenario are realised (Table 6.7).

**Table 6.7**  
**Supply & Demand Projections for Milk in Kerala under Alternative Scenarios:2010–2030**

Year	Projected Supply in '000 tonnes			
	Base-line	Interventionist	Optimistic	Demand
BE 2009/10 (Base-year)	2,489.9	2,489.9	2,489.9	2794.5
2015	2,300.1	2,832.0	3,063.2	3,115.5
2020	2,159.1	3,154.2	3,640.9	3,293.0
2025	2,031.0	3,514.6	4,328.0	3,421.3
2030	1,913.7	3,917.8	5,145.2	3,519.5

Source: Computations by NCAER

6.5.3 Milk demand is projected to grow to 3,519.5 thousand tonnes by 2030, from the base year level of 2,794.5 thousand tonnes. Currently, Kerala is relatively self-sufficient in milk production with nearly 90 per cent of milk demand being met from internal production. Under the 'business as usual' scenario, milk production would decrease to the level of 1,913.7 thousand tonnes by 2030. If sufficient corrective measures are taken as indicated under the interventionist scenario, Kerala could emerge as a surplus producer of milk within the span of two decades.

## Egg

6.5.4 As in the case of milk, the baseline projections of egg supply also indicate an emerging situation of excess demand. Egg supply slowed down in the last decade, with production declining from 2,044.3 million numbers in Biennium Ending (BE) 2000–01 to 1,571.2 million numbers by BE 2009–10 as given in Table 6.5. Following this trend, the projections under the baseline scenario anticipate a far lower supply of 688.2 million eggs by the year 2030 (Table 6.9). However, with minor interventions such as arresting the drop in the number of layers and through better management practices for sustaining the egg yield growth (Table 6.8), supply can be raised to (interventionist) 2,169.6 million numbers within a span of two decades (Table 6.9). If there are improvements in both layer population and per layer productivity (optimistic scenario), egg supply may reach 3,647.4 million units within the same time span.

**Table 6.8:**  
**Growth Scenarios in Number of Layers and Egg Yield per Layer (%)**

Type of animal	Scenario	Assumed trend growth rates (%) in		
		No. of layers	Egg yield/layer	Total Supply
Fowls	Base-line	-5.69	1.62	-4.07
	Interventionist	0	1.62	1.62
	Optimistic	2.6	1.62	4.22
Ducks	Base-line	-0.34	0.08	-0.25
	Interventionist	0	0.08	0.08
	Optimistic	0.1	0.08	0.18

Source: Computations by NCAER

**Table 6.9:**  
**Supply and Demand Projections for Eggs in Kerala  
under Alternative Scenarios:2010–2030**

Year	Projected Supply in Million numbers			
	Base-line	Interventionist	Optimistic	Demand
BE 2009–10 (Base-year)	1,569.9	1,569.9	1,569.9	2,299.7
2015	1,234.2	1,721.1	1,992.2	2,715.8
2020	1,012.7	1,858.8	2,434.1	3,008.0
2025	833.4	2,007.9	2,977.9	3,219.6
2030	688.2	2,169.6	3,647.4	3,381.4

Source: Computations by NCAER

6.5.5 By 2030, consumers in the State are expected to demand a total of 3,381.4 million eggs. Going by baseline projections of supply, self-sufficiency in egg production will drop significantly from the existing level by 2030. Even under the interventionist scenario, Kerala will not be able to maintain its current status of self-sufficiency. Therefore, Kerala will have to shift from existing models of production to achieve its growth potential and meet the emerging growth in demand from its population.

## Meat

6.5.6 Presently, Kerala meets 73 per cent of its meat demand from its own production. As of now, more than half the total meat production in the State comes from the unregistered sector. The registered and unregistered sectors, together, contributed roughly 333.2 thousand tonnes of meat in the year 2009–10 (Table 6.5). Unlike with milk and eggs, the statistics on meat show that its production has increased substantially during the last few years. Between 2002–03 and 2009–10, meat production grew at an annual rate of 9 per cent in the State. However, calculations show that Kerala can sustain its present level of self-sufficiency even if this sector grows at a rate of 2.5 per cent annually. Even at a higher rate of 4.1 per cent per annum, it is possible to achieve 100 per cent self-sufficiency in this sector. Therefore, the focus now should be on devising means that can sustain the existing momentum of growth so that the presently thriving sector can be sustained in the long run.

**Table 6.10**  
**Demand Projections for Meat in Kerala ('000 tonnes): 2010–2030**

Commodity	2010	2015	2020	2025	2030
Meat	483.0	582.1	652.2	703.3	742.5

*Source: Computations byNCAER*

6.5.7 Theoretically, there are three phases of growth in the livestock population. In the first phase of growth, the quality of livestock is low. In order to respond to the growing dairy supply gap, efforts are made to increase the number of cattle and buffalo herds. In the second phase, the emphasis is on genetic improvements and hybrid crosses intended to increase the milk output. In the third phase, milk producers adopt more efficient practices and experience economies of scale. Kerala seems to be in the second phase of growth and will have to aim at transitioning to the third phase.

6.5.8 The animal husbandry farms are facing a shortage of labour. Further, the livestock sector is a source of instability for various ecosystems and contributes to environmental problems. Greenhouse gas emissions from livestock production and the consequent waste, and from pasture expansion into forests are major contributors to climate change. The presence of livestock affects biodiversity and water quality. It is also a major consumer of energy and water. The challenge before policymakers is to maintain a balance between growth on the one hand and environmental balance on the other.

## 6.6 Strategy Framework

### 6.6.1 Vision

“The livestock sector will be efficient, safe and sustainable—ensuring better lives through livestock rearing. It will be competitive not only nationally, but also on the international stage.”

### 6.6.2 Mission

- Improving the sector’s competitive position, including profitability and efficiency of the farm and enhanced competitiveness in dairy product markets, both formal and informal.

- Developing, adapting and promoting science-based practices.
- Supporting the smallholder sector to become more productive and more profitable.
- Incentivising the actors through the supply chain for ensuring the safety and quality of the product.
- Ensuring that the dairy sector develops in a socially and environmentally responsible manner.

### 6.6.3 Targets

- Self-sufficiency in supplying the local market with fresh milk, dairy products and meat.
- Meet internally about 80 per cent of the demand for eggs.
- Enter export markets for milk products (cheese, for instance) and meat by 2030.

### 6.6.4 The strategic framework: Sustainable dairy farming

6.6.4.1 The new strategic framework will depart from the current policy framework, which treats this sector as a means of addressing rural livelihood. It will continue to place strong emphasis on people and communities, but within the wider context of farm production and productivity. While re-shaping the industry strategy, it must be clear that dairy farming's first priority is to remain competitive. This means producing safe and high quality dairy products at a competitive cost. At the same time, it must also take responsibility for the wider goals of environment protection, animal welfare and people-related outcomes. In a nutshell, a sustainable livestock strategy aims at reducing the environmental footprint of farms, while improving milk production, farm profitability and the well being of the people and animals involved. The new strategy will have five pillars.

#### Pillar 1: Enhance competitiveness

6.6.4.2 The main constraints to improving productivity and profitability of milk production are common across Kerala and are — feed availability, shortage of improved stock, insufficient knowledge of 'raising management' skills and access to affordable credit. A key element in addressing these constraints is to facilitate entrepreneurial initiatives, business linkages and know-how to ensure competitiveness.

#### Action Plan 1: Adopt an enterprise-driven approach to development of the livestock sector

6.6.4.3 The sector has been perceived in policy circles as a source of rural livelihood and not as a source of generating economic value. That perception poses challenges around attracting talent and introducing new practices and innovation. It is, therefore, important to change the way this sector is perceived. Recognising the market opportunities associated with this sector, the strategy will be to modernise it and upgrade its status. This will require the transformation of small 'livelihood' family farms in Kerala into highly competitive market-oriented small to medium sized family farms. At the same time, encouragement will be given to the establishment of large commercial farms, with at least one in each district. The cooperative sector is responding by adapting its business model and legislation to the new generation models. In India, enterprises based on cooperative structures can now be registered as producer companies under the Companies Act. Many cooperative societies (including Gujarat Cooperative Milk Marketing Federation Ltd, Anand) are in the transitional phase. There is a need to promote producer companies in the livestock sector in Kerala as well. Graduating from subsistence, smallholder milk producers to small, commercial dairy farmers is fundamental to implementing the strategy. Some of the alternative organisational approaches have been provided in Box 6.1.

**Box No 6.1****Selected successful, smallholder dairy chain business models in the countries studied include:**

- 1) **Contract farming model:** The processors remain a key driver of the dairy industry, with constant reinvestments in and diversification of the product portfolio. Private sector-smallholders are linked with them through contract farming, For example in Pakistan (Halla and Haleeb models), Sri Lanka and Vietnam.
- 2) **China's dairy park model:** Dairy parks are developed by large processors and are used by smallholders to keep and milk their cows. The number of cows in the parks ranges from 300 to over 1,000, and are financed either by the processors, the local authority or the smallholders themselves.
- 3) **Philippines' dairy zone model:** Essentially it is an enterprise-driven model that transforms smallholders into dairy farming entrepreneurs. Zones consist of around 100 smallholders with about 300 dairy animals, located in adjacent villages served by a processing plant located within a 30 km radius of an urban centre that is capable of absorbing 300 to 500 litres per day. This enables economies of scale for dairy input and output service providers.

Source: International Food Policy Research Institute

## Action Plan 2: Paradigm shift in improving productivity sourcing of animals: Local or crossbred

6.6.4.4 A paradigm shift to substantially improve productivity is essential, covering a field visit-oriented extension system in association with dairy cooperatives, livestock management and appropriate modification in breeding policy to suit the Kerala condition.

6.6.4.5 Promote mechanisation in this sector to ensure higher productivity and a better environment. Feed stations, for instance, conserve resources by regulating cows' feed. When a cow enters the station, the processor identifies her by an electronic transponder around her neck. Because the processor calculates every animal's daily ration continuously, around the clock, it can immediately assess if the cow should eat and how much. The station then blends and dispenses the feed right to the cow's mouth at a speed predetermined to match her eating speed. Similarly, pre-cooling transfers heat from the milk and cools it significantly before it reaches the cooling tank.

## Action Plan 3: Increase fodder production

6.6.4.6 To increase fodder production to feed more animals, the following measures are suggested within the framework of the sustainable development strategy for agriculture:

- Increasing the volume of locally produced fodder through an increase in field fodder production and improvement in fodder ratio.
- Introducing mechanisms to promote efficient use of pastures and ensuring technical assistance to lessees and owners of pastures for improving vegetation cover, rehabilitation of ecological balance and provision of watering points for animals.
- Raising fodder production through large scale, dairy cooperative society-based, fodder development projects and by encouraging intercropping.

- Enhancing cattle feed production capacity, both by setting up new plants and by raising capacity of existing plants.
- Trying out locally available material such as jackfruits and banana stems as fodder.

## Action Plan 4: Promote infrastructure, marketing and finance

6.6.4.7 The following measures are proposed to promote infrastructure and marketing:

- Enhance market access through both formal and informal market channels to better meet consumer needs and affordability.
- Facilitate financial development of the sector, including investments by smallholders, SMEs, cooperatives, governments, NGOs, community organisations and corporations, as well as by public investment in infrastructure and support services.
- Focus on enhancing feed production, particularly feed for pigs, goats, rabbits and ducks, as there is a marked shortage in the availability of feed, and launch special projects to augment production.
- Support small and marginal farmers to get organic and 'locally produced' certification to ensure higher prices for their produce. The process of getting certification is typically an expensive one. For example, support for rearing Malabari goats for meat, which may cater to local tastes and thereby fetch a higher price.

## Goat farming and buffalo rearing

6.6.4.8 Rearing of Malabari goats is encouraged in Kerala especially in integrated farms. Genetic improvement of Malabari goats through selection of superior germplasm and artificial insemination using frozen semen from superior bucks needs to be encouraged. Buffalo rearing may also be adopted if found sustainable in Kerala. Buffalo milk gets a higher price than cow milk.

## Backyard poultry

6.6.4.9 Empirical evidence from around the world suggests that backyard poultry has the potential to uplift people, especially women, out of poverty. However, backyard poultry may be particularly susceptible to diseases. The South Asia Pro-Poor Livestock Policy Programme, which is a joint initiative of the National Dairy Development Board of India and the United Nations Food and Agriculture Organisation, has identified and documented a range of good practices along the poultry supply chain in Bangladesh, Bhutan and India.<sup>19</sup> These include interventions related to the provision of inputs, management and improved husbandry practices, health service delivery and the marketing of live birds and eggs. Kerala may partner with this programme to encourage backyard poultry. Specifically, possible interventions are:

- o Sourcing of birds: Local breeds are preferable, as exotic species require exotic feed. Supply chains may be developed for this. KSPDC has already implemented this practice in its integrated farms.
- o Access to animal health and veterinary supplies: While this point is discussed in general in the next section, provision of animal health workers (AHWs) has been identified specifically for backyard poultry, as this reduces mortality rate in poultry. "Usually, rural villagers, often semi-literate women, are trained to provide vaccinations, de-worming and first aid to poultry, small ruminants and large ruminants and are given access (for free or for a fee) to basic equipment and vaccines/drugs. These animal health workers (AHWs) charge a small fee for their service. The fee is affordable for farmers because AHWs live locally (reduced transaction costs) and

have less income expectations than fully trained veterinarians or animal health assistants. The income derived from the provision of small animal health services, however, cannot be a primary source of livelihood for AHWs, who need to also rely on other sources of income.”<sup>20</sup> This is an area where Kudumbashree can play a strong role together with the KSPDC.

- o Feeding and housing birds: Small changes in feeding such as adding crushed snail shells available in fish ponds to poultry feed (as a source of calcium) or rearing termites in earthen pots (as a source of protein) and changes in cropping pattern, which result in the availability of crop residue, can all increase the quantity and quality of feed for poultry birds and, hence, their productivity. This is also in consonance with the concept of developing integrated farms proposer in the chapter on Agriculture.

## Slaughterhouses

6.6.4.10 A well-defined strategy for slaughterhouses would include the following:

- Adopt Dutch standards for slaughterhouses.
- Policy to regulate and monitor slaughterhouse to maintain sanitary conditions and the quality of the meat.
- Setting up physical infrastructure, with mechanised slaughterhouses.
- Waste management and disposal policies and setting up of physical infrastructure accordingly. Solid waste may be re-used for fertiliser wherever possible.

## Higher-value-added products

6.6.4.11 All products should be converted into higher-valued-added products and branded ‘Made in Kerala’ and marketed suitably. For example, Kerala’s highlands can provide a natural environment for the production of cheese, ice-cream, packaged milk, butter, flavoured curd, chocolates and so on, which are all examples of higher-value-added products. Jackfruit ice-cream and jackfruit curd made in Kerala can be best sellers. Amul is one of the most successful cases in this arena. In Kerala, activities such as cheese making can be linked to the tourism sector too, with people learning to make cheese while on a holiday in the State. This can create an additional revenue stream for the dairy entrepreneur. Acres Wild is an organic cheese making farm-stay in Coonor in Tamil Nadu, which offers cheese making courses. Flanders Dairy Products is another example of cheese making, with the dairy producing a number of varieties of cheese. Obviously, proximity to Delhi and selling in an upscale location helps the dairy. Organic milk and eggs fetch a higher price and linking that with upmarket restaurants in Kerala can fetch higher prices for entrepreneurs, while restaurants can brand their products ‘local organic food’.

## Financial incentives

6.6.4.12 Loans to farmers and entrepreneurs in this sector may be considered as agricultural loans and, therefore, offered at subsidised interest rates.

## Technology

6.6.4.13 Small innovations such as bucket type milking machine, slurry pumps and machines that automatically provide drinking water may help in improving productivity. Linking dairy farms with biogas plants may be a win-win situation for both the farmer/entrepreneur and the community. ICT may also be used in animal husbandry. While there is KISSAN Kerala, which mostly provides information services, ICT usage can be further enhanced in innovative ways like in Botswana.<sup>21</sup> Radio Frequency Identification (RFID) was used in Botswana to prevent and treat cattle diseases in the country.<sup>22</sup> Documentation of successful innovation in this sector can then be transmitted through KISSAN Kerala.

## Pillar 2: Attract the best talent

6.6.4.14 Dairy farming currently has a low social and economic status. As a result, this activity does not attract talent. Economic intuition suggests that when returns are higher than costs, this will automatically attract people to work in the sector. The challenge is to make the sector remunerative. Currently, the production structure is dominated by smallholders whose principal activity is agriculture or by workers from marginalised sections of society. The strategy of facilitating livestock extension and development can be a deliberate and creative development vehicle that is sensitive to the needs of smallholders. Initially, livestock extension must be channelled through the existing extension services. The FAO is promoting a strategy wherein a small, multi-disciplinary task force is used within a selected area to promote livestock production through a combination of training and development activities. With Dutch bilateral assistance, the International Poultry Centre in Indonesia has taken its extension staff and farmer training programme out of the centre. Training is now being given by small training teams in selected districts. The training teams travel around and hold training sessions for both farmers and extension staff in the villages, using village facilities. This is believed to be an extremely promising exercise that should be examined closely. Further, agricultural research centres providing extension services can greatly enhance knowledge in the area and create a circular relationship between this sector and researchers.<sup>23</sup> The Oregon State University (OSU) Extension Service conveys research-based knowledge in a way that is useful for people to improve their lives, their homes and their communities. The OSU Extension faculty work with businesspeople, growers, foresters, youth and community leaders. They see first-hand what's working and what's not in Oregon's communities. Extension educators consult scientists at Oregon State University, where they focus their research on real issues that are important to real people. Results from that research circle back to the community through extension programmes. Knowledge grows from this cycle of reaching out and engaging the people who use it. For example, OSU researchers examined whether cattle could co-exist with prairies in a certain part of Oregon.<sup>24</sup> The researchers assessed how the cows impacted plants, insects, soil, ground-nesting birds and each other. They watched each bite that the cows took and also examined the contents of their stomachs. The research found that in moderate numbers, similar to ranchers' current use, the flora and fauna didn't suffer and the cows maintained a marketable weight.

6.6.4.15 A few countries have developed successful, hands-on, knowledge-based, vocational training facilities. These are sustained, for example, by incentives provided by the public and private sectors. Others have developed outreach training systems including farmer-to-farmer learning that take training out to smallholders, close to their homesteads and farms. This is particularly effective for disseminating improved technology and promoting hygienic milk production, both vital elements of competitive market access.

6.6.4.16 India has followed the former approach of formal training in dairying. Courses in dairy development are well structured. Graduate and post-graduate courses are offered in this area. Over time, training to small and big holders in this sector will have to be mainstreamed by:

- Developing state-of-the-art, vocational training courses for best practices and models, including course material and practical lessons, which are sustainable and provide incentives for trainers and trainees.
- Introducing management courses in animal husbandry and dairying for increasing the number of qualified plant managers, quality control and product development officers and AI technicians. This will increase the pool of talent available to growing enterprises.
- Developing short-term programmes that will include a resource pool of successful dairy entrepreneurs and plant managers who can be tapped as trainers or visiting coaches for promising dairy enterprises.
- Administering entrepreneurship development courses (EDCS).

6.6.4.17 Further, the approach of direct training through ‘farmers’ field schools’ also needs attention.

#### Box No 6.2

### Enterprise-oriented vocational training in Dairying in Mongolia

A permanent capacity building facility — the National Dairy Training Centre — was established within the campus of the Food Technology College, under the Ministry of Education. Six basic training modules were developed in the Mongolian dairy chain model. The centre is equipped with state-of-the-art adult learning and teaching aids; a commercial demonstration dairy plant; a mobile outreach training unit; a dairy product development facility; a milk and dairy products quality control laboratory; and a small technical library and course administration office. Existing staff from the college were re-trained as core vocational trainers to run short residential and outreach courses. Other specialists from the private and public sectors were also trained as key trainer members of the dairy training team, led by the college’s training manager. They also act as advocates, out in the field, for the training programme, now part of the current ten-year National Dairy Programme (2007–2016). The demonstration dairy is run on a semi-commercial basis and currently provides milk and dairy products to 600 school children in Ulaanbaatar under the government’s ‘school lunch programme’. Outreach training focuses mainly on enhancing milk production, productivity, including milk producer organisations, feeding, breeding and clean milk production, and involves tailoring the training session to each location.

Source: Improved market access and smallholder dairy farmer participation for sustainable dairy development prepared by Common Fund for Commodities- Animal Production and Health Commission for Asia and the Pacific Food and Agriculture Organisation, United Nations (2008)

[http://www.fao.org/ag/againfo/themes/documents/dairy\\_dev\\_strat.pdf](http://www.fao.org/ag/againfo/themes/documents/dairy_dev_strat.pdf)

### Promote the formation of farmers’ associations along the lines of industry chambers

6.6.4.18 Like industry chambers, farmers’ associations can contribute to helping their members’ businesses grow. They help the farming community meet and find solutions to their problems and safeguard their interests. They can be instrumental in promoting information exchange on markets, best practices and new technology. Breeders’ associations may also be encouraged.

### Pillar 3: Quality control

#### 6.6.4.19 Action Plan 1: Improve and maintain safety and quality and minimise losses

- In order to strengthen the quality of the dairy cooperatives in the State, it is proposed to expand their infrastructure base for milk procurement by creating better cold chains.
- There is a need to design and establish common facilities and networks of resources, including laboratories, at the state level to enhance quality control.
- It is necessary to develop research programmes in improving the safety and quality of livestock items.
- Finally, it is proposed to create fair and transparent pricing systems, with incentives to deliver quality milk.

## Action Plan 2: Implement a livestock production identification programme

6.6.4.20 Livestock producers should be required to register a unique property code, formally assess their production and husbandry systems and maintain accurate records to monitor the quality of products. The programme may also involve independent audits to ensure that the integrity of the programme is maintained.

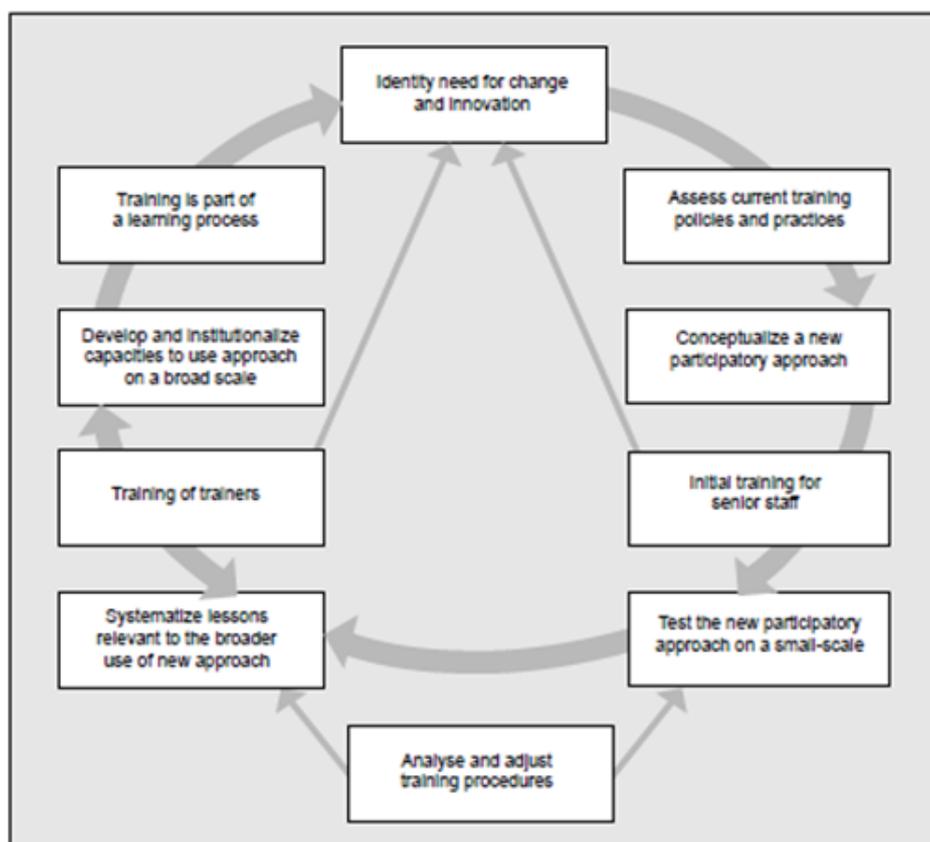
## Action Plan 3: Encourage accreditation and standards

6.6.4.21 An organisation responsible for quality standards and accurate description of livestock products may be set up. This organisation will develop, maintain and review accreditation standards to protect the industry's reputation and integrity with respect to sales, distribution and exports.

## Pillar 4: Service delivery

### 6.6.4.22 Action Plan 1: Strengthen veterinary services and upkeep of animals

**Figure 6.4**  
**Institutional Learning Process and Training Cycle**



Source: Thompson, J. 1998. *Participatory approaches in government bureaucracies: facilitating institutional change*. In J. Blackburn and J. Holland, eds. *Who Changes? Institutionalising participation in development*. London, Intermediate Publications cited in Animal Production and Health Division, FAO Agriculture Department. *Improving Animal Health for Poverty Reduction and Sustainable Livelihoods*. FAO Animal Production and Health Paper 153. <ftp://ftp.fao.org/docrep/fao/005/y3542e/y3542e.pdf>.

- Strengthen veterinary services and upkeep of animals by introducing a veterinary doorstep service and by improving the facilities of veterinary hospitals and laboratories.
- The state should ensure the protection and regeneration of the environment and the reasonable utilisation of natural resources. There will be a state-wide programme for animal identification and recording. The upkeep and safety of animals depends on the availability of a comprehensive system of animal identification and registration to improve livestock health and breeding systems.
- There is a need to deliver veterinary services to rural areas. Community-based animal health delivery systems are successful in improving health delivery services.<sup>25</sup> Information-based infrastructure will also be useful, especially in Kerala where mobiles can be used to deliver information and train small and marginal farmers.<sup>26</sup>
- An institutional learning process should be set in place. Figure 6.4 shows the conceptual framework.

## Action Plan 2: Legal framework

6.6.4.23 It is necessary to have a legal framework to protect animals. The law will regulate the intensification of livestock breeding, receiving of pedigree materials, creation of farm animals with new pedigrees, conservation of their reproduction and utilisation, as well as the protection of critically endangered pedigrees. There should be a regulatory system of veterinary medicine, related veterinary services and feedstock to protect animals from contagious and non-contagious diseases by applying preventive, anti-epidemiological measures and mandatory diagnostic and hygienic measures.

## Action Plan 3: Mechanised sanitation of animals

6.6.4.24 This sector has undergone a technological revolution in terms of highly sophisticated machinery designed for the sanitation of cattle. These are, for instance:

- Automated footbath: Maintains an effective, environment-friendly hoof care programme.
- Feedtech silage: Contains a range of products, which are tailor-made for different silage crops.
- Frequency-controlled vacuum pumps: Constant vacuum stability for smooth milking can improve cow udder health.
- Chlorinated alkaline detergent: This is used for cleaning milking installations.
- Herd navigator: It is an analysis system, which identifies every in-milk cow in need of special attention.
- Hoof care disinfectant.
- Swinging cow brush: Swinging cow brush (SCB) starts to rotate on contact, at an animal friendly speed.

6.6.4.25 There is a need to enhance awareness and availability of these technologies and equipment through education programmes held directly for farmers.

## Disease control programmes

6.6.4.26 A healthy livestock sector depends on the health of the livestock. Considering that the livestock mortality rate is high, Kerala will undertake disease control programmes. This will also require a focus on R&D to identify the causes of diseases and methods to control them.

## Pillar 5: Environment

6.6.4.27 This pillar highlights the need to preserve the natural heritage of Kerala through proactive environmental stewardship and wise use of natural resources in this sector. The major environment-related issues of this sector are nutrient contamination of soil, groundwater pollution, surface water eutrophication, ammonia emissions and loss of biodiversity. However, it is important to recognise that many of the complex relationships between the livestock sector and its impact on environment are not fully appreciated, even in developed countries. The most 'forward' examples of measures being taken to address pollution problems can, perhaps, be drawn from the Netherlands and Denmark. In both countries, pollution problems from intensive agriculture (mostly dairy farming and pig farming) have been an important target for many years and measures have been adopted to address the problem. These are widely perceived to have been reasonably successful. In Denmark, mandatory controls apply to almost all farms. In the Netherlands, however, the degree of compulsion is considerably lower. However considering the Kerala situation, a state-specific pollution management strategy has to be evolved for the sustainability of the sector.

6.6.4.28 Better management of nutrients, waste and water may be one of the practical policy options in this direction. This can be achieved through training, R&D, mechanisation and integrated farming systems.

### Training and spreading awareness

6.6.4.29 The success of measures to reduce environmental impact through voluntary codes and legislation essentially depend on farmers' awareness of these issues. Specific training and use of advisory services may raise the level of awareness of the agriculture-environment interactions on dairy farms. Additional environmental awareness training can be easily incorporated within the existing extension service provisions, which are mainly funded at the central level.

#### 6.6.4.30 Promotion of integrated farming

6.6.4.31 As discussed in the previous chapter, integrated farming has been successful in demonstrating how intensive growing systems can use organic and sustainable farming practices, while yielding high productivity. It integrates all the segments of the primary sector— crops, livestock, aquaculture and forestry — and manages them as an ecosystem. This system comprises:

- Crop mix
- Fodder crops and tree production
- Livestock
- Bio-digesters
- Vermiculture
- Aquaculture

6.6.4.32 Integrated farming also has the added advantage of providing cheap fodder to animals. As shown earlier, in the poultry study, crop residue can be fodder for animals. There is a cycle — cow urine adds to the fertility of the soil, the improved productivity that results means more output, which can then be diverted for fodder. Paddy cultivation may prove to be more remunerative if animal husbandry is combined with it. The Elappully model could be replicated elsewhere in Kerala with good effect (See Box 6.3).

### Box No 6.3 Elappully Model of Dairying

**The Green Kerala Express**, the first social reality show on Indian television showcasing grassroots level development initiatives of three-tier local bodies, held from March to July 2010 saw Elappully Grama Panchayat in Palakkad winning the Rs 1 crore prize. The 103-episode show was telecast by Doordarshan's Thiruvananthapuram Kendra. One hundred and fifty-two panchayats vied with one another with their development projects, which ranged from dairy sector interventions and healthcare projects to panchayat-run courts to settle cases and organic farming. Panchayat office-bearers were given 30-minute slots to present their development initiatives before a jury. Viewers were asked to SMS their votes for the panchayats of their choice.

Elappully panchayat, mainly inhabited by debt-ridden marginal farmers, had undertaken a dairy project to enhance milk production. With a complete 'dairy village' concept, Elappully had achieved a four-fold increase in milk production across two years. From 2,400 litres per day, the village's milk production had gone up to 12,000 litres a day, helping the dairy farmers earn a combined turnover of Rs 7.5 crore the previous year.

The panchayat assisted women in the predominantly paddy-growing families to set up 623 dairy units, each with two cows. Of them, 233 were in the general category for women, 270 were SC families and 70 were Kudumbashree units. The remaining were 50-odd individuals under schemes of the district panchayat. The panchayat also began fodder cultivation on 50 acres of land and set up a model veterinary hospital for the villagers. As hoped by the panchayat authorities, dairying not only provided supplementary income to the households, but also had a beneficial effect on paddy cultivation. From 1,830 hectares, paddy cultivation spread to 1,870 hectares. Students of the Elappully Government Higher Secondary School also chipped in with fodder cultivation on two acres of land.

The dairy farmers supply their 'Elappully Farm Fresh Milk' to households, hotels and various other establishments in the panchayat. Despite selling only the remaining milk to Milma, they were able to earn a turnover of Rs 7.5 crore. They have also launched various value-added products under their own brand name. One sign of the positive change that the initiative has brought about is the magical increase in the number of dairy farmers in the panchayat: from 1,400 to 2,800 in two years. The panchayat, with a population of 42,000, has also been trying hard to revive paddy farming in the area by leveraging the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) and offering all possible support. The shortage of farm hands, a major handicap, was sought to be overcome by going slow on MGNREGS for about six months a year so that a sufficient number of workers were available during the farming seasons. Work under the MGNREGS is then bundled during the following months so that both sides benefit. The MGNREGS has also come in handy for preparing the land, constructing bunds and so on.

Source: The New Indian Express, Thiruvananthapuram, 10 July 2010; The Hindu, Thiruvananthapuram, 23 July 2010

6.6.4.33 The agro-ecological zone and the agro-ecological unit based approach to the development of the livestock sector is followed for augmenting the income of farmers.

## 6.7 Monitoring

The number of animals needs to be tracked along with their production and productivities. The European Union tracks the following<sup>27</sup>:

- Number of laying hens
- Information on milk and milk products:
  - Collection of cow's milk
  - Production of butter
  - Production of milk powder
  - Production of cheese
  - Production and utilisation of milk on the farm
- Livestock and meat:
  - Production of meat: pigs
  - Production of meat: cattle
  - Production of meat: sheep and goats
  - Production of meat: poultry
  - Number of dairy cows
  - Number of cattle
  - Number of sheep
  - Number of pigs
  - Holdings with dairy cows

## 6.8 Conclusion

6.8.1 Demand for protein food is forecast to increase over the next 20 years. Kerala's strategic way forward involves changes, which will improve productivity while maintaining environmental sustainability. Marketing its products, both within the State and outside, is crucial. This involves heavy investment in physical infrastructure so that the State can improve the value-add of its products. At the smaller scale, people need to be trained to increase productivity and to learn sustainable practices. Again, they need to be linked to marketing networks so that they can reap increased benefits for their efforts. Standard codes, integrated farming techniques and waste management techniques are critical for the development of this sector. This will raise the demand for food 'Made in Kerala'.

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*Ear-tags, the traditional form of identification, required herdsmen or veterinarians to handpick cows through a lengthy process. This system speeds up the identification process. Herdsmen can optimize feeding schedules, select certain bulls for breeding programs, and keep updated health records, which improves productivity directly by reducing susceptibility to disease and planning for yields.” ICT in Agriculture website.*<http://www.ictinagriculture.org/sourcebook/module-5-increasing-crop-livestock-and-fishery-productivity-through-ict#dominican>.

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# FISHERY: BUILDING A SUSTAINABLE FUTURE





## Fishery: Building A Sustainable Future

### 7.1 The Background

7.1.1 Fish production plays an important role in the socio-economic life of Kerala. The State is endowed with a long coastline of 590 kilometres (km) and rich inland water bodies consisting of 44 rivers (with an area of 0.85 lakh hectares), 30 major reservoirs (0.30 lakh ha), fresh water ponds and tanks (0.25 lakh ha), 45 backwater bodies and extensive brackish water area (2.43 lakh ha). This makes Kerala a leading fish producing state in the country. Fishery is an important source of income and employment for rural farmers, particularly women. It contributes 1 per cent to the Gross State Domestic Product (GSDP) of Kerala and provides employment to 11.52 lakh fisher folk. There are 335 fishing villages in the State, which include 10 fishing harbours

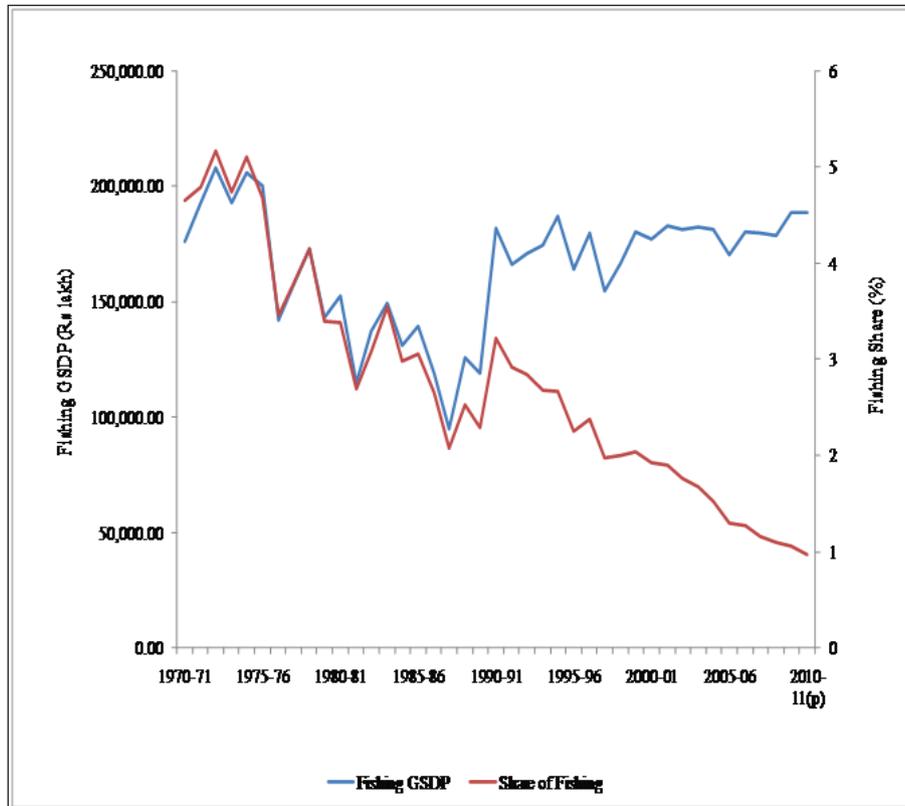
### 7.2 The Current Status

#### 7.2.1 Contribution to GSDP

7.2.1.1 Until 1960, fishing in Kerala was entirely dominated by the non-mechanised, traditional country crafts—*kattumarams*, plank and dugout canoes — using a variety of gear. While there was a shift from cotton to nylon nets, it did not change the sector very much. The mid-1960s saw the coastline, once known for its traditional gear and crafts, give way to mechanised boats and advanced nets. The catch increased and the sector emerged as an important economic activity and by 1970–71 its share in GSDP stood at 4.7 per cent. Over time, the share has declined and is currently around 1 per cent (Figure 7.1). Fishery also contributes almost 12 per cent of the primary sector GSDP.

7.2.1.2 The share of the fishing sector in the value of output<sup>1</sup> of agriculture and allied services at the national level has gone up from 4.3 per cent in 2004–05 to 7.2 per cent in 2010–11 at constant 2004–05 prices. The corresponding numbers for Kerala are 10 per cent in 2004–05 and 18.8 per cent in 2010–11.

**Figure 7.1**  
**Fishery GSDP (Rs lakh) and Share of Fishery GSDP in total Kerala GSDP (%):**  
**1970–71 to 2010–11 (at constant 2004–05 prices)**

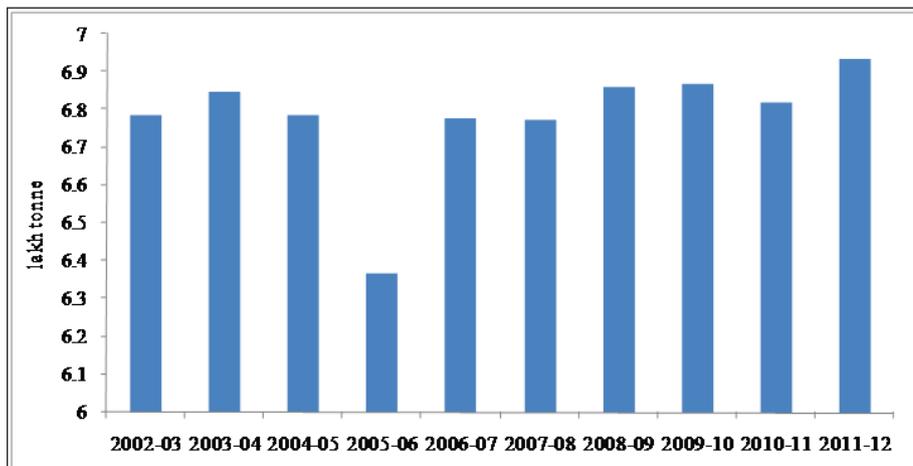


Source: Central Statistical Organisation (CSO)

## 7.2.2 Total fish production

7.2.2.1 The total production of fish increased from 0.75 lakh tonnes in 1950–51 to 6.8 lakh tonnes in 2002–03. Thereafter it fluctuated around this level (Figure 7.2). During this period, fish production at the national level increased continuously from 63 lakh tonnes to 86.7 lakh tonnes. As a result, the State's share in national fish production declined from 10.7 per cent in 2004–05 to 8 per cent. Notably, Kerala's water resources are around 7 per cent of the national water resources. Kerala's share in production has, thus, been higher than its share in water resources. Over time, however, the gap is closing.

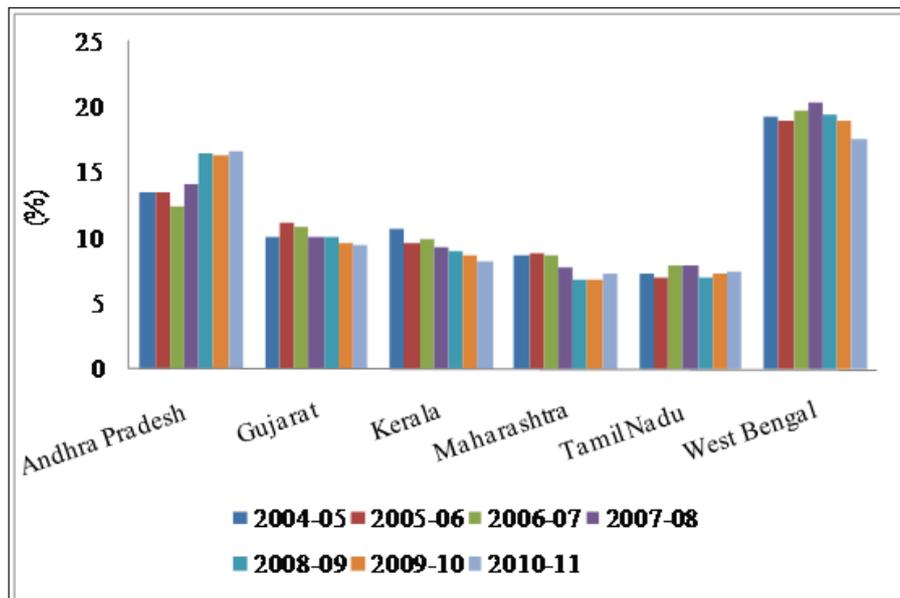
**Figure 7.2**  
Trends in Total Fish Production in Kerala 2002-03 to 2011-12 (Lakh tonne)



Sources: Department of Animal Husbandry, Dairying & Fisheries, Government of India. 2012. Handbook on Fisheries Statistics 2011. October and Department of Fisheries, Government of Kerala. Facts and Figures 2012. Thiruvananthapuram

7.2.2.2 Currently, Kerala is the fourth largest state in India in terms of fish production after West Bengal, Andhra Pradesh and Gujarat (Figure 7.3). Over the past few years, the share of Kerala in fishing has declined and the State has lost the third position to Gujarat. Andhra Pradesh has increased its share in production significantly, almost reaching the share of top-ranking West Bengal in 2010-11.

**Figure 7.3**  
Percentage Share of Top Six Fish Producing States of India, 2004-05 to 2010-11 (%)



Source: Department of Animal Husbandry, Dairying & Fisheries, Government of India. 2012. Handbook on Fisheries Statistics 2011. October

## 7.2.3 Domestic household consumption

7.2.3.1 National consumption surveys indicate that the per capita consumption of fish in Kerala is nearly 10 times the national average (Table 7.1). The average consumption levels in both urban and rural areas are of similar order, both in the State and also nationally. There was a significant increase in per capita consumption between 2004–05 and 2011–12 at the national level, but not in Kerala.

**Table 7.1**  
**Average Monthly Consumption per Person of Fish and Prawns: 2004–05 & 2011–12(kg)**

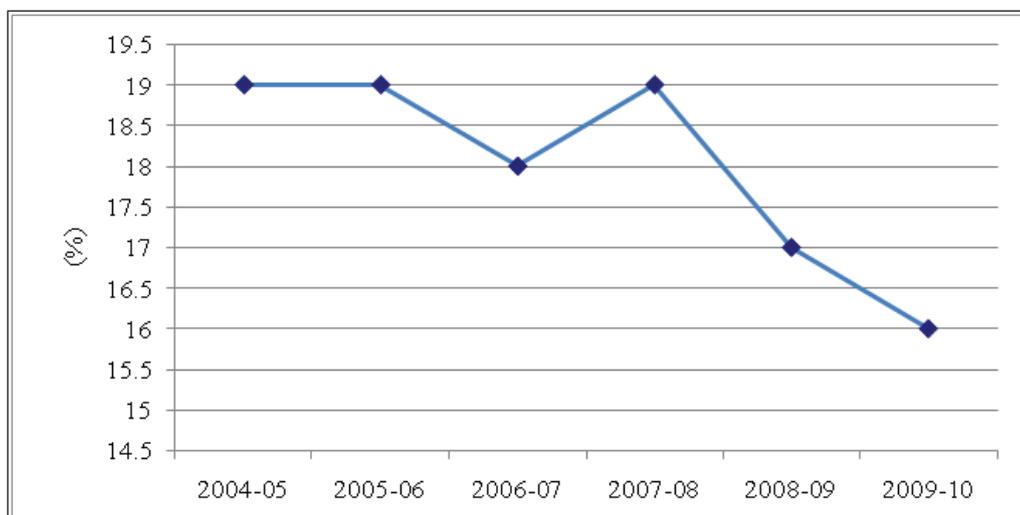
	2004–05		2011–12	
	Kerala	India	Kerala	India
Rural	1.91	0.08	1.992	0.192
Urban	1.95	0.09	1.904	0.196

Source: Household consumption expenditure in India, NSSO–61st Round (July 2004–June 2005) and 68th round (July 2011–June 2012)

## 7.2.4 Exports

7.2.4.1 Marine fish production is also one of the major contributors to foreign exchange earnings through seafood exports. Kerala contributed 19 per cent of foreign exchange earnings through export of marine products in 2004–2005. Since then it has declined to 16 per cent (Figure 7.4).

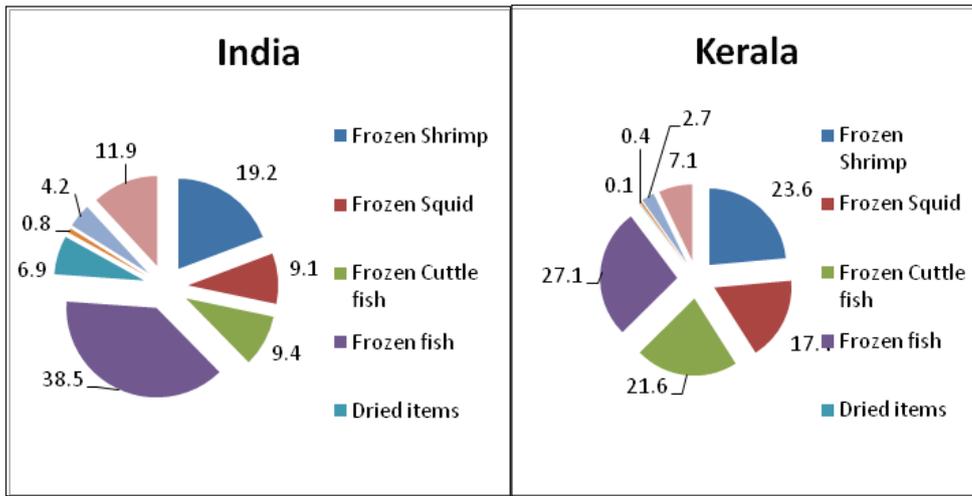
**Figure 7.4**  
**Percentage Share of Marine Export Products of Kerala in India (%)**



Source: Director of Fisheries. 2012. Marine Fisheries Statistics 2010. Statistical Cell, Directorate of Fisheries, Government of Kerala, Thiruvananthapuram.

7.2.4.2 Some migratory marine fish like pelagic finfish (71 per cent of total fish landings), molluscs, demersal fin fish and crustaceans are the most saleable items in the international market. The major export item among marine products is frozen fish. Shrimps, which are the most saleable item in the international market, are also found in abundance in India including along the Kerala coastline. However, excessive pollution has adversely affected shrimp farming in India.

**Figure 7.5**  
**Percentage Share of Item-wise Export of Marine Products during 2009–10 (%)**



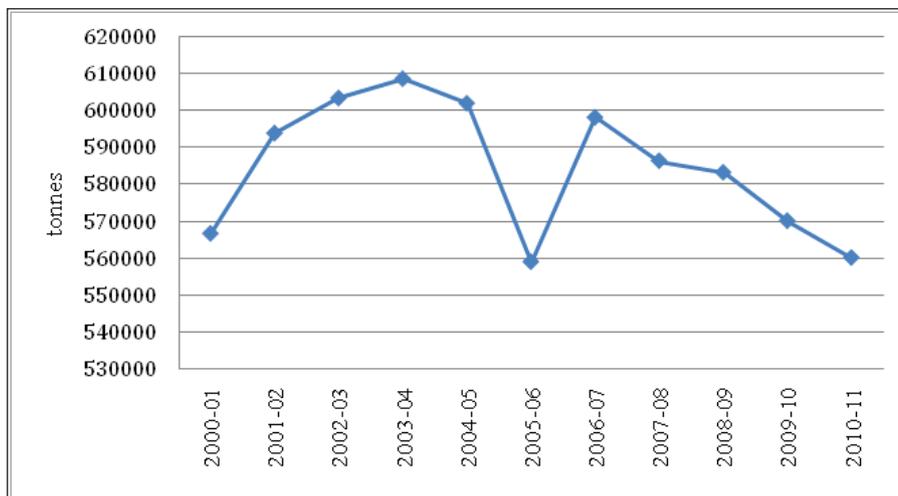
Source: Director of Fisheries. 2012. Marine Fisheries Statistics 2010. Statistical Cell, Directorate of Fisheries, Government of Kerala, Thiruvananthapuram.

### 7.2.5 Patterns of fishing

#### Marine fish production

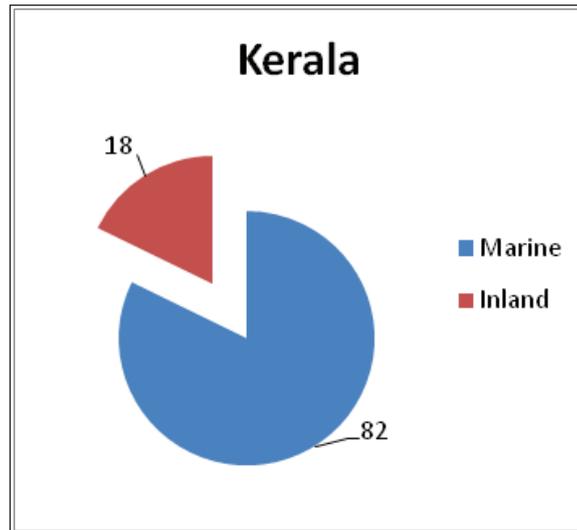
7.2.5.1 In India, Kerala is the second highest contributor of marine fish after Tamil Nadu. During 2010–11, 5.6 lakh tonnes of marine fish were produced in Kerala accounting for 80 per cent of the total fish production in the State. It accounted for over 16.5 per cent of the national marine fish production in 2010–11. Further, the share of marine fish in total fish production in Kerala is higher than the national average. Over time, the share of marine fishing has come down, but it still remains 80 per cent. At the all India level, marine fish production is less than 40 per cent of the total fish production.

**Figure 7.6**  
**Trends in Marine Fishing in Kerala: 2000–01 to 2010–11 (tonnes)**



Source: Department of Animal Husbandry, Dairying & Fisheries, Government of India. 2012. Handbook on Fisheries Statistics 2011. October

**Figure 7.7**  
**Percentage share of Marine & Inland Fish Production (2010–11)**

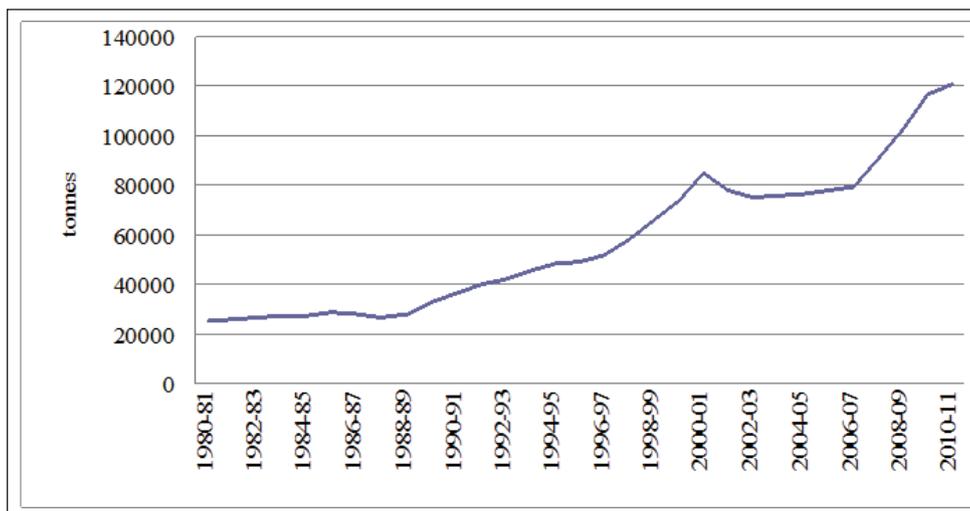


Source: Department of Animal Husbandry, Dairying & Fisheries, Government of India. 2012. Handbook on Fisheries Statistics 2011. October

## Inland fishery

7.2.5.2 Inland fish production has been growing in Kerala since the late 1980s. This is due to the rise of aquaculture (carp, molluscs, crustaceans) in the State. The Agency for Development of Aquaculture, Kerala (ADAK) was established in 1989 to promote inland fish farming. With economic liberalisation in the early 1990s, the fishing industry received a major boost in investment and sustained the positive trends.

**Figure 7.8**  
**Trends in Kerala Inland Fish Production: 1980–81 to 2010–11 (tonnes)**



Sources: Department of Fisheries. 2012. Kerala Inland Fisheries Statistics 2010. Government of Kerala, Thiruvananthapuram and Department of Animal Husbandry, Dairying & Fisheries, Government of India. 2012. Handbook on Fisheries Statistics 2011. October

7.2.5.3 A major push was given to inland fisheries and aquaculture in 2008, when the state government approved the 'MatsyaKeralam' project for the productive utilisation of inland water bodies which were till then largely unused and under exploited. The target was to increase inland fish production from the then level of 75,000 tonnes to two lakh tonnes over a period of three years. It was an integrated programme implemented with the help of local bodies and farmers in all 14 districts of the State. Under the programme, about 505 Fish Farmers Clubs were formed across the State and 450 Aquaculture Coordinators were selected by 773 local governments. The Fish Farmers Clubs facilitated aquaculture promotion through improved management practices, information exchange, timely supply of inputs and crop insurance. As a result, production increased sharply from 79,600 tonnes in 2006–07 to around 1.5 lakh tonnes by June 2012.

7.2.5.4 Currently 14 Fish Farmer Development Agencies function under the Department of Fisheries to promote inland aquaculture, both in fresh and brackish water. There is extensive infrastructure in terms of landing centres, fishing harbours, seed rearing units, markets, fishing schools and testing laboratories.

7.2.5.5 The Matsya Keralam programme came to an end in 2012. Realising the need to further promote aquaculture through direct intervention, the government has initiated another programme called 'MatsyaSamrudhi'. Under this programme, the target is to bring 6,000 hectares (ha) of inland water bodies under aquaculture. Fish production is targeted to increase from 1.5 lakh tonnes to 2.5 lakh tonnes. The three-year programme is scheduled to implement diversified aquaculture initiatives for maximum utilisation of water bodies in the State. The important components are:

- Paddy and fish culture in *kole* lands.
- Integrated fish culture.
- Fresh water fish culture.
- Shrimp farming in *pokkali* (a unique saline and flood resistant tall-stalk variety of rice), *kaipadu* (wetlands influenced by tidal flow) fields and private ponds.
- Mussel farming.
- Crab fattening.
- Pearl spot seed rearing.
- Kitchen ponds.
- Pond culture of pearl spot.
- Cage culture.

7.2.5.6 While marine fish production has been declining (Figure 7.6) inland fish production shows an increasing trend (Figure 7.8).

## 7.3 Challenges

### Below potential inland fishing

7.3.1 Inland fish production potential is not fully captured in the State. Kerala has over 7 per cent of the inland water bodies in the country, but its share in inland fishing is just above 2 per cent nationally.

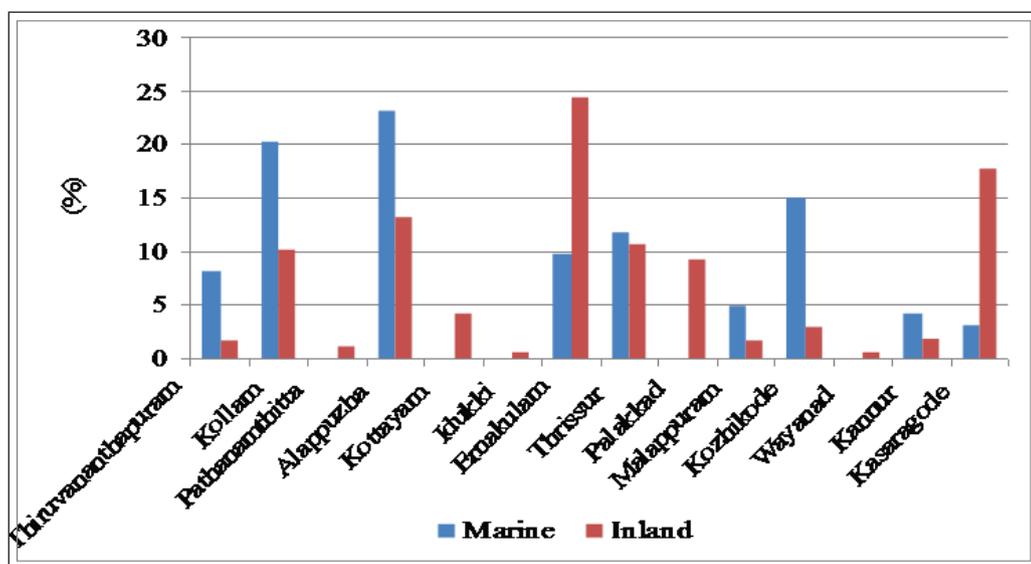
7.3.2 Table 7.2 shows that Kerala's productivity (fish production in kg against the total water bodies in ha) in inland fishing is lower than in many other states. The inland water resource potential is, therefore, not fully exploited in Kerala. District-wise patterns indicate that the share of inland fish production is the highest in Ernakulam (24.4 per cent) followed by Kasaragod (17.8 per cent) and Alappuzha (13.2 per cent) (Figure 7.9). In other districts it is insignificant.

**Table 7.2**  
Production, Area and Yield: 2011–12

	Total production (Inland )	Total water bodies (Inland)	Yield (Inland)	Total production (Marine )	Approx.length of coastline (Marine)	Yield (Marine )
	('000 tonnes)	('000 ha)	(kg/ha)	('000 tonnes)	('000 ha)	(kg/ha)
Andhra Pradesh	1,079.6	811.0	1331	288.6	97.4	2,963.4
Gujarat	86.0	426.0	202	688.9	160.0	4,305.8
Karnataka	204.3	740.0	276	295.6	30.0	9,852.3
Kerala	139.5	543.0	257	560.4	59.0	9,498.3
Maharashtra	148.6	348.0	427	446.7	72.0	6,204.2
Tamil Nadu	190.0	693.0	274	424.8	107.6	3,948.3
West Bengal	1,436.5	545.0	2636	1,971.1	15.8	12,4751.9

Source: Department of Animal Husbandry, Dairying & Fisheries – Annual Report 2011–12

**Figure 7.9**  
District-wise Percentage Share of Marine and Inland Fish Production in 2010–2011



Source: Fisheries Statistics at a Glance, 2011  
Department of Fisheries, Kerala

### Declining marine fishing and unsustainable fishing practices

7.3.3 Decline in marine fishing is a worrisome trend in Kerala. Marine fishing in Kerala has been declining since 2004–05, except for 2006–07 and 2011–12. As a matter of fact, the world has been facing a global fishing crisis of unprecedented proportions. Marine ecosystems are on the decline worldwide. According to the U.N. Food and Agriculture Organisation (FAO), 70 per cent of the world's commercially important marine fish stocks are fully fished, overexploited or depleted. The global situation is mirrored in Kerala. The main reason for this scenario is unsustainable fishing practices. In

general, over dependency on marine fisheries has resulted in excessive and indiscriminate fishing along the Kerala coastline. This, in turn, is because of a number of factors such as inappropriate incentives, high demand for limited resources, inadequate knowledge, ineffective governance and interactions between the fishery sector and other aspects of the environment. Some of the unsustainable fishing practices are:

- Intrusions by trawlers into artisanal zone were reported in all the coastal districts, with higher frequency of violations in Alappuzha, Ernakulam, Kozhikode, Kollam and Kasaragod districts. Estimates of illegal catches by trawlers in the five nautical mile artisanal zone are about 2,100–3,320 tonnes for Kerala.
- Using estimates from fieldwork, it was found that almost 90 per cent of the stakenets do not follow the legal statutory requirements of the Kerala government on distance and mesh size and are, hence, engaged in illegal fishing. Removal of illegal stake nets and Chinese dip nets by the fisheries department has been met with stiff resistance by fishermen in the backwaters.
- Illegal operation of nets during high tide.
- The Government of India through the state governments of the respective maritime states implements a fishing ban during the monsoon every year. The ban lasts for 45–60 days, with each state using a different time period or criteria such as advancement of monsoon as an indicator. Absence of a uniform ban period throughout the coastline has led to fishing trawlers of several states using this legal technicality to fish where the fishing ban exists and land in an adjacent state where there is no ban, leading to low catches during the post-ban period. With most of the coastal states having weak enforcement due to huge gaps in allocated infrastructure, manpower and monetary resources, illegal fishing persists through domestic fishing vessels in inshore waters. Moreover, it also leads to problems in misreported catches, where fish caught in one jurisdiction are reported as caught in another location.
- It has also been reported that there is more fishing by small-scale fishermen during the ban period. So, the fishing effort from the mechanised sector is transferred to the small-scale sector every monsoon, with more ring seines operating during this period, leading to overfishing of pelagic fish stocks.
- Every year a narrow stretch of water between Alappuzha and Neendakara constitutes the breeding ground for the bulk of shrimp caught in the State. But less than one quarter of this area is protected from trawlers. Subsistence fishermen along this section of the coast are not left with any option but to use smaller-sized gill nets to catch juveniles.
- Traditional fishermen in Kerala are also to blame for the decline of fish catches as they have allowed operation of smaller meshed ring seines which catch 'zero' and 'one' size classes of sardines and mackerels in larger numbers every year.
- The regulation that stipulates that none of the deep-sea fleet is to enter the 22 nautical mile zone is not closely followed. Effective monitoring of the entire Kerala coast requires far more resources than presently available.
- The dominance of foreign and domestic trawling ships has changed the harbours into war zones during the monsoon trawl ban period. The lack of machinery to monitor the sea line has led to night trawling.
- There is a high level of wasteful catch, destruction of egg-bearing marine fish and juvenile fish.
- The mechanised boats are invariably fishing within the territorial seas using banned gear resulting in the destruction of marine wealth. This also results in conflicts between small-scale artisan fishermen and the mechanised boat operators.
- The unemployment issue in Kerala may be another reason for the growing marine fisheries-dependent population in the State. For the growing number of fishermen dependent on inshore fisheries, the use of offshore or deep-sea resources is one way to find additional employment.

## Environmental issues

7.3.4 The health of marine fisheries is intrinsically linked with various natural phenomena. Environmental hazards that are encountered have also adversely affected marine stock in Kerala over the years. These are:

- a. Loss of marine biodiversity and consequent decrease in the fodder on which the marine fishes are generally dependent for their survival.
- b. Water pollution and emission of effluents into the sea adversely affecting the overall health of marine fisheries. Even loss of watersheds and pollution has adversely affected the inland water bodies. The worst part is one does not know the quality of the fish being consumed.
- c. Kerala's coastline is one of the major sea shipping routes and there are numerous instances of effluent emission and spillage from ships. These have affected the marine biodiversity, thereby causing a decline in marine fisheries.
- d. Fish farmers and their communities are also often exposed to prolonged hazards such as the spread of fish disease due to effluents from mining, industry and urbanisation, which ultimately affect aquatic life in the sea.
- e. Some fishing techniques such as dredging and trawling cause widespread damage to marine habitats and organisms living on the sea floor.

## Inadequate fish processing

7.3.5 Fish processing in India is done almost entirely for export. Open, sun-dried fish and fishmeal are the only major exceptions. The total fish processing and storage facility in Kerala is grossly inadequate compared to the potential for fish production and processing. Most exports are in the form of frozen fish. Also, the Indian brand does not exist in advanced countries' markets. Even at the national level, barely 5 per cent of India's seafood exports are in processed form. In fact, more than 60 per cent of India's exports to South East Asia are re-exported after processing. Vietnam, a relatively small country, has created vast capacity in fish processing and is importing raw material to re-export after processing.

## Cooperative societies

7.3.6 The worsening livelihood situation of Kerala's fishermen due to decreasing fish catches led to massive unrest among the fisher folk in the 1970s. Social and religious activists in several coastal localities motivated the creation of fishermen's cooperatives and unions, in an effort to direct the community's anger into organised action to defend its interests. In 1984, the Kerala government created Matsyafed (Kerala State Cooperative Federation for Fisheries Development Ltd) to protect the interests of the State's fisher folk. The structure of the federation was envisaged in a way that each fishing village would have a primary cooperative society to represent it on the apex body. However, several issues remain.

## Social issues

7.3.7 **Lack of infrastructure:** The lack of storage facilities and processing plants lead to inefficient supply chains in the sector.

7.3.8 **Safety and protection of fishermen:** There is a drop in fishing activity along the coast since the fish wealth there is over exploited. Hence, trawlers and large fishing vessels go for deep-sea fishing. This also compels the fishermen to go for deep-sea fishing. However, they are ill equipped to do so. Several years ago, the FAO stipulated that a kit with fourteen lifesaving tools be kept on board

vessels in order to save the lives of fishermen. However, it has been found that more than 98 per cent of fishing boats in Kerala lack these facilities on board.

7.3.9 The department also lacks the infrastructure in terms of sufficient lifeboats and patrol craft. There are only a few patrol boats for Kerala's long coastline. Even the police machinery does not have proper equipment such as GPS and lifesaving tools. Very often, the fishermen do not have the sophisticated equipment required to tackle emergencies. Accidents often occur during the rough season, hence the availability of manpower alone does not solve the crisis.

7.3.10 **Coastal poverty:** The average population density along the Kerala coast is very high compared to the inlands of the State. The thickly populated coastal areas lack sanitary facilities. Kerala's monsoon season, from June to August, is a difficult period.

7.3.11 As the fisher folk belong to the unorganised working class, the value of fish in the domestic market at consumer level is about Rs 4,500 crore, whereas the value realised by fishermen at shore is only Rs 2,500 crore. The disposable income of the fishermen is less than Rs 540 crore—the annual per capita income of fishermen is less than Rs 30,000. Thus, income levels remain low.

7.3.12 **Competition between traditional and trawler fishermen:** The conflicts between the trawler crews and the *kattumaram* fishermen have grown in intensity over time. Many incidents are reported of clashes between traditional fishermen and boat crews out at sea. If trawling is carried out in the same area as *kattumaram* fishing, there is great risk of damage to the latter fishermen's gear as well as to their lives. Moreover, since the catching capacity of the trawlers is very high, it affects the catch of traditional fishermen. Even though there is a law stipulating a 22 km stretch of sea only for traditional fishermen, the trawlers may not obey this rule.

7.3.13 **Digital divide:** Development in the communication sector has brought both advantages and disadvantages to the fishery sector. Since the price of fish fluctuates, the communication divide helps merchants and major players in the fishery sector exploit traditional fishermen. The price is dictated by the price of fish in the global market or at least in nearby markets at that time. Those fishermen who have both transportation facilities and sustainable income to back them, have an advantage over the rest thanks to their ability to quickly move fish to nearby markets that offer a higher price.

## 7.4 Projections

7.4.1 Extrapolation of NSSO data shows that household domestic consumption of fish is projected to rise (Table 7.3).

**Table 7.3**  
**Projections for Domestic Consumption of Fish and Prawns: Average**  
**Monthly Consumption per person (kg): 2012–16 to 2027–30**

	2011–12	2012–2016	2017–2021	2022–2026	2027–2030	Yield (Ma- rine)				
	Kerala	India	Kerala	India	Kerala	India	Kerala	India	Kerala	India
Rural	1.99	0.192	2.03	0.28	2.04	0.30	2.04	0.32	2.04	0.32
Urban	1.90	0.196	1.89	0.28	1.88	0.30	1.88	0.31	1.88	0.32

Source: Computations by NCAER

7.4.2 Extrapolation of available export data for Kerala's fishery sector will show that exports will fall because it is based on existing trends. While it is difficult to forecast the international demand for fish from Kerala, the FAO 2010 reportsays that "the contribution of fish to global diets has reached a record of about 17.2 kg per person in 2009 on average, supplying over three billion people with at least 15 percent of their average animal protein intake. This increase is due mainly to the ever-growing production of aquaculture which is set to overtake capture fisheries as a source of food fish."<sup>2</sup>

7.4.3 In sum, at current levels, while demand for fish is forecast to increase both within and outside India, Kerala's production of fish is growing at very slow rate (0.4 per cent between 2003–04 and 2010–11).

7.4.4 How Kerala can meet the increased demand for fish and get a growing share is outlined in the next section.

## 7.5 Vision, Mission and Strategic Policy

### 7.5.1 Vision

Kerala will be the world leader in sustainable utilisationand development of the fisheries sector, both marine and inland. The people of Kerala will be able to enjoy the wealth and benefits of diverse and self-sustaining living fishery resources.

### 7.5.2 Mission

- To maximise economic benefits from living marine resources without compromising the long-term health of coastal and marine ecosystems. This will be achieved through their scientific conservation and management and promotion of the health of their environment.
- To build and maintain sustainable fisheries to ensure that fish stocks are available for commercial, recreational and subsistence uses.
- To increase long-term economic and social benefits to the nation from living marine resources.
- To conserve and recover marine species, protected by statute or international treaty, listed as threatened or endangered through conservation programmesthat are based on sound scientific research and decision-making.
- To protect living marine resource habitats for the success of management and conservation efforts.
- Improve the economic status of fisher-families

### 7.5.3 Goals

- Ensure agrowth rate of 1 percent in fishery by improving fisheries productivity and value addition in input and output marketing chains.
- Maintain healthy stocks important to commercial, recreational and subsistence fishing.
- Eliminate over-fishing and rebuild over-fished stocks important to commercial, recreational and subsistence fishing.
- Promote the development of robust and environmentally sound aquaculture.
- Protect, conserve and restore living marine resource habitats and biodiversity.
- Credible, high-quality science supported-fisheries mission and minimising risk in management decision making.
- Use of emerging technologies and products.
- Enhance public confidence in the safety of seafood.
- Increase processing and value-addition.

- Fisherymarketing and extension machinery.
- Ensure social security of fisher folk.
- Ensure housing, sanitation and water supply to fisher folk.

## 7.5.4 Strategic planning

### 7.5.4.1 Pillar 1: Increase productivity without damaging the environment

7.5.4.1.1 Human impact has increased dramatically on marine life, with rapid population growth, substantial developments in technology and significant changes in land use, over-fishing, pollution and so on. There is an urgency to carry out environment-friendly fishing. Fish being a renewable resource, the rate at which the resources are harvested should be in harmony with the rate at which they multiply. However, there should be proper checks and balances, as a large number of people have been dependent on fishing historically and, therefore, livelihood concerns of the poor fisher folk should be kept in mind. So on the one hand, there should not be any exception to the protection of Kerala's marine ecosystem through the introduction of suitable policy measures and a legal framework, on the other hand, there should also be corresponding and alternative policies and laws that ensure the livelihood of poor fishermen and that their traditional and cultural fishing rights are not drastically affected. An overall assessment of the total fishery sector has to be undertaken. As per the assessment, a comprehensible ecosystem and integrated approach to resource use and fisheries resource management should be adopted.

#### 7.5.4.1.2 Three approaches are proposed:

- Institutionally, a well-drafted policy is required for ensuring a legal framework and increased people's participation.
- Technologically, it implies utilisation of renewable energy resources and methods, which are environmentally appropriate and less destructive.
- From the human resource perspective, the government will need to adopt all possible measures to promote practices that ensure that fishermen are trained to adopt and utilise such technology in fishing without damaging the environment.

#### 7.5.4.1.3 Action Plan 1: Institutional approach

- Adequate and applicable policies/legal framework should be made at the state level in order to address various concerns of the local fishermen and to safeguard their religious, cultural and natural practices associated with fishing.
- The State should phase out destructive gear such as bottom trawling. All fishery equipment should be under the monitoring of an independent local committee with representation from all interest groups related to fisheries.
- There could be limits on the catch of certain species. In New Zealand, for instance, fisheries are managed by a quota system that sets catch limits for commercially important species.
- The specifications and licensing procedures should be maintained. There is a need for coordination between various agencies in this regard. At present, there is no official mechanism to do this in Kerala. The rules are stipulated only on paper. There is little concern about the licensing mechanism, since there are no checks or inspections from the government in this regard.
- Both the number of fishing vessels and hours at sea should be restricted for fishing trawlers during the breeding season to prevent capture of juvenile fish and shrimp.
- The Pollution Control Board should initiate pollution-free water bodies in Kerala. It can be done through frequent monitoring of the water bodies and strict legislation.

- Fish being a renewable resource, biologically it would mean that the rate at which the resources are harvested should be in harmony with the rate at which they multiply. Humanly, it means that the principles of equity and basic need get a high priority.
- It is imperative that the level of hygiene in the harbours be modernised taking into consideration the issues in each harbour. They have to be run from the perspective of post-harvest management by implementing Hazard Analysis and Critical Control Points (HACCP) to promote exports. Integrated harbour management societies may be constituted for each harbour. It also requires regular de-silting for smooth passage of boats. In a consultative and participatory way, provision for potable water, sanitation, night shelters, chilled and frozen storage facilities to benefit women vendors and fish vendors should be available.
- Coordination between the water transport authorities and the fishing industry is also recommended to enable both faster movement of water transport and sustain fish.

## Action Plan 2: Appropriate Technology

7.5.4.1.4 Fishermen will be encouraged to adopt appropriate technology to reduce the harm to the biodiversity of the sea.

- Reduce the amount of tickler chains, avoid excess weight in the beams and use other stimuli (for example, electric pulses) as an alternative to chains to scare the target fish off the bottom and into the net. The use of acoustics, light or other additional stimuli to enhance encounters with target species within the 'catching zone' of trawl nets is worth exploring.
- It has been observed that the use of improved location and targeting of fish with the help of electronic seabed mapping tools and integrated global navigation satellitesystems has resulted in avoidance of sensitive bottom habitats and helped minimise fishing effort and fuel consumption.

7.5.4.1.5 **Multi-beam acoustic technology** widely used in seabed exploration, has been successfully applied, for example, to map scallop beds off the east coast, thereby substantially reducing the time required to locate the grounds and the actual fishing time.

7.5.4.1.6 **Bottom seining:** Bottom seining (Danish, Scottish and pair seining) is generally considered to be a more environment-friendly and fuel-efficient fishing method than bottom otter trawling. The gear is lighter in construction and the area swept is smaller than in bottom trawling. Moreover, because there are no trawl doors or heavy ground gear, there is less force on the seabed. The light gear and low hauling speed mean that fuel usage can be significantly lower than for a comparable trawling operation. Bottom seine nets are generally also regarded as having low impact on benthic invertebrates. However, the high by-catch of both undersized individuals of the target species and individuals of non-target species can be a problem in some seine fisheries.

7.5.4.1.7 **Trap-net:** The pontoon trap was introduced in the late 1990s. It offers various advantages compared with traditional trap-nets such as being easy to transport, handle and haul, adjustable in terms of size, target species and capture depth, as well as being predator-safe. Future developments may include large-scale, ocean-based fish traps together with the technology to attract fish. Modern trap-net fisheries can be energy efficient, flexible, selective and habitat-friendly, providing catches of high quality, as the catch is usually alive when brought aboard the vessel. Live capture provides the operator with a greater number of options to add value to the catch. However, designs and practices need to be developed to prevent the entangling of non-fish species in netting and mooring ropes of the trap.

7.5.4.1.8 **Pots:** A pot is a small transportable cage or basket with one or more entrances designed

to allow the entry of fish, crustaceans or cephalopods and prevent or retard their escape. Pots are usually set on the bottom, with or without bait. While pot fishing vessels in general have low fuel use, some pot fisheries have high fuel use owing to the need to tend fleets of many pots and lifting them more than once a day, necessitating travelling at high speed over long distances. Pots are extensively used in the capture of crustaceans such as lobster and crab. Recent tests with collapsible pots have shown promising results for Atlantic cod in Canada and for pink cuskeel (*Genypterus blacodes*) in Argentina. A floating pot developed in the Scandinavian region provides another example of an innovative pot design that has shown significant potential. Floating the pot off the bottom allows the pot to turn with the current so the entrance always faces the down current, resulting in a higher catch rate of cod. It also avoids non-target catch of crabs and may also reduce the seabed impacts compared with a pot sitting on the bottom.

The above scientific methods present environment-friendly fishing techniques.

### Energy efficiency

7.5.4.1.9 The fishing sector should strive to further lower its fuel consumption and reduce the impact on the ecosystem. Despite a growing number of initiatives and experimentation with energy-reducing technology, there is currently no viable alternative to fossil fuels for mechanically powered fishing vessels. However, it is well demonstrated that through technological improvements, gear modifications and behavioural change, the fishing sector can substantially decrease the damage to aquatic ecosystems, reduce GHG emissions and lower operational costs for fuel without excessive negative impacts on fishing efficiency.

7.5.4.1.10 Bottom trawling or dragging is one of the most widely used industrial fishing methods around the world. It involves towing a large net across the seabed targeting the species that live on the sea bottom. However, bottom trawling has been identified as one of the most difficult tasks to manage in terms of by-catch and habitat impacts. There are many techniques and operational adaptations available to reduce the drag and weight of the bottom trawl gear and, thereby, reduce significantly fuel consumption and seabed impacts without a marked decrease in the catch of the target. Fuel savings of 25–45 percent and gear-drag reductions of 20–35 percent have been reported.

#### **Box No 7.1** **CRIPS-Trawl**

A new semi-pelagic low-impact and selective trawl gear (CRIPS-trawl) is underdevelopment in Norway. The new trawl design (CRIPS-trawl) has a reduced bottom contact and less drag compared to a conventional bottom trawl. The trawl doors and the footrope of the trawl are lifted off the bottom. The front panels of the trawl are replaced by herding ropes and the aft parts are made of square-mesh netting. This will reduce the drag of the trawl while still maintaining the stimulation for herding the fish into the cod-end. The extension piece and the cod-end are made of four panels and include a net camera and various selection devices to release unwanted fish from the trawl. The four-panel design improves the stability of the trawl and the selection devices. The net camera gives real-time information on the fish species and sizes entering the cod-end and allows the skipper to make informed decisions regarding how to continue the fishing process. The trawl may also be fitted with an active mechanism to release unwanted catch. This trawl concept also includes a cable connection from the vessel to the trawl headline. The cable will carry the video signal from the net camera and acoustic sensors and it will also increase the vertical opening of the trawl. The concept will, later, also include an independent system to adjust the distance of the doors from the seabed.

Source: Food and Agriculture Organisation of the United Nations. 2011. The State of the World Fisheries and Aquaculture 2010. Rome, Italy

7.5.4.1.11 Also, energy-saving technologies need to be developed by public–private sector initiatives to commercialise economically viable alternatives.

## Marketing

7.5.4.1.12 Steps should be taken to build marketing infrastructure and maintain it. At present, fish is either transported to faraway places or sold through the traditional markets. The traditional fishermen are subject to the dictates of the big players because there is no alternative arrangement to sell their catch. In processing too, the condition is similar. There should, therefore, be government-led initiatives to create appropriate marketing facilities such as fish outlets, processing plants and so on. Retail outlets with modern facilities (clean water, storage, waste disposal) are the immediate necessity, which can be constructed by grampanchayats in each village and leased to fishermen to ensure supply of quality fish to local consumers.

7.5.4.1.13 Quality control in export marketing is highly emphasised in the WTO agreements, necessitating adequate care in all stages, from catching fish till the consumer. The internal marketing and distribution system in India's fishery sector is not well equipped with quality maintenance mechanisms comprising essential marketing infrastructure and proper administrative procedures. Quality maintenance in the internal distribution system of fresh and processed fish is also essential. Fish is transported from landing centres to far off retail outlets without proper storage, causing deterioration in quality. Insulated carriers, cold storages and cold chain networks need to be promoted to provide solutions to this problem.

### 7.5.4.1.14 Infrastructure

1. Explore the possibility of a 90 per cent grant from National Fisheries Development Board (NFDB) in urban areas or 50 per cent grant from the Government of India for hygienic retail markets.
2. Sufficient number of stalls with water displays, cutting and cleaning area, storage area, continuous supply of water, sanitary ware, ETP (effluent treatment plant), waste utilisation facilities and so on should be ensured in retail markets.
3. Provision of bathing facilities and toilets in fish markets will provide dignity for fishworkers while boarding public transport. This has a special significance for women, as it mainstreams gender concerns on the lack of public toilets in Kerala. It is especially important since women dominate the fish vending business.
4. Fish malls can be established in large cities.
5. Wayside marketing can be modernised by establishing fish bays.
6. Interest subsidy to the fishing sector, similar to that given to farmers.
7. Encourage clean vessels: Improve fishing boat crews' awareness, accessibility and use of sewage pump-outs, dump stations and floating toilets.

### 7.5.4.1.15

#### Use of ICT in fishing

In fisheries, new ICT is being used across the sector, from resource assessment and capture to culture to processing and disaster management. There are specialist applications such as:

- Sonar for finding the big schools of fish.
- General purpose applications:

- GPS for navigation and location finding: Widespread use by mechanised boats. Further, “tools like GPS and mobile phones can help fishers and governments locate poachers and report abuse. The South Pacific Forum Fisheries Agency, for example, now has a vessel monitoring system, which observes fishing grounds throughout the area, identifying and fining illegal fishers. The Sustainable Fisheries Livelihoods Programme has helped Guinean fishing communities perform similar policing: local fisherman used hand-held GPSs to calculate the position of poachers and then radio them to the coastguard. Benefits of these technologies improve productivity indirectly by protecting the fish population. In Guinea, for example, incursions by industrial criminal vessels went down from 450 to 81 after just two years.”<sup>3</sup>
- Mobile phones for trading, information exchange and emergencies.
- Radio programmes with fishing communities.
- Web-based information and networking resources.

It needs to be examined whether technology available from the Meteorology Department can be used to enhance production of fish in a sustainable manner. The use of Indian National Centre for Ocean Information Services (INCOIS) may be expanded to Kerala, like it has happened for Tamil Nadu and Andhra Pradesh.

#### 7.5.4.1.16 There has been a mobile revolution as well with:

- Dramatic improvement in the efficiency and profitability of the fishing industry.
- Boat crews cut deals for the day’s catch using mobile phones, while still at sea.
- Reduced waste from between 5 and 8 per cent of total catch to close to zero.
- Increased average profitability.

#### 7.5.4.1.17 Major fishing states have taken some initiatives, some of which are listed below:

- ITC’s aqua-choupal in Krishna and Godavari districts of Andhra Pradesh along the lines of e-Choupals.
- Byrraju Foundation’s V-Aqua ICT mediated service delivery/advisory services in West Godavari district of Andhra Pradesh.
- MSSRF’s VKCs in Puducherry and Tamil Nadu: M.S. Swaminathan Research Foundation (MSSRF) set up Village Resource Centres (VRCs) and Village Knowledge Centres (VKCs) in villages across Tamil Nadu and Puducherry. The VKC acts as a platform for the dissemination of information and is operated by a computer-trained local person. The available infrastructure is leveraged to provide mobile information.
- Mobile-based advisory services of Surat Shrimp Farmers’ Association.
- ISRO/INCOIS’s weather and potential fishing zone advisory services/community efforts.
- Kerala Independent Fish Workers Federation’s Website — [www.alakal.net](http://www.alakal.net).
- South Indian Federation of Fishermen Societies’ (SIFFS) online market intelligence network for selected marine fish — Fish Market Intelligence System (F-MIS) — collects fish price information from fish markets and fish landing centres and continuously monitors several key wholesale fish markets in Tamil Nadu and Kerala, and publishes this information on its Website
- Community radio: *Kalanjiam Samuga Vanoli* (Nagapattinam, Tamil Nadu) provides weather information, disaster management and advisory services.

#### 7.5.4.1.18 However, the potential has not been fully captured:

- Only pilot projects/small scale localised experiments have been conducted.
- ICT as a powerful means of reducing people’s vulnerability and fostering equity and social inclusion is yet to take shape.
- ICT has promising application in marketing efforts, but has so far not had much effect.

7.5.4.1.19 Kerala will draw on these experiences to create integrated infrastructure to cover the entire fisher folk community by 2030.

### Action Plan 3: Human capital approach

7.5.4.1.20 The key features of the strategy proposed to implement an ecosystem approach to fisheries and aquaculture are as follows:

- Adopting participatory approaches at all levels of planning and implementation.
- Ensuring that all key components of the fishery/aquaculture system are considered, including those related to the ecological, social, economic and governance dimensions, while also taking into account external drivers (for example, changes in the supply of and demand for inputs and outputs, climate change, environmental disturbances).
- Encouraging the use of the 'best available knowledge' in decision making, including both scientific and traditional knowledge, while promoting risk assessment and management and the notion that decision making should also take place in cases where detailed scientific knowledge is insufficient.
- Promoting the adoption of adaptive management systems, including monitoring performance and creating feedback mechanisms linked to performance, at different time scales, to permit adjusting of the tactical and strategic aspects of the management/development plans.
- Ensuring maximum participation and support at the local level through the involvement of the coastal panchayats.
- To further the said objective, traditional fishermen should be educated about modern, environment-friendly fishing techniques/methods through government and non-government networks and through community mobilisation among the fisher folk, the government and the large trawler owners.
- Integrate the fishing sector with the knowledge economy: It was only in 2011 that Kerala opened an autonomous university called the University of Fisheries and Ocean Studies (KUFOS).<sup>4</sup> It is the first university devoted to fisheries in India. Its Website shows that the university is under construction. The university will offer Bachelors of Science and Masters of Science in fishing, besides post-graduate courses in science, business administration, law and technology. The faculty are from fisheries, ocean studies and technology, ocean engineering, climate variability, aquatic ecosystems and management and social sciences. This centre for excellence is a brilliant first step for Kerala, in terms of uniqueness, courses offered and interdisciplinary skills. It also includes a fishing research station. KPP 2030 suggests that KUFOS can, perhaps, model itself on the lines of US universities such as Oregon State University (OSU). The US government started a Sea Grant Programme in 1968 for its ocean and coastal resources and it was opened in Oregon.<sup>5</sup> The current goal of the Oregon Sea Grant Programme is to serve "the state, region and nation through integrated research, education and public engagement on ocean and coastal issues." The key issues in the Oregon Sea Grant Programme are very similar to those of KUFOS — coastal hazards and climate change, coastal learning and decision making, fisheries and seafood, marine spatial planning, oceans and human health, watersheds and water resources. The potential focus areas are many:
- KUFOS should adopt an integrated approach to the whole sector, like the OSU has towards research, education and public engagement. Over the long term, it should develop very strong extension services that will work with communities for many years to develop the fishing sector in an environment-friendly manner. It should work with the water authorities in Kerala on coastal management. Besides, it should also work with knowledge partners such as CWRDM (Centre for Water Resources Development and Management) and the environment

department to reduce water pollution, clean up water bodies, recover wetlands, rivers, streams and re-introduce native fish species. This is especially important because inland fishing is seeing high double-digit growth in contrast to marine fishing. Fishing techniques should be sustainable to maintain the ecosystem.

- The Coastal Oregon Marine Experiment Station, also under OSU, has two centres which work on marine fisheries management, resource dynamics, ecology, economics, genetics, marketing, sustainability, aquaculture, cetacean conservation, pinniped ecology, seafood-related research, improved quality, seafood safety and value-added products.<sup>6</sup> Scientists and fisherman should work together. KUFOS can adopt the motto of the Coastal Oregon Marine Experiment Station —‘Seafood for Supper is equal to Sustainable Fisheries = Sustainable Communities + Sustainable Seafood’. The station also works on waterfronts. Taking a cue from Oregon, Kerala’s underutilised minor ports can be developed as waterfronts for tourism. Plus, aquariums developed along the coast can be among Kerala’s big attractions, boosting all stakeholders involved. In the medium term, the KUFOS should develop synergies with all stakeholders, including ports authorities, to work in an integrated manner.
- The world over, fishing communities are falling behind the rest of society. The Sea Grant Programme aims to connect science with coastal communities. For example, it is partnering with the education authorities to encourage teaching science, technology, engineering and mathematics (STEM) in two districts that house fishing communities.<sup>7</sup> Over time, KUFOS needs to adopt a similar approach because in Kerala the long-term sustainability of the sector is closely correlated with the sustainability of the communities. KUFOS can work on profiles of fishing communities and similar initiatives.
- Offer fishing and aquaculture degree and diploma courses in universities and link it to internships in fishing communities. Similarly, internship opportunities for management students can be created in fishing communities. Exchange of knowledge between two different groups, with different backgrounds, may help attract younger people to this domain, especially if they see higher returns, and fisherfolk may benefit from better technology and marketing practices. Science degrees should be clubbed with marketing courses. Vocational and diploma courses can also prove to be useful. Plus, entrepreneurship in fishing may be encouraged. KUFOS should encourage consultants who will then be able to transfer knowledge to other parts of India and the world.
- KUFOS may work with the Kerala State Electricity Board to explore whether the vast reservoirs, which are under the board, can be used for fishing for either livelihood or recreational purposes. Pilot studies may be carried out.
- The Royal Forest and Bird Protection Society (New Zealand) publishes the *Best Fish Guide* to try and encourage people to make more sustainable choices when purchasing seafood. The list evaluates fish stocks by catch levels and the fishing methods used.
- FAO has promulgated a code of conduct for responsible fisheries for conservation and sustainable exploitation of fishery resources. Awareness campaigns highlighting such issues should be launched for fishermen through various modes including film shows, booklets, posters and group discussion.

## 7.5.4.2 Pillar 2: Increased Economic Value Generation

### Action Plan 1: Increase Exports and High Value-Added Products

7.5.4.2.1 Shifting focus to export-oriented fisheries will bring modernisation in fishing techniques, which will further boost fishing as a source of long-term sustainable livelihoods and food. Thailand is the largest exporter of shrimp. It has been able to achieve this not just by producing shrimp, but also by

making them value-added products by undertaking processing activities such as filleting and canning. High value marine products should be given more priority in farming for export purposes. Aquaculture farming techniques for all shrimp species should be implemented, including in artificial ponds near the coast. Entrepreneurship in this regard may be encouraged. The Kudumbashree programme may be leveraged to provide training. KUFOS can adapt the OSU model to set up a special research branch on seafood. The OSU looks at a variety of issues — food quality and biochemistry, food products, by-products and waste, food safety, value-added processing and product development. Their research includes a variety of issues including how to move from packaging seafood (from cans to cardboard-based packaging) to looking at nano-sized ice to improve seafood quality.

7.5.4.2.2 Exports of marine products have been erratic and on a declining trend, which could be due to the adverse market conditions prevailing in the EU and US markets. The antidumping procedure initiated by the US government has affected India's shrimp exports to the US. It is important to identify new markets and new products. In Japan, for example, the consumer supermarket price for *sashimi* tuna is very high. It should, therefore, be an objective to develop tuna in the form of *sashimi* with a brand name in the international market. Further, facilities for production/ processing of value-added products such as ready-to-eat, ready-to-serve breaded and battered products and so on are necessary to realise maximum return. For this, it is, however, necessary to have proper MIS and market data.

## Action Plan 2: Diversify Aquaculture Aquaculture in Kerala

7.5.4.2.3 Having been the principal marine fish producing and exporting state in the country for a long time, Kerala occupies an inimitable position on the fisheries map of India. But in the last couple of years, the State has lost its prime position due to the depleting fish stock in conventional fishing grounds. In this context, aquaculture is viewed as a second option for increasing fish/shrimp/prawn production. The technological development in inland fisheries paved the way for making use of inland water resources spread over the different districts of the State for aquaculture development. Aquaculture currently enjoys the distinction of being one of the fast growing food production sectors in the State.

7.5.4.2.4 Kerala has great potential in aquaculture fishery. As seen earlier, the Agency for Development of Aquaculture, Kerala (ADAK) was established in 1989. The Kerala government also launched the 'MatsyaKeralam' scheme to increase export of fish and fish products and to create new employment opportunities in rural areas through the development of inland and brackish water aquaculture. Though marine fish production in Kerala contributes 82 per cent of the State's total fish production, fish farming under artificial conditions can also be done in village ponds, tanks or new water bodies.

7.5.4.2.5 There are basically five types of aquaculture practices followed in India:

- Freshwater aquaculture
- Brackish water aquaculture
- Mariculture
- Coldwater aquaculture
- Ornamental fish culture

7.5.4.2.6 Freshwater aquaculture and brackish water aquaculture are already practised in the pookali fields of Kerala. There has also been promotion of rice-fish farming. Kerala will need to promote mariculture and ornamental fish culture.

**7.5.4.2.7 Mariculture in Kerala:** Mariculture is a specialised branch of aquaculture involving the cultivation of marine organisms for food and other products in the open ocean, an enclosed section of the ocean or in tanks, ponds or raceways which are filled with seawater. It has rapidly expanded worldwide over the past two decades due to new technology. It was introduced in Kerala in the recent past with shrimp farming being practised at the commercial level. Some mariculture methods for edible oysters, mussels, marine pearl production in pearl oysters, seaweed and marine ornamental fishes (damsels, clown fishes and seahorses) are also being practised along Kerala's coastline in order to meet export requirements. However, these have not yet reached the commercial level. Their promotion will enable the required diversification into non-food fisheries, such as seaweed cultivation, pearl farming and so on, with high export potential.

**7.5.4.2.8** Further, with application of biotechnology, lobster and crab culture can be developed in the coastal areas of Kerala, especially since lobsters and crabs are one of the most attractive and economically important premium seafood delicacies across the globe. States such as Tamil Nadu, Gujarat, Andhra Pradesh, West Bengal and Maharashtra have already successfully developed and disseminated viable technology for fattening lobsters and crabs in their coastal areas. Also, there has been a substantial improvement in the earnings of their coastal fishermen. Therefore, lobster and crab culture has great potential in coastal areas and Kerala can adopt such biotechnology-based methods in marine fishery, with the objective of creating income streams and fostering sustainable livelihood security for the fishing communities.

**7.5.4.2.9** While shrimp farming is a commercial activity in the country, the non-availability of disease-free seed is a major bottleneck. There is a need to domesticate the shrimp and produce specific pathogen free (SPF) seed to overcome the problems. While R&D efforts are in place in the country, establishment of bio-secure facilities and dedicated seed centres is an important requirement. Further, the quarantine mechanism to screen imported seed needs to be strengthened in the State.

**7.5.4.2.10 Cold water aquaculture:** Finally, there will be promotion of cold water fish culture in the highlands of the State. These include all species of salmon and trout. The most commonly cultured cold water species in the US' Midwest is rainbow trout, whose optimal temperature range for growth is 8.8–18°C. Species selection will be based on the temperature of the water supply. However, the costs and benefits of introducing a foreign species in Kerala's waters must be considered, as this can have adverse consequences.

**7.5.4.2.11** In sum, the State will remove single species dependence in brackish water aquaculture, with diversified shrimp as well as brackish water fin fishes. Seed production at one end and processing of new species at the other will address the need to achieve the desired diversification in the culture practices.

**7.5.4.2.12 Seed production:** Seed of pearlspot is available throughout the year along the east and south-west coasts of India. The peak season of abundance is during the months of May-July and November-February. It can be easily collected from both brackish water and freshwater tanks and ponds. A simple method of seed collection is adopted taking advantage of the tendency of the fish to congregate in large numbers for feeding on epiphytic growth. In this method twigs or branches are kept submerged in the water a week ahead of the day of collection. The juveniles congregating for feeding purpose are trapped using an encircling net or trap. Fecundity of pearl spot is low and has been estimated to be around 3,000–6,000; hence, a successful hatchery production of seeds is difficult. However, Central Institute of Brackishwater Aquaculture (CIBA), Chennai using the technique of environmental manipulation, has successfully demonstrated the hatchery seed production of pearl spot.

**7.5.4.2.13 Ornamental fish culture:** The global ornamental fish trade is estimated at US\$4 billion and is said to be a fast growing sector. Kerala, with its pleasant environment and huge fresh water reservoirs, has the potential to be an excellent player in the sector. Despite the huge potential offered by rich diversity and environment, export of ornamental fish from Kerala continues to remain negligible due to lack of knowledge and practices. Proper training and guidance on marine ornamental fish culture can improve the income of fishermen. The most positive part of ornamental fish culture is that it does not disturb the marine ecosystem.

**7.5.4.2.14** Special projects should be launched for commercial use of ornamental species, including:

- Training local communities in the technical aspects of ornamental fish farming.
- Undertaking stock enhancement and sea farming of commercially demanded species.
- Setting up backyard units for income generation.
- Promoting market potential and trade for ornamental fishery.
- Expanding ornamental fishery to households to create additional livelihood options.

**7.5.4.2.15** Strengthening ornamental fishing in Kerala's fishery sector can directly generate additional employment and additional income. During the monsoon period, when marine fishing is banned, ornamental fish rearing can be a beneficial measure for the sustainable development of fisheries in the State. Poor fishermen can sustain their livelihood by practising ornamental fishery in ponds, rivers, dams, springs, tanks and so on (all inland recourses).

**7.5.4.2.16 Other emerging aquaculture technology:** New scientific opportunities are emerging in aquaculture. These include cold water fishery, integration of seaweed farming, culture of mullets in brackish water aquaculture, spirulina production, lobster fattening, sea ranching, small-scale fresh water carp culture in seasonal ponds and catfish culture. While cage culture and pen culture originated in the South East Asian nations and have been successfully implemented,<sup>8</sup> their environmental impact is uncertain. Any new technology or culture has to be evaluated from the environment perspective of Kerala. So pilot studies need to be carried out before recommending a particular technology to fisherfolk. Notwithstanding their proven benefits, the adoption of aquaculture methods have been found to be constrained by problems such as lack of skill, capital, infrastructure, availability of water bodies, tragedy of commons, input (feed) scarcity and high risk. These need to be addressed.

**7.5.4.2.17 Recreational fishery:** Recreational fishing, also called sport fishing, is fishing for pleasure or competition. The most common form of recreational fishing is done with a rod, reel, line, hooks and any one of a wide range of baits. Big-game fishing is conducted from boats to catch large, open-water species such as tuna, sharks and marlin. Noodling, kayak fishing and trout tickling are also recreational activities. Recreational fishing competitions (tournaments) are a recent innovation in which fishermen compete for prizes based on the total weight of a given species of fish caught within a predetermined time.

**7.5.4.2.18** Recreational fishing has led to the rise of a recreational fishing industry. It consists of enterprises such as the manufacture and retailing of fishing tackle, the design and building of recreational fishing boats and the provision of fishing boats for charter for guided fishing trips. Recreational fishing is a multi-billion dollar industry. According to an estimate, in Sweden, the net value of recreational fishing has been estimated at almost 79.5 million euros, exceeding the value of commercial fishing. In the US, about 12 million recreational saltwater fishermen generate US\$30 billion in economic impact and support 350,000 jobs. Fishing tourism may be considered in the State. Fishing in Kerala is termed as open sea fishing, which is also carried on in other regions such as Odisha and Lakshadweep. A travel tour to Kerala locales where angling is practised will show that it is home to fishermen and anglers who practise fishing only for commercial purposes.

### 7.5.4.3 Pillar 3: Social Security

**7.5.4.3.1 Socio-economic development:** The government and other agencies have been attempting to improve the social aspect of the fisheries industry in Kerala. This is being done by implementing schemes and programmes such as housing schemes, insurance cover for fishing implements, pension for fishermen, modernisation of country crafts, purchase of fishing nets, savings-cum-relief scheme for poor fishermen and so on. The Kerala Swathanthra Matsya Thozhilali Federation (KSMTF), established by the Kerala fishermen's union, works for the socio-economic and political development and education of the fisher folk community in Kerala. It includes those who are involved in fishing and marketing of fish in both the inland and marine sectors. It also works for the rights and benefits of fisheries workers. There is evidence in literature that socio-economic yardsticks such as education, employment, infrastructure development, recreation, means of ownership, per capita production, income and expenditure pattern and so on have undergone rapid changes in the coastal areas. To consolidate these improvements, appropriate policy measures and a legal framework for the livelihood security of fishermen in the mechanised sector or commercial sector needs to be framed. Traditional fishermen also need to be protected through training in the use of trawling nets and other modern techniques in the traditional sector. In addition, rural development programmes must be initiated to improve their standard of living.

**7.5.4.3.2** Besides social infrastructure, provisions for safe shelter and drinking water, improvement of public health (mobile health clinics) and education facilities, total sanitation and solid waste management, coastal roads and so on need special care and attention. For speedy implementation and ensuring the future operation and maintenance of social infrastructure, it can be brought under a state-sponsored scheme for local self-governments. Present housing schemes assisted by the National Fishermen Welfare Fund can be implemented in an integrated manner, along with the State's share and contributions from local government institutions or NGOs.

**7.5.4.3.3** Fisherfolk who choose to leave the sector because it is not remunerative should be rehabilitated. In the Chapter on Labour, KPP 2030 recommends a model that involves re-training of workers. Giving them land is another option, but allocating land alone is not enough, for fisher folk need to be re-trained to become farmers. Therefore, training becomes an important aspect of any rehabilitation programme for fisher folk. They can be provided government-funded training, especially through the vocational education system. The Kudumbashree programme may help, especially with social entrepreneurs. The best synergy would be if unused, and even used, minor ports can be developed as tourist spots, where former fisher folk can be employed in various ways. A detailed rehabilitation programme may be worked out by KUFOS, the fisheries department and education, revenue and labour departments.

**7.5.4.3.4 Protection from sea-erosion:** Coastal fishermen are highly vulnerable to sea erosion, cyclones and other disastrous weather events. Sea erosion and flooding requires a permanent solution. One suggestion is that two or three rows of huge hollow tetrapods be planted in the sea along the coast, upto a distance of 20–25 metres from the shore. They can be planted in the sea according to the depth. The force of the waves and currents will be broken when they hit the tetrapods. As a trial, planting of tetrapods can be done in a 100 km stretch from the Cochin harbour to Purakkad. Being an area of very severe and disastrous sea-erosion, and due to its proximity to the harbour, that area is likely to give spectacular results in a very short time. If successful, the project can be replicated in other areas as well. Besides the benefits from preventing sea-erosion, it also helps regain the land lost and can help in mineral accretion, turning these areas into regions with mineral deposits.

**7.5.4.3.5 Insurance:** Fishermen risk their lives and livelihood every time they leave port. A centrally-sponsored national scheme for the welfare of fishermen has been in operation since 2002, with group insurance as one of its components. Under the scheme, identified and registered fishermen

are insured for Rs 100,000 against death or permanent total disability and Rs 50,000 for partial permanent disability, 50 per cent of which will be subsidised as grant-in-aid by the Centre and the remaining 50 per cent by the state government. The annual premium payable by fishermen does not exceed Rs 15 per head. The scheme covers fishermen in both marine and inland sectors. Various alternative models may be adopted to extend insurance facilities to them.

**7.5.4.3.6 Community insurance:** The Kerala government can encourage a 'community insurance scheme' for fishermen in which fisher folk themselves pay a small contribution for insuring their risks. In India, Yeshasvini healthcare programme in Karnataka is one such scheme that has provided protection to millions of farmers. In Bangladesh, the state-run JibanBima Corporation has introduced a community insurance scheme in 15 coastal districts, and a significant number of fishermen have already enrolled in it, each paying Tk 1,240 (\$16) a year for insurance cover of Tk 200,000 (\$2,500).

**7.5.4.3.7 Kerala Fishermen's Welfare Fund Board** operates nearly 30 welfare schemes to benefit the fisher folk.

**7.5.4.3.8 Women's empowerment:** The role of women in the economic activities of coastal fishing communities supplements the region's livelihood. The degradation of coastal ecosystems and the displacement of fishing communities from their living spaces have adversely affected the workload and quality of life of women in the communities. Involvement of self-help groups and NGOs in this field can create more opportunities for them. Kudumbashree can play a major role in this sector, teaching sustainable fishing techniques to women entrepreneurs in this area.

**7.5.4.3.9 Treatment for conditions such as skin diseases, rheumatic complaints, urinary tract infections, gynaecological problems, fast aging and so on for fisherwomen** should be available. Therefore, proper education programmes for awareness on hygiene and sanitation should be conducted, and hospitals or special wards in hospitals should be allotted for such treatment.

#### 7.5.4.4 Pillar 4: Food Safety

**7.5.4.4.1 Importers** are applying stricter requirements in food safety and hygiene. Ensuring quality, food safety and hygiene in the seafood sector are, thus, crucial to its progress. Some of the measures proposed for this are:

- The government needs to support enterprises in establishing a testing system in the production chain, ensuring consistency in applying standards and practices in food safety and hygiene management from production, sourcing, transporting and processing raw material to the final exports.
- The government should raise awareness among farmers, enterprises and processors about their responsibilities in ensuring quality, food safety and hygiene. Administrative procedures must be simplified to save time and costs in testing export consignments by competent authorities. Some countries have introduced state-mediated certification procedures to certify their safety and environmental credentials, particularly in their aquaculture industries — such as 'Thai Quality Shrimp'. This can be seen as a proactive strategy to respond to safety and quality demands from import markets by promoting themselves as suppliers of safe and high quality fish and seafood.
- Seafood related training programmes need to cover areas such as quality assurance, microbiological methods, preparation of value-added products (such as fish pickles, cutlets, fingers, pappads), hygienic handling of fish, fabrication of nets and so on. Skill development programmes for rural fishermen should implemented.

### 7.5.4.5 Pillar 5: Environment

7.5.4.5.1 Fishing has to be sustainable for the sustainability of the economy, environment and communities. Water pollution in Kerala is a significant problem. While discussed at length in the Chapters on Environment and Water, an integrated approach is recommended. Water bodies and wetlands have to be cleaned, protected and recovered, and native species re-introduced for sustainability of the ecosystem. There should be support for using *kaipadulands* for fishing/farming and *pokkali* rice fields for farming. Both the KUFOS and Kerala Agricultural University need to examine these issues. The Kerala fisheries department needs to work with the ports and inland waterways department to plan both water transport and sustainability of fishing. Therefore, the European Union's overall strategy in this area is adapted for sustainable fishing in Kerala<sup>9</sup>:

- A more decentralised approach to the development of more environment-friendly fishing methods.
- Greater involvement of the fishing sector in the regulatory process.
- Sharing and developing knowledge at the community level.
- Simplification of community rules.
- Changing fishermen's behaviour through the development of incentives.
- Further development of impact assessments on the ecological, economic and social effects of environmentally friendly fishing methods, particularly as regards their long-term effects.

## 7.6 Conclusion

7.6.1 The strategy for Kerala is to make fishing both economically and environmentally sustainable. A combination of investment in physical infrastructure such as cold storages, human readiness or changes in fishing techniques, training, changes in marketing techniques such as processing and branding will drive increased returns for all stakeholders. The fishing industry also may look to improve returns by working with other sectors such as tourism and other primary sectors.

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# INDUSTRY

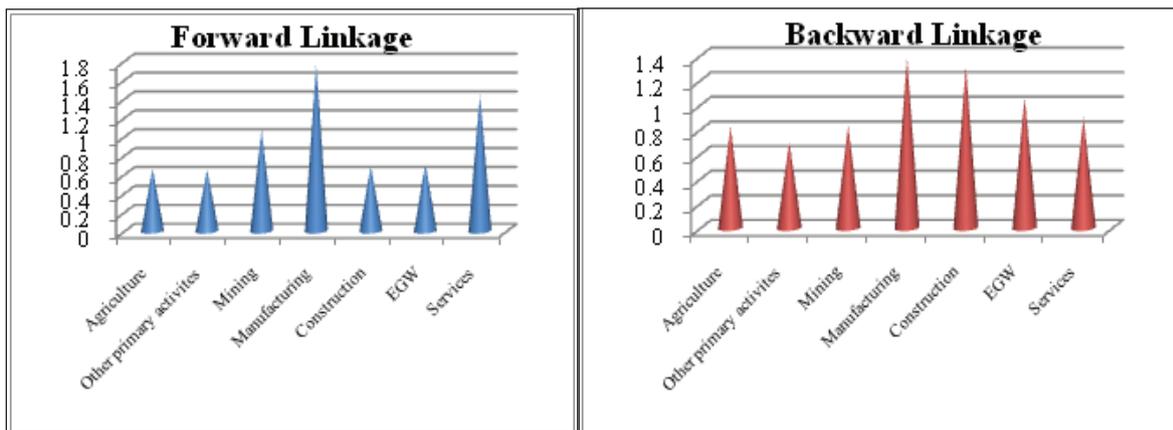




## 8.1 Why Industrialisation?

8.1.1 Evidence suggests that the countries that manage to pull themselves out of poverty and get richer are those that are able to move away from agriculture and other traditional products into manufacturing and other modern activities. Expansion of industry and services is essential for economic development and growth, as these are major enablers of productivity increases. Higher productivity growth in these sectors results from increasing returns to scale and gains from innovation and learning by doing. As labour and other resources shift from agriculture into modern economic activities, overall productivity rises and incomes expand. Figure 8.1 shows sectoral inter-linkages based on the Kerala Input-Output (IO) model of 2009–10. It reveals that non-primary sectors score over their primary counterparts in terms of both backward and forward linkages. This chapter focuses on ‘manufacturing’, which has the strongest linkages with the rest of Kerala’s economy and constitutes approximately 40 per cent of the industrial<sup>1</sup> Gross State Domestic Product (GSDP). The linkage factor for manufacturing is found to be greater than one for both backward and forward linkages.<sup>2</sup> Among other components, construction and utilities have strong backward linkages, while mining depicts strong forward linkages with the rest of the economy. It means that manufacturing is a key ingredient in the process of economic growth.

**Figure 8.1**  
Sectoral Inter-linkages Based on the Kerala IO Model 2009–10



Note: EGW- Electricity, Gas & Water

Source: Computations based on IO Table, NCAER

8.1.2 Strong linkages are translated into high income, employment and tax multipliers. Industrial stagnation in the consumption-led growth scenario of the Kerala economy, therefore, means that a significant amount of the income earned leaks out of the economy through imports and inter-state

purchases, thus reducing the income multiplier within the State. This also means that industrialisation can provide a long-term solution to the problem of unemployment, which remains unacceptably high in Kerala and may be further exacerbated by the slowdown in the demand for labour in the Gulf countries and the advent of return migrants.

## 8.2 Industrial Performance

8.2.1 Industrial development activities in Kerala started as early as in the mid-19th century with the pioneering efforts of missionaries and other Europeans who started textile and coir factories in the state of Travancore. The erstwhile local rulers of Kerala, particularly in the princely state of Travancore, also demonstrated industrial dynamism. The traditional cottage industries such as coir, yarn, spinning, handloom weaving, fibre extraction and others were employment-generating. According to the 1931 census, about 15.18 per cent of the people were engaged in different types of industries in Travancore;<sup>3</sup> the proportion was only 10 per cent as far as India as a whole was concerned.

8.2.2 The period between 1934 and 1948 is generally considered the golden age of industrialisation in Kerala's history. It was during this period that several industries were established in the Travancore and Cochin areas. The foundation of chemical industries was laid during this period. The period 1935-48 saw the establishment of a number of factories engaged in the production of rayon, titanium dioxide, textiles, ceramics, aluminium, plywood, glass and chemicals and drugs. This period also witnessed the setting up of several power projects in Travancore, Cochin and Malabar, which gave a boost to and created a favourable climate for the development of modern industries. The most important landmark in Kerala's industrial development was when Fertilisers and Chemicals Travancore (FACT) was commissioned in 1947. The base of chemical industries was further expanded with the setting up of the Cochin Refinery.

8.2.3 In the 1950s, Kerala witnessed the emergence and growth of a number of power generating projects with very high growth potential. These projects generated a very high demand for transformers, cables, conductors, control panels, circuit breakers, steel wires, relays and a wide variety of other products that led to the growth of the electrical machinery industry in Kerala. Many other industries were also set up in Kerala during that period with a view to making use of the availability of power.

8.2.4 However, Kerala could not exploit its early mover advantages in industrial development. Its industrial dynamism started petering off in the post state-formation period. Its manufacturing growth can best be characterised as slow and of poor-quality.

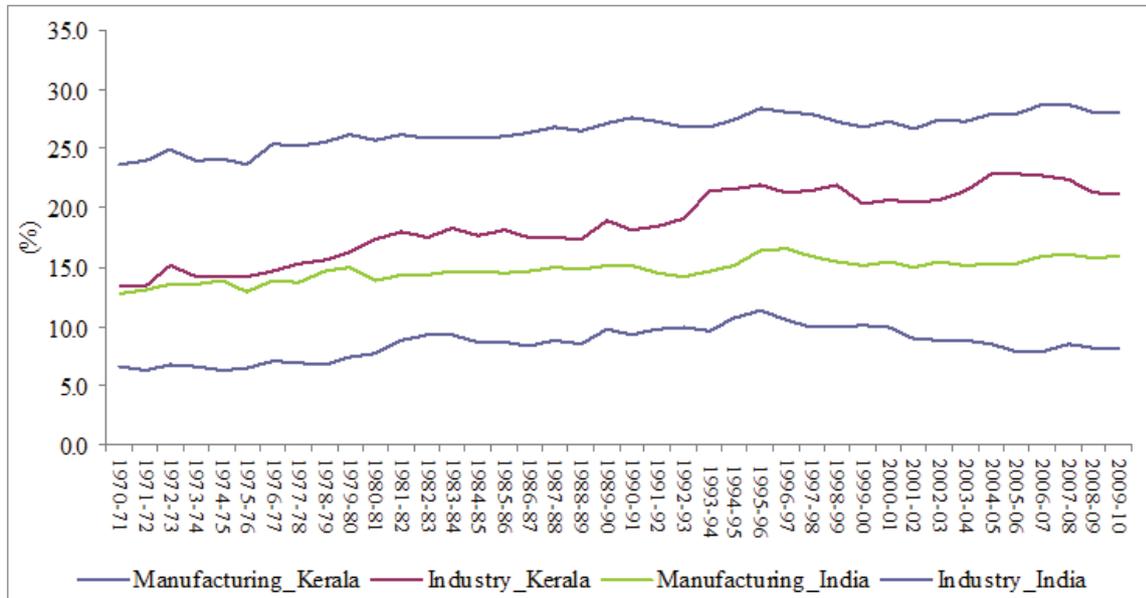
### 8.2.5 Slow growth

#### Low share of manufacturing in GSDP

8.2.5.1 One of the most disappointing features of Kerala's economy is poor industrial growth, which is reflected in its low share in GSDP (Figure 8.2). While the economy has diversified, the overall contribution of industry, particularly of manufacturing, to the GSDP remains disappointingly small. Industry accounts for 21 per cent of the state domestic product, which is significantly lower than the national average of more than 28 per cent. More disappointing is that the share of manufacturing in GSDP has been below 10 per cent, as compared with 16 per cent at the national level. Not only did the industrial sector never rise to its expected prominence, but it has also been declining continuously since the late 1990s. This is despite several policy measures adopted by the government, particularly since 2001-02, to attract investment in manufacturing.

Kerala (ADAK) was established in 1989 to promote inland fish farming. With economic liberalisation in the early 1990s, the fishing industry received a major boost in investment and sustained the positive trends.

**Figure 8.2**  
**Share (%) of Industry and Manufacturing in GDP,**  
**Kerala and India: 1970–71 to 2009–10 (%)**



Note: These series are in constant terms with base year 2004–05

Source: Computations based on Central Statistical Organisation

8.2.5.2 A falling share of industry reflects its relatively lower growth rate. The State Development Report released in 2008 projected the growth of the industrial sector under three alternative scenarios:<sup>4</sup>

- The per capita Industrial State Domestic Product (ISDP) of Kerala to be matched by the leading industrialised states of India — Andhra Pradesh, Gujarat, Karnataka, Maharashtra, Punjab and Tamil Nadu — and India as a whole.
- The ISDP of Kerala to eliminate unemployment backlog in three to four years.
- The industrial requirements of Kerala to correspond to the State's future projected power consumption needs.

8.2.5.3 A comparison of the minimum and the maximum growth targets of Kerala under the three scenarios reveal that the Industrial State Domestic Product of Kerala was to grow within a range of 6.69–11.7 percent at the minimum to 14–22 per cent at the maximum. The growth rates presented in Table 8.1 shows that the actual growth remained at the minimum of the range. Indeed, the growth rate in the manufacturing sector has picked up strongly since the late 1980s and accelerated further since 2001–02. But it fell far short of the requirement, given a rather small industrial base. A disappointing trend is that the growth rates have been below the all-India averages for almost all the periods under review.

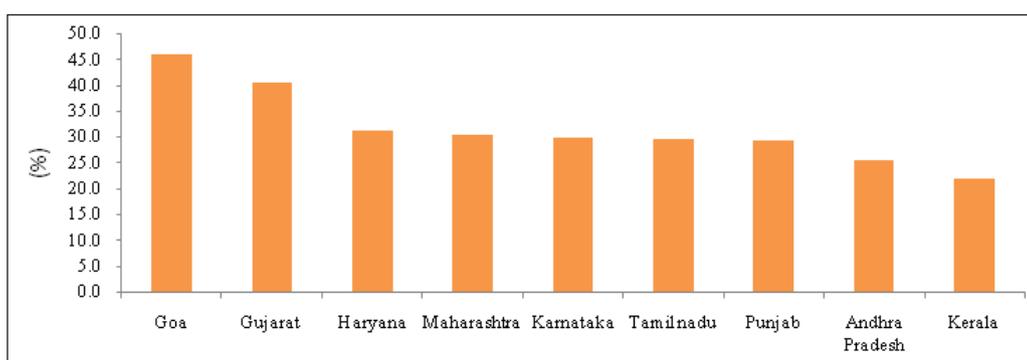
**Table 8.1**  
**Industrial SDP Growth Rates in Selected Periods Between 1970–71 and 2010–11 (%)**

Sector	1970–71– 1980–81	1980–81– 1986–87	1986–87– 2001–02	2001–02– 2010–11
Manufacturing	2.51	2.93	6.7	7.1
Registered	2.9	3.6	7.8	5.9
Unregistered	2.5	3.6	5.9	8.3
Construction	3.7	2.1	6.4	10.9
Water and electricity	11.3	–0.05	13.4	–0.17
Mining and quarrying	–2.27	6.5	11.6	11.9
Industry	3.27	2.12	6.35	7.8
Industry national	3.7	5.63	6.14	8.5

Source: Central Statistical Organisation

8.2.5.4 A comparative analysis of the top nine states, which contributed 52 per cent and 55 per cent to the total GDP of India in 2004–05 and 2009–10 respectively, shows that Kerala lagged behind all of them in terms of the average share of industry during 2004–05 and 2009–10 (Figure 8.3).

**Figure 8.3**  
**Average Industry Share in GSDP in Nine Indian States  
 with Highest GSDP: 2004–05 to 2011–12 (%)**



Source: Computations based on Central Statistical Organisation

## 8.2.6 Low quality industrial growth

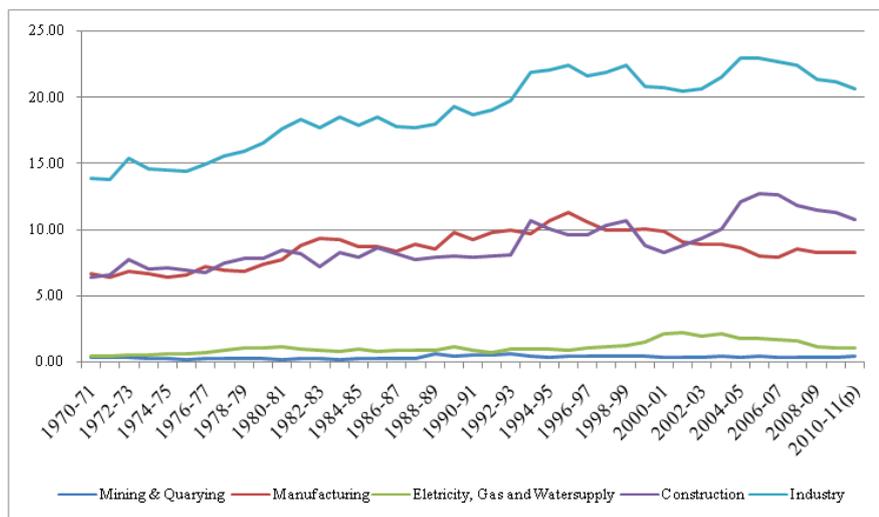
### Low share of manufacturing in industry

8.2.6.1 More than quantity, the quality of industrial growth matters as depicted by the composition of industrial growth. It is, for instance, well established that within industry, growth of manufacturing matters the most. This is because it makes crucial contributions to four objectives. One, it is scale intensive, is a major source of innovation and learning and is a major driver of growth. Two, it creates high quality wage employment, especially for those workers who otherwise would earn low wages. Three, it drives the services sector growth. Four, it makes a disproportionately large contribution to environmental sustainability because a number of technologies and products that are critical to a clean economy are manufacturing intensive.<sup>5</sup> Utilities (such as water, electricity and gas), another component of industry, are also crucial in any functioning economy. These must be developed and distributed adequately and affordably to industry. The transmission of energy and water, typically

makes use of grid networks that are considered critical infrastructure. In contrast, mining and construction are two relatively low-productivity, low-wage sectors.

8.2.6.2 While exploring Kerala's industrial sector within the above framework, it is observed that essentially, construction and mining and quarrying drive industrial growth. Water and electricity also grew rapidly in the moderate-growth regime of 1986–2002, but manufacturing has not shown signs of acceleration in any period. Its share has been declining, both in industry and in overall GSDP since the late 1990s (Figure 8.4).

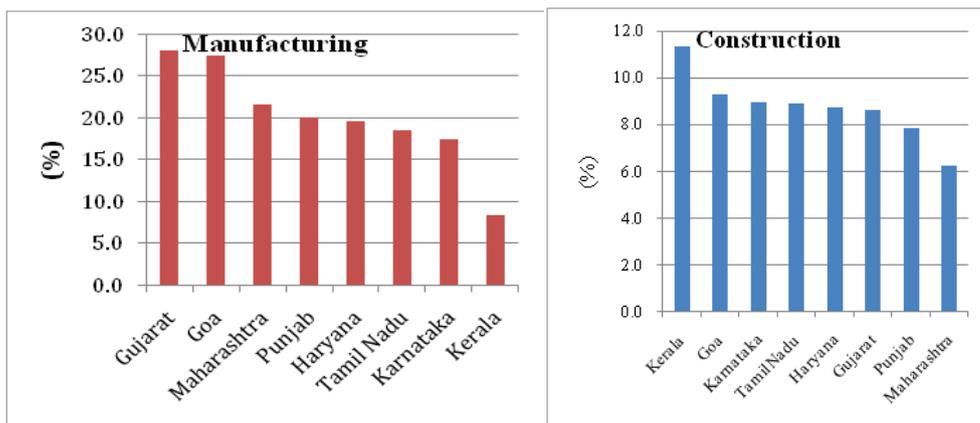
**Figure 8.4**  
**Sectoral Growth Rates in Industry in Kerala:1970–71 to 2010–11**



Source: Central Statistical Organisation

8.2.6.3 A comparative analysis of Kerala's industrial sector composition with nine other major industrial states reveals that the former is an outlier. In comparison to the other states, its manufacturing sector is very small while the construction sector is disproportionately large (Figure 8.5).

**Figure 8.5**  
**Inter-state Comparison of the Share of Manufacturing and Construction in GSDP: 2009–10 (%)**

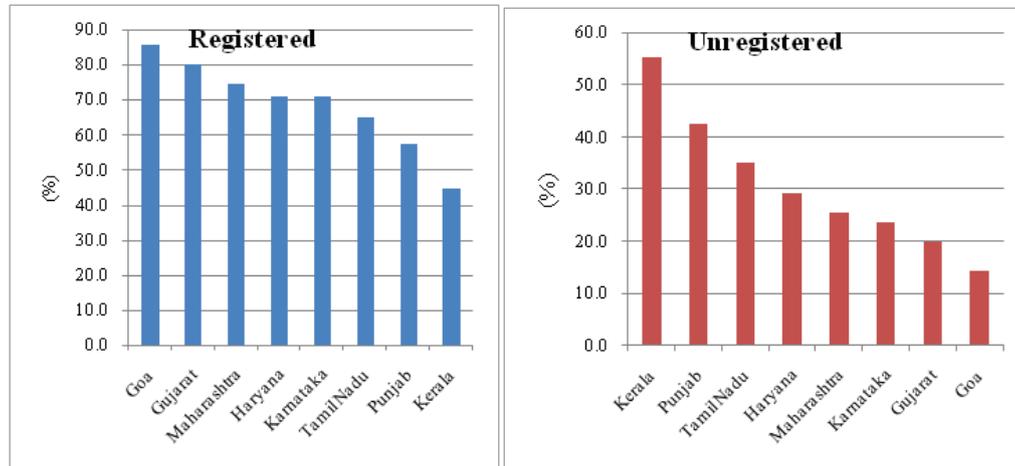


Source: Computations based on Central Statistical Organisation

## Share of unregistered manufacturing is disproportionately large

8.2.6.4 Another highlight of industrialisation in Kerala is the disproportionately larger share of unregistered manufacturing in total manufacturing. It is not only larger than registered manufacturing in Kerala, but also higher than in any other high-income state in India (Figure 8.6). Since working conditions and wages are relatively lower in this sector, this is a matter of serious concern for policymakers.

**Figure 8.6**  
Share of Registered and Unregistered Segments in Total Manufacturing across Selected States:2009–10 (%)

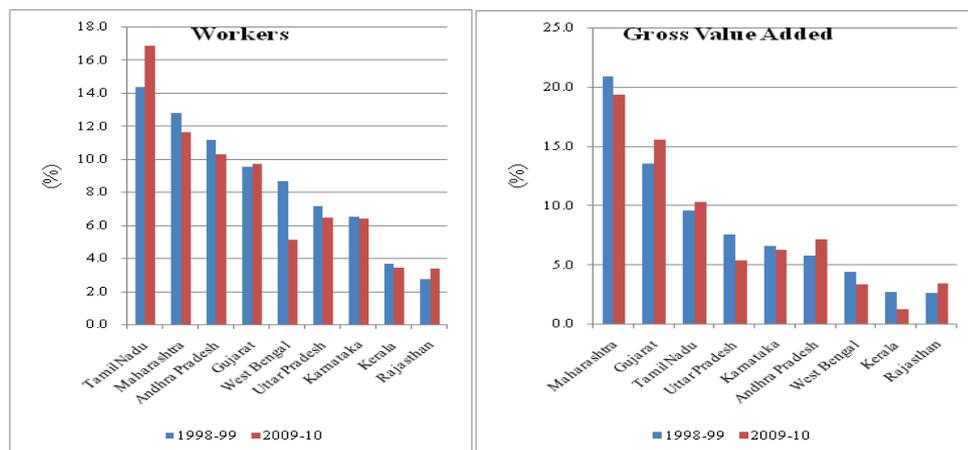


Source: Computations based on Central Statistical Organisation

## Small and declining share of the registered sector

8.2.6.5 Kerala's factory sector is not only small, but has also been shrinking over time compared with the all India average. Its share at the national level was 2.5 per cent in 1998–99, which declined to 1.2 per cent in 2009–10 (Figure 8.7). In terms of employment, also, there has been a decline in Kerala's share in the national total.

**Figure 8.7**  
Share of Top Nine States in National Total Factory Sector GVA and Workers: 1998–99 and 2009–10 (%)



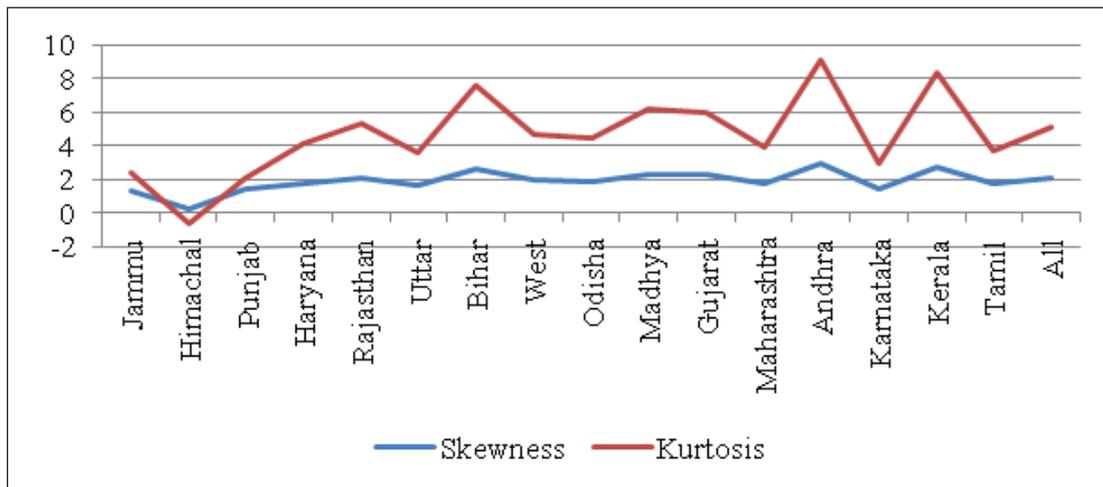
Source: Annual Survey of Industries

8.2.6.6 An inter-state comparison of the share of nine major states in all-India factory workers and gross value added shows that, of these states, Kerala made the smallest contribution to the national total and that its contribution has declined over time, between 1998–99 and 2009–10 (Figure 8.7).

### A highly skewed industrial structure

8.2.6.7 Enterprise size distribution in registered industry is highly right-skewed in Kerala. Figure 8.8 reveals a high degree of ‘skewness’ with a positive sign in Kerala’s industry compared to the rest of the Indian states.<sup>6</sup> Interestingly, Kurtosis of the distribution is also high indicating a distinct peak near the mean. This shows that most enterprises are clustering within a short range of small size groups. Over 42 per cent of the total enterprises in the State are in the smallest size group of 0–14 workers.

**Figure 8.8**  
**Skewness and Kurtosis of Size Distribution of Industries across**  
**Major Indian states: 2008–09**



Source: Annual Survey of Industries

### Lop sided composition of industries

8.2.6.8 While the industrial base is quite diversified in the State, the structure is rather narrow with 11 of 61 two-digit industries contributing 75 per cent of the value addition in both years. Three resource-intensive industries — coke, refined petroleum products and nuclear fuel; food products and beverages; and chemical and products — contributed approximately half of the total gross value added (GVA) in both 1998–99 and 2007–08 and have been the top rung industries. Their aggregate share has remained constant over time (Table 8.2). Within this sub-group, however, the composition has undergone a significant change. The share of the refinery sector, which is publicly owned, has increased from 12 per cent to over 23 per cent. The chemical and food processing sectors, both of which are dominated by the private sector, have shrunk.

8.2.6.9 In the second rung, textiles, electronics, publishing and rubber-based industries constituted 26 per cent of GVA in 1998–99. However, their share declined to 23 per cent by 2007–08. While the share of rubber and publishing increased further, the decline was due to a drop in the shares of textiles and electronics. Clearly, there has been degradation in the Kerala industrial structure, with resource-oriented industries increasing their share. Most industries in Table 8.2 that have increased their share are resource-based.

**Table 8.2**  
**Share of 2-digit Industries in Manufacturing Sector in Kerala:1998–99 and 2007–08 (%)**

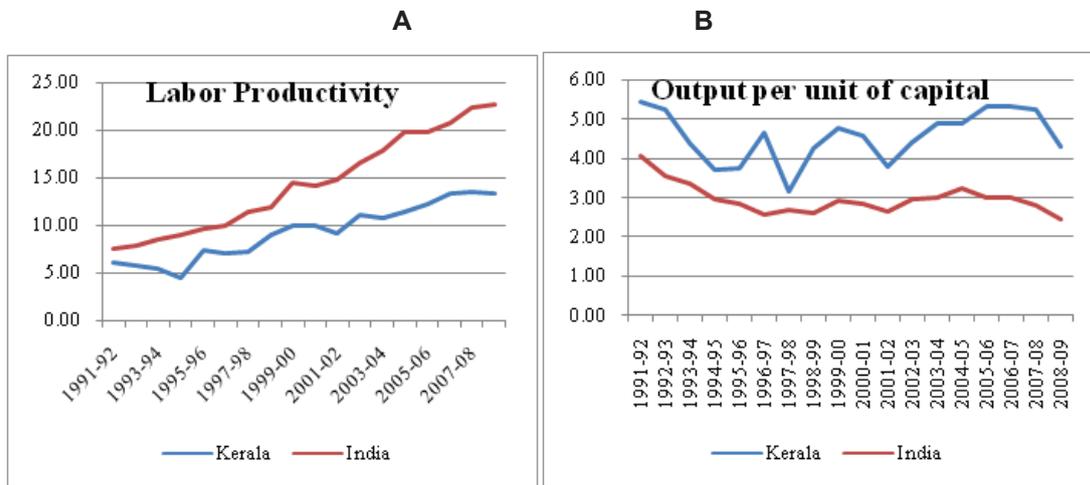
Industries with increasing share			Industries with declining share		
Industry	1998–99	2007–08	Industry	1998–99	2007–08
Tobacco Products	0.1	1.2	Food Products and Beverages	19.6	15
Wearing Apparel Dressing and Dyeing of Fur	0.2	1.1	Textiles	6	3.2
Publishing, Printing	5.6	8.5	Leather	2.3	0.4
Coke, Refined Petroleum Products and Nuclear Fuel	12	23.3	Wood and Products of Wood	1.1	0.9
Other Non-Metallic Mineral Products	3.1	3.6	Paper and Paper Products	2.7	1.1
Basic Metals	3.5	4.6	Rubber and Plastic Products	8.2	7.6
Fabricated Metal Products, Except Machinery and Equipment	1.2	2.7	Chemicals and Products	18.4	10.4
Furniture; Manufacturing N.E.C.	0.3	0.5	Machinery and Equipment N.E.C	2.1	1.3
Medical, Precision and Optical Instruments, Watches and Clocks	0.6	0.9	Electrical Machinery and Apparatus N.E.C.	2.3	1.9
Other Transport Equipment	2.4	5	Electronic products	5.9	3.9
Office, Accounting and Computing Machinery	0.1	0.2	Motor Vehicles, Trailers and Semi-Trailers	0	0.03
Others	2.3	3.6			

*Source: Annual Survey of Industries*

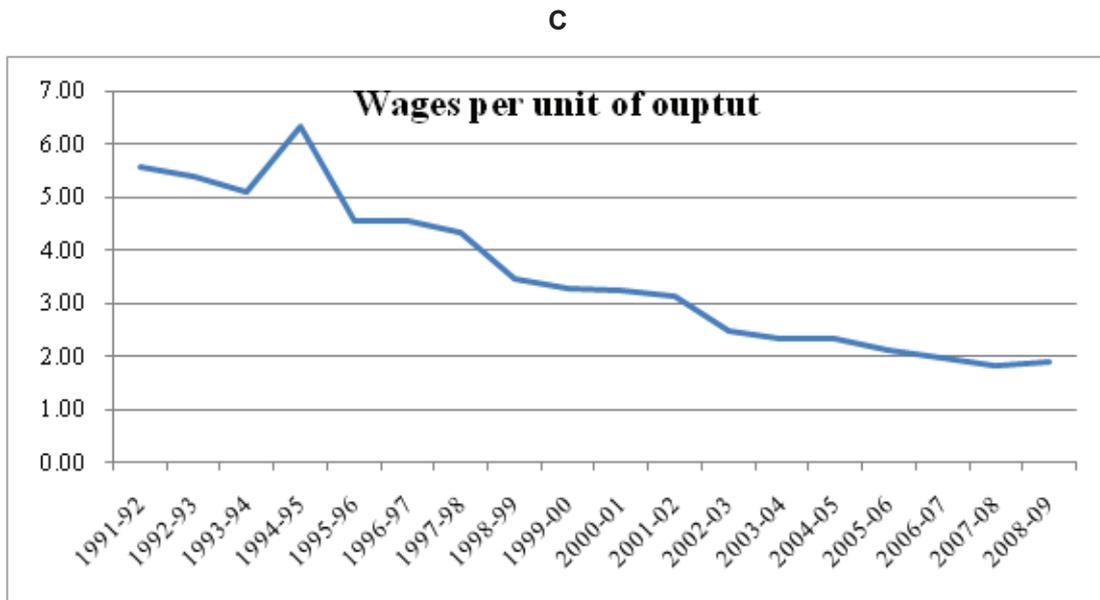
## Low efficiency

8.2.6.10 Labour productivity is an indicator of productive efficiency that measures the relationship between an industry's output and the labour hours used in producing that output. Figure 8.9A plots labour productivity trends from 1991–92 through 2007–08 for the factory sector both in Kerala and at the national level. It shows that labour productivity in Kerala has always been lower than the national average. However, the difference was marginal until 2000. After 2000, average national productivity surged while that of Kerala slowed down, increasing the gap between the two. Output per unit of capital for Kerala and all India also diverged over this period (Figure 8.9B). It is also noteworthy that the wage cost per unit of output has declined continuously in Kerala (Figure 8.9C).

**Figure 8.9**  
**Gross Value Added per Unit of Labour and Capital for Kerala and India:**  
**1991–92 to 2007–08**



Notes: A. Rs lakh per worker and B: Units Rs and Base Year: 2004–05

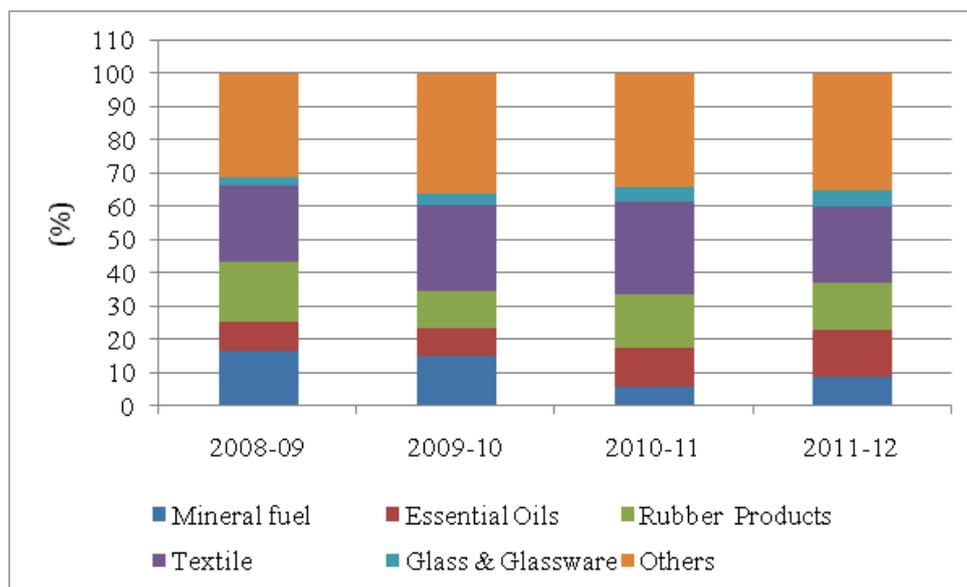


Note: Units: Rs and Base Year is 1998–99  
 Source: Annual Survey of Industries

## International trade in merchandise products

8.2.6.11 The structure of exports reflects the competitive advantages of the State. The Directorate General of Commercial Intelligence and Statistics' (DGCIS) Kerala state data on trade indicates that the share of agriculture in merchandise exports remains more than 50 per cent while that of agro-processing remains at just 6 per cent. This bias needs to be corrected. Figure 8.10 shows that the composition of Kerala's manufacturing exports is dominated by textiles, rubber products, essential oils, cosmetic and other similar preparations.

**Figure 8.10**  
**Composition of Kerala's Manufacturing Exports 2008–09 to 2011–12 (%)**



Source: Directorate General of Commercial Intelligence and Statistics (DGCIS)

## Mining

8.2.6.12 Kerala is rich in deposits such as heavy mineral sand, china clay, iron ore graphite, bauxite, silica sand, lignite, lime shell and so on. However, mining activities are largely based on four minerals — heavy mineral sand, china clay, silica sand limestone and graphite. About 90 per cent of the total value of mineral products in the State lies covered by heavy mineral sand and china clay. However, 75 per cent of the mineral revenue comes from the minor minerals. Mining in Kerala faces obstacles such as non availability of land for mining, vast expanse of reserve forest and dense population.

8.2.6.13 There are 81 major mineral mines that are in operation in the State. Also, there are 3,500 licensed minor mineral quarries in the State. The government gets revenue from minerals mainly by way of royalty. Revenue collected during the year 2011–12 was Rs 44.3 crore (Rs 11.17 crore from major minerals and Rs 33.13 crore from minor minerals) which is 22 per cent higher than the previous year's collection of Rs 36.34 crore.

**Table 8.3**  
**Revenue Collection from Minerals in 2005–06 to 2009–10 (Rs. in crore)**

Year	Major Minerals	Minor Minerals	Total
2005–06	7.33	16.27	23.6
2006–07	6.54	19.93	26.47
2007–08	7.05	24.03	31.08
2008–09	7.59	27.9	35.49
2009–10	8.74	26.33	35.07

Source: Mining & Geology Department via State Planning Board, Government of Kerala. Economic Review 2010 and 2012, Thiruvananthapuram

## 8.2.7 What went wrong?

8.2.7.1 Kerala has a natural resource and communications advantage in industry. It has a long coastline facilitating trade and is strategically located on the trans-national trade corridor. It has rich deposits of non-metallic minerals. When compared to the neighbouring states of Tamil Nadu and Karnataka, and Andhra Pradesh, Kerala is relatively poor in ferrous and non-ferrous metals and basic industrial raw materials such as coal, limestone and so on. The State, however, possesses rich deposits of beach placer sands consisting of ilmenite, rutile, monazite, zircon, sillimanite and so on. Other minerals of economic importance found in the State are iron ore, bauxite, limestone (both of crystalline and marine origin), graphite and mica. Finally, it has vast hydel power resources for energy production. Until 1982, the State enjoyed a surplus in power production. As has been discussed in Volume II, it also has a large educated and trained labour force, which is looking for decent employment commensurate with skills. Its Human Development Index is on par with many developed countries. The State, as mentioned earlier, also had an early mover advantage, as 39 industrial units were registered<sup>7</sup> before the Five Year Plans started. However, the industrial dynamism could not be sustained after Independence.

8.2.7.2 Kerala's industrial development during the first 10 years after independence was not satisfactory.<sup>8</sup> Very little importance was given to industries in the first two Plans. In the First Plan, the outlay for industries was a mere Rs 112 lakh or 3.7 per cent of the total Plan outlay. The total outlay for industries in the Second Plan increased to Rs 6.84 crore or 7.9 per cent of the total Plan outlay, but Kerala's share of central investment remained a mere 0.1 per cent.<sup>9</sup> While at the national level heavy industrialisation was taking place, in Kerala, more attention was given to the promotion of small, cottage and traditional industries. This continued in the Third Plan as well, when the industrial outlay was increased to over 10 per cent. In 1961, the Kerala State Industrial Development Corporation (KSIDC) was established as the nodal agency for the promotion of large and medium scale industries in Kerala. But, industrial activity could not be accelerated.

8.2.7.3 In the late 1960s, there was a resurgence of interest in industrial promotion by the state. Several efforts were made by successive governments to revive industrialisation. The first industrial policy in Kerala was formulated in 1967 with the following objectives: acceleration of industrial activity, raising of industrial finance and formation of industrial corporations to expand or rehabilitate industries and make subsequent plans to increase industry outlays. Following this, a variety of service agencies were set up in the early 1970s. These included: the State Industrial Development Corporation, Kerala Financial Corporation, Kerala Technical and Consultancy Organisation, State Electronics Development Corporation, and Kerala State Industrial Enterprises Ltd. In subsequent years, the policy evolved through successive Industrial Policy Statements. While there has been no revision in the Industrial Policy Statement at the national level after 1991, the Kerala government has revised its Industrial Policy Statement several times over the past decade: 2001, 2003, 2007, 2009 and 2011(draft). Essentially, the objective is to offer a package of policy measures and incentives, which seeks to make Kerala one of the most attractive investment destinations in the country and to accelerate industrial growth in the State by attracting a steady stream of investment into industry, infrastructure and core strength sectors. The Industrial Policy Statements cover almost every aspect of industrialisation — promotion of the thrust sectors, small scale industrial units, medium and large scale industries and traditional industries, industrial infrastructure, industrial R&D, industrial relations, industrial entrepreneurship, human resource development, incentives and marketing.

8.2.7.4 Another important policy is the Biotechnology Policy, which has been framed to catalyse the development and application of biotechnology (BT), take advantage of the State's resources and emphasise its specific needs while meeting global requirements. The state government has also formulated an Information Technology Policy with the aim of establishing Kerala as a global centre for excellence in IT and human resources, through the creation of a large pool of diverse,

multi-skilled technically competent manpower in the State. Also, there is an Energy Policy, which is directed towards placing a greater thrust on overall development and promotion of renewable energy technology and applications.

8.2.7.5 The promotion of industrial infrastructure in the form of industrial estates/parks has been an integral part of the industrial policy in Kerala since the 3rd Five Year Plan. An elaborate government set up has emerged in the State, which has been entrusted with the responsibility of developing and managing industrial infrastructure, specifically aimed at the economic development of industrially backward regions of Kerala. This is to be done by setting up industrial estates, industrial areas, industrial parks/townships/zones and so on.

8.2.7.6 Notwithstanding all of the above, the State failed to attract private investment. Kerala's industrial backwardness is associated with several socio-political developments in the State that took place in the post-formation period:

- From the historical and social perspective, labour unionisation has frequently been cited as a major cause of industrial backwardness. The argument is that strong labour unions were successful not only in raising wages, which were not commensurate with the productivity of labour, but also in resisting introduction of new technology, particularly in the 1960s and 1970s. While the incidence of labour militancy has declined over time, a highly active role for the trade union movement and a high incidence of labour unrest in the past gave the State the image of a destination with an unfriendly investment climate, which continues to linger.
- Politically, credibility of governments also adversely affected the confidence of investors. It is also argued that excessive bureaucratisation and over-politicisation of society and public action politics (See Chapter 1) affected entrepreneurship badly.
- Economic factors that affected industries adversely include infrastructural bottlenecks, high price of land and, above all, an unsupportive business environment. The project-based approach of creating industrial infrastructure in terms of industrial parks and estates and promoting other services through state-owned agencies with little strategic vision and focus appear to have proved ineffective in propelling industrial growth in the State.

8.2.7.7 Despite the high degree of human resource development and the early rise of a commercially minded middle class, the private capitalist class could not emerge in Kerala. In the late 1960s, the state government assumed the role of an industrial entrepreneur and spread its limited resources<sup>10</sup> thinly, across a large number of public sector enterprises. A number of large enterprises in the public sector emerged — the first steel complex at Feroke and the expansion of Traco Cable, Cochin Refineries, Hindustan Latex, Hindustan Machine Tools, Modern Bakeries and so on. The government also exhibited enthusiasm for 'industrial cooperatives' as a means to achieve economic development with social development. The late 1960s witnessed a massive drive to promote cooperative societies not only for traditional and small industries, but also to expand the modern sector. The government formed a number of corporations to rehabilitate or expand industries relating to coir, cashew, handloom, textiles, minerals and handicrafts. In the late 1970s, a massive new programme was launched to create 100,000 new units, revitalise the old ones over a period of four years and to reorganise the industries department. As a result of these and other policies, Kerala has the distinction of having the largest number of state government-owned units. There are 63 Public Sector Units (PSUs) under the Department of Industries, out of which 17 have remained closed for long periods. Five are welfare corporations and four are developmental agencies. Thirty-seven companies are directly engaged in manufacturing. These units are spread across several sectors, including the traditional ones. Until 2005–06 most units were making losses, though in 2006–07 there was a considerable leap, both in turnover and profit.

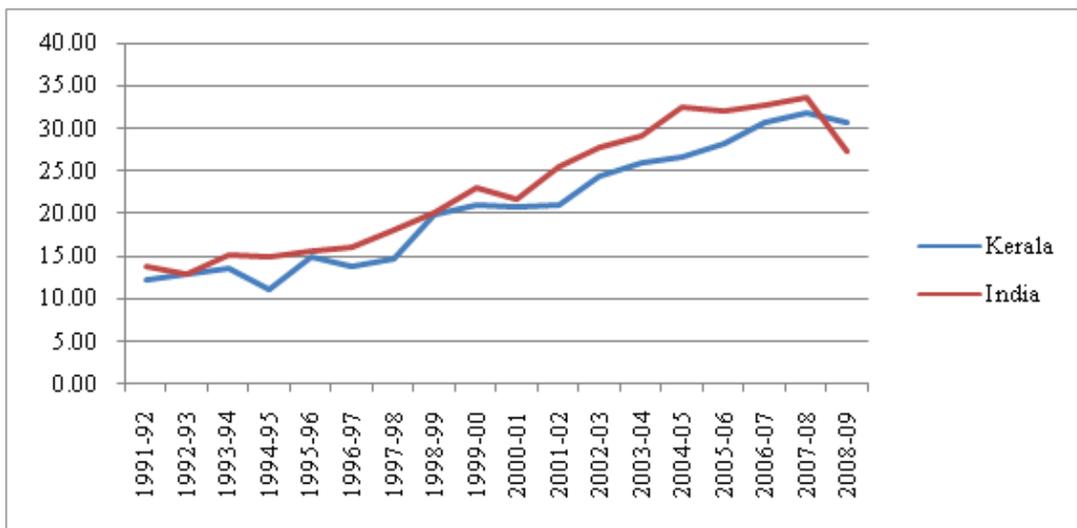
8.2.7.8 Thus, state capitalism could not replace private capitalism. Recognising the importance of private capital and entrepreneurship, the state government has taken several measures, especially since 2001–02, to promote industrial investment within the State. But these measures do not appear to have made a significant dent on investment in the private sector due to the overall investment climate.

## 8.2.8 Social implications

### Jobless growth and declining wages

8.2.8.1 The predominance of low and medium-tech industries in Kerala's manufacturing has social implications. The main pillar of strength for these industries is their cost competitiveness. But in Kerala, high wage rates in the initial phase eliminated their cost competitiveness. This situation was not tenable and resulted in jobless growth. Employment elasticity came down to 0.07, which is much lower than the national average (0.2). Output per worker is higher in India than for Kerala throughout the period starting from 1991–92 to 2008–09. For Kerala the number in 1991–92 was Rs 7.4 lakh per worker and in 2008–09 was Rs 15.4 lakh per worker. The corresponding numbers for India were Rs 9.89 lakh per worker and Rs 29.35 lakh per worker, respectively. Emoluments (wages and salaries including employer's contribution) per worker is also higher in India than for Kerala throughout the period starting from 1991–92 to 2008–09. For Kerala, the number in 1991–92 was Rs 600.1 per worker and in 2008–09 was Rs 502.1 per worker. The corresponding numbers for India were Rs 693.7 per worker and Rs 1,366.6 per worker, respectively. Combining output per worker and emoluments per worker, Figure 8.11 shows output per emoluments and two things can be interpreted from this. One, industry in Kerala has been more labour intensive than the national average in the organised manufacturing sector. Two, despite that, emoluments per worker remained lower than the national average until recently. This situation could not be sustained for long, and the emoluments per unit of labour started increasing in Kerala above the national average towards 2006–07.

**Figure 8.11**  
Output per unit of Emoluments (in real terms): 1991–92 to 2008–09 (Rs)



Note: For deflating Emoluments: Consumer price Index for Kerala has been used: base 1998–99 and India: base 2000–01. Correlation between real emoluments with base 1998–99 and base 2000–01 is 91 per cent.

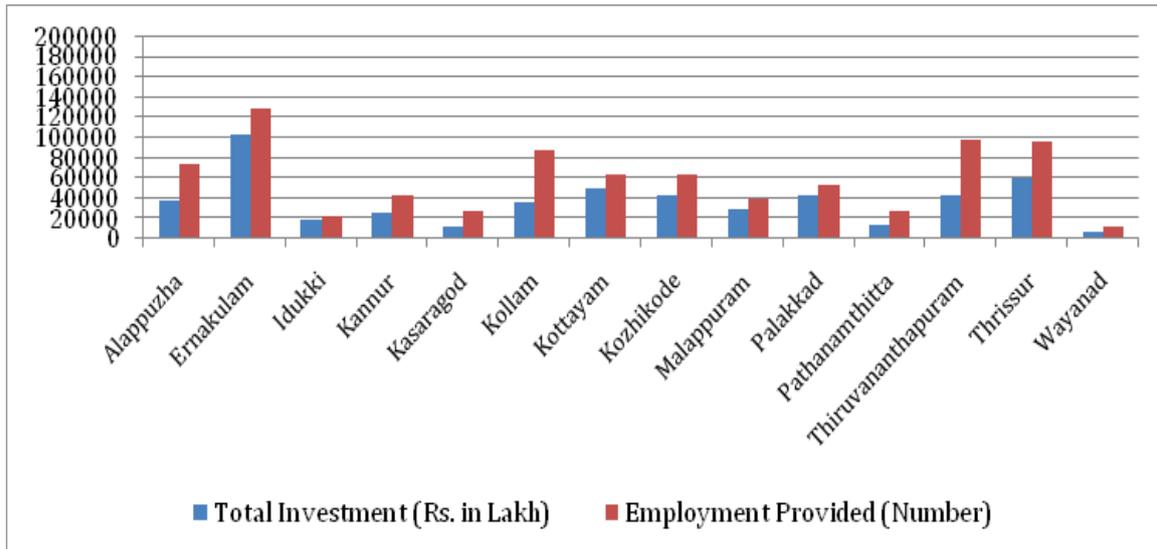
Annual Survey of Industries gives the data for formal organised manufacturing sector

Source: Annual Survey of Industries

## Regional inequalities

8.2.8.2 Of the 14 districts in the State, only five attract substantial investment: Ernakulam, Thrissur, Kottayam, Thiruvananthapuram and Kollam, with Ernakulam leading by a big margin (Figure 8.12).

**Figure 8.12**  
**Industrial Investment and Employment across 14 Districts of Kerala:2009–10**

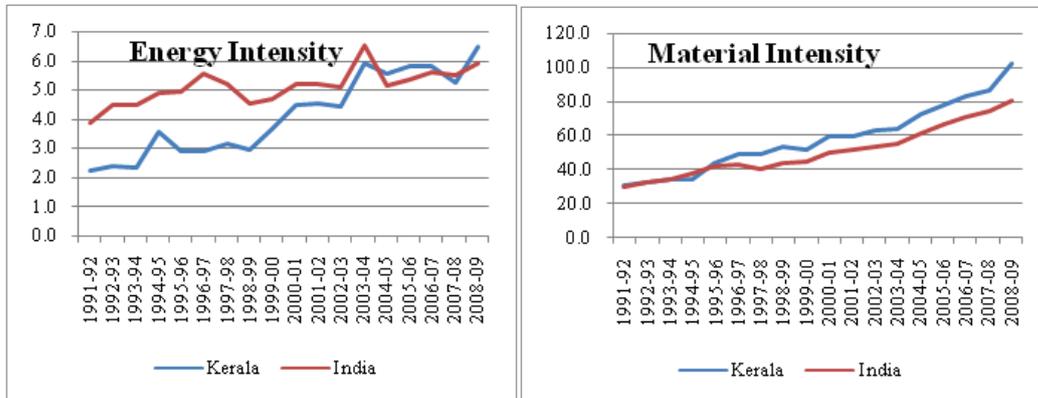


Source: *Indiasat.com*

## 8.2.9 Environmental implications

8.2.9.1 Considering the fact that the industrial structure of Kerala has been skewed in favour of the resource-intensive industries, the material intensity of Kerala's industry sector has been higher than the national average (Figure 8.13). Likewise, it may be seen that Kerala's advantage in energy intensity is also reducing (Figure 8.13). High material and energy intensities have environmental implications for Kerala. Further, the State also has a severe problem of solid waste management. Industrial firms have been one of the major sources of waste generation, polluting the environment further. The Greater Kochi Area (GKA) ranks 24th (with Comprehensive Environment Pollution Index (CEPI) score of 75.08) among the critically polluted areas (CPA) in the country.<sup>11</sup> The main pollution sources of concern are industries, municipal solid waste, biomedical waste, e-waste and domestic waste.

**Figure 8.13**  
**Material and Energy Intensities of Manufacturing in the Factory Sector: Kerala and National Average (1991–92 to 2008–09)**



*Note: Energy Intensity is only available till 2007–08*  
*Source: Annual Survey of Industries*

## 8.3 Opportunities

8.3.1 The State enjoys 'revealed comparative advantage' among Indian states in selected three-digit industries. These are provided in Table 8.4. Most of them are resource-based. More important to note, however, is that it also has a comparative advantage in some knowledge-intensive electronic and electrical components industries, such as electronic valves and television and radio. This provides the State with opportunities to expand its base in technology-driven segments of the industry by building on this.

**Table 8.4**  
**Revealed Comparative Advantage based Classification of three-digit Industries in Kerala**

Industries with Revealed Comparative Advantage (RCA)	Industries which do not have Revealed Comparative Advantage
Food Processing, Tobacco, Other Textiles, Wood, Printing & Publishing, Refinery & Petroleum Products, Basic Chemicals, Rubber Products, Fabricated Metals, Electronic Valves, Television & Radio, Instruments & Appliances, Repair of Boats & Ships.	Beverages, Knitted and crocheted fabrics and articles, Spinning, Weaving and finishing of textiles, Wearing apparel, Leather, Paper and paper products, Other chemical products, Plastic products, Glass and glass products, Non-metallic mineral products n.e.c, Basic precious and non-ferrous metals, Structural metal products, Reproduction of recorded media, Coke oven products, Man-made fibres, Basic Iron & Steel, Casting of metals, General purpose machinery, Accumulators, primary cells and primary batteries.

*Source: NCAER's calculations based on Annual Survey of Industries*

## Mega projects

8.3.2 The state government has initiated several mega projects to kickstart industry:

- Integrated Petroleum, Chemicals and Petrochemical Investment Regions (PCPIRs) spread over an area of 10,000 acres.
- Kochi-Palakkad National Investment and Manufacturing Zone (NIMZ) for Rs 53,825 crore, spanning a large area covering Ernakulam, Thrissur, Malappuram and Palakkad districts. It proposes to establish industrial and commercial establishments across 20 identified nodes.
- Electronic Park with infrastructure development at a cost of Rs 336 crore and land cost of Rs 750 crore over 334 acres at Amballur village in Kochi.
- The Rs 2,000 crore Supplementary Gas Infrastructure Project by Kerala Gail Gas Limited (KGGL). KGGL will take up initiatives including city gas distribution, CNG stations for KSRTC buses, establishment of a gas training institute, laying of spur lines from GAIL's main pipeline and setting up of gas-based small power generating plants.
- The Kochi Metro Rail.
- A Rs. 320 crore oceanarium project through public-private-partnership (PPP) in Kochi on 36.5 acres of land.

8.3.3 In addition, the Vizhinjam International Deep Water Multipurpose Seaport, the Monorail Project in Thiruvananthapuram and Kozhikode, the Indian Institute of Information Technology, Kottayam, seaplane services in Kerala, gas-based power project at Cheemeni and Suburban Railway Corridor Project are some of the other projects that are in the pipeline. These projects will offer rich opportunities for industries to grow in the State.

8.3.4 Keeping in view the challenges and opportunities, a strategic framework has been proposed for the sustainable development of manufacturing in the State.

## 8.4 Vision, Mission and Objectives

### 8.4.1 Vision

8.4.1.1 To establish Kerala as one of the most competitive locations for business investments in Asia. Kerala will develop an industrial sector that is:

- Dominated by high value-added activities
- Innovation driven
- Socially and environmentally sustainable

### 8.4.2 Mission

8.4.2.1 "Sustainable industrial prosperity."

### 8.4.3 Strategic goals

#### 8.4.3.1 Economic:

- Increase the share of manufacturing from 8 per cent to 10 per cent of GSDP by 2030.
- Shift the structure of industry from resource-driven to efficiency-driven over the next 20 years and, further, to innovation-driven by 2040.

### 8.4.3.2 Social:

- Reduce the share of the informal sector in total manufacturing to 20 per cent from 56 per cent to achieve developed countries' standards.
- Promote sustained employment in manufacturing.

### 8.4.3.3 Environment:

- Save energy per unit of production by 10 per cent.
- Reduce, recycle and reuse 60 percent of industrial waste by 2030.

## 8.5 The Strategic Framework

8.5.1 The central idea is to achieve sustainable industrialisation. This calls for a strategy that sets out the path for a development model that will balance economic prosperity, environmental stewardship and social sustainability. Also, there is a growing recognition that social and environmental sustainability are significant components of, and complements to, economic performance. Hence, they need to be properly integrated with the objective of accelerating industrial growth to drive it towards higher levels of sustainable prosperity. The four pillars of the new industrial strategy will be as follows:

### 8.5.1.1 Strategic Elements and Action Plan

#### Pillar 1: Industrial Prosperity

Action Plan 1: Focus on restructuring industry towards high knowledge intensity

#### Prioritise high knowledge activities

8.5.1.1.1 Promotion of industries on the basis of existing comparative advantages is not the best approach. Comparative advantage is not a static phenomenon; it changes over time. The focus in Kerala's industrial planning will be on continuous upgrading of industry, from a low value-added, resource-driven economy to a high value-added, innovation-driven economy. It will not mean focusing on industries producing knowledge-based goods alone. Rather, it means an increase in the knowledge intensity of industrial production. This can be achieved by promoting both new technology for existing products and new, knowledge-intensive industries. The industrial policy, instead of prioritising industries will, therefore, adopt a more dynamic approach of targeting activities and products/services. Under the new industrial strategy, interventions will be targeted at three sets of activities:

- All new products/technology in both the non-traditional and traditional/established industries.
- All start-ups in nascent non-traditional sectors/industries to encourage imitative entry to promote industry growth.
- New industries.

8.5.1.1.2 The new industrial strategy will be to encourage the diversification of the industrial structure by promoting innovative (not necessarily new) and non-traditional industrial projects and upgrading the traditional industries.

#### Diversify the industrial structure

8.5.1.1.3 The State, by making full use of its current resources, infrastructure and ports, will promote existing industries, such as petrochemicals, agro-processing and shipbuilding, and at the same time will speed up the development of the equipment-manufacturing industry. It will make breakthroughs in five key areas:

- Nuclear power equipment
- Environment-related equipment and services
- Wind power equipment
- Major equipment for power transmission and transformation
- Ocean engineering equipment

8.5.1.1.4 The objective will be to forge a world-class manufacturing base for major sets of equipment. The non-mineral raw materials used by the electrical machinery industry and equipment are available within Kerala (as discussed above) and can be leveraged.

8.5.1.1.5 In services, it will promote tourism (See Chapter 3) and ICT (See Chapter 4) and lay the foundations of:

- Logistics industry
- Environment services
- Financial services
- R&D services

8.5.1.1.6 Kerala will thus develop into a globally important belt for high-tech industries by rapidly enhancing its core competitive strengths in high-tech activities.

### Design an appropriate incentive structure

8.5.1.1.7 A well-designed incentive structure will be a key element of the industrial policy. The incentive structure will be based on the carrot and stick strategy. Under the policy, 'carrots' in the form of subsidy or protection or tax incentives or venture capital will be offered to investors in new industries and to those with new ideas. These economic rents will, in turn, be subject to performance requirements, which will act as a 'stick'. The idea will not be to choose the winners, but to choose the potential winners. Failure will be allowed, but not to use up the economy's resources indefinitely.<sup>12</sup> The policy will ensure that bad projects are phased out. East Asian industrial policies have typically had both elements. South American industrial policies, typically, have used too much of the carrot and too little of the stick, which explains why South America has ended up with much inefficiency alongside some world-class industries.

8.5.1.1.8 An extreme form of incentives are investment guarantees on new ideas and new products. This means that if the project fails, the government will make up the entire amount spent by the investor. The South Korean government used this as a tool to promote new industries. Since this has the potential of being misused, its use may be restricted to certain new industries.

### Action Plan 2: Improve economic efficiency

8.5.1.1.9 Business environment and freedom determine the institutional environment, which has a strong bearing on competitiveness and growth. However, institutional environment is only one set of factors that determines competitiveness. Competitiveness is a much broader term that covers the set of institutions, policies and factors that determine the level of productivity of an economy that is a fundamental driver of its growth rate. The World Economic Forum has identified 12 pillars of competitiveness.<sup>13</sup> These are grouped into three categories: basic requirements, efficiency enhancers and innovation and sophistication promoters. Some of them can be addressed directly as part of industrial planning. These can be regrouped into four broad categories:

- Business regulations: Legal and administrative framework, labour market efficiency and good market efficiency.
- Infrastructure
- R&D
- Financial development

## Improving legal and administrative framework

8.5.1.1.10 Improving the legal and administrative framework within which individuals, firms and governments interact to generate wealth is a key element of the new growth strategy. A growing body of research has traced the effects of simpler business regulations on an accelerated pace of new business creation. There is a high correlation (0.83) between the Doing Business rankings and the rankings on the World Economic Forum's Global Competitiveness Index.<sup>14</sup>

8.5.1.1.11 The ease of doing business does not mean fewer (or no) regulations. Rather, it means having rules that facilitate interactions in the marketplace without needlessly hindering the development of the private sector. It is proposed here that the State should adopt SMART (Streamlined, Meaningful, Adaptable, Relevant and Transparent) business regulations. A growing body of research, which revolves around business entry rules, shows that simpler entry regulations encourage the creation of more new firms in the formal sector. These studies have confirmed the positive association between improvements in business registration and registration of new firms in such countries. More specifically, these studies have reported increases of 5–17 per cent in the number of newly registered businesses after reforms of the business registration process.<sup>15</sup> Where regulation is particularly onerous, levels of informality tend to be higher. Informality comes at a cost. Compared to their formal sector counterparts, firms in the informal sector typically grow more slowly, have poorer access to credit and employ fewer workers—and these workers remain outside the protection of labour law. Some of the good practices adopted worldwide (Table 8.5) may also be considered by Kerala.

**Table 8.5**  
**Good Practices Around the World**

Topic	Practice
Making it easier to start a business	Putting procedures online Having no minimum capital requirement Having a one-stop shop
Making it easier to deal with construction permits	Having comprehensive building rules Using risk-based building approvals Having a one-stop shop
Making it easy to obtain an electricity connection	Streamlining approval processes Providing transparent connection costs and processes Reducing the financial burden of security deposits for new connections Ensuring the safety of internal wiring by regulating the electrical profession rather than the connection process
Making it easy to enforce contracts	Making all judgments in commercial cases by first-instance Maintaining specialised commercial court, division or judge Allowing electronic filing of complaints
Making it easy to get credit	Legal rights such as allowing out-of-court enforcement*, allowing a general description of collateral, maintaining a unified registry Credit information Distributing data on loans below 1 per cent of income per capita Distributing both positive and negative credit information Distributing credit information from retailers, trade creditors or utilities as well as financial institutions
Making it easy to pay taxes	Allowing self-assessment Allowing electronic filing and payment Having one tax per tax base
Making it easy to trade across borders	Allowing electronic submission and processing of documents Using risk-based inspections# Providing a single window

*Note: \*In Latvia, in 2009 further amendments to the insolvency law introduced a mechanism for settling insolvencies out of court to ease pressure on the judiciary. As a result of these reforms, the recovery rate for creditors rose from 32 cents on the dollar to 56 between 2010 and 2011, leading to the biggest improvement in the ease of resolving insolvency worldwide according to Doing Business 2012.*

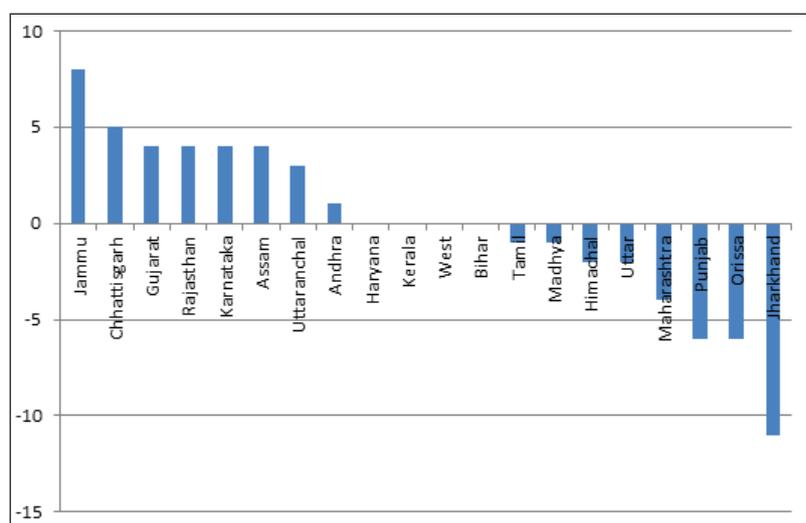
*# Risk Based Inspection (RBI) is a system for establishing risk profiles that allow custom officers to apply physical inspections in proportion to the potential risk of consignments.*

*Source: World Bank and International Finance Corporation. 2013. Doing Business 2013: Smarter Regulations for Small and Medium Size Enterprises. World Bank, Washington D.C., USA.*

## Improving business freedom

8.5.1.1.12 The Economic Freedom Index 2012, as developed by eminent economists of India,<sup>16</sup> ranks Kerala 10th among 20 Indian states.<sup>17</sup> In a more disaggregated analysis, Kerala fares rather poorly in terms of regulation of labour and business, followed by the size of government. The relative ranking in terms of the former is 15 while it ranks at 12 in terms of the latter. Kerala's improvement has been quite marked in terms of legal structure and property rights between 2005 (13) and 2011(6). Also, there has been a significant decline in the cases under economic offence. Overall, however, Kerala's ranking is stable over time. The Indian states that have improved their ranking between 2005 and 2011 are Jammu and Kashmir, Chhattisgarh, Gujarat, Rajasthan, Karnataka, Assam, Uttaranchal and Andhra Pradesh (Figure 8.14).

**Figure 8.14**  
**Improvement in rank ladder in Business Freedom Index of Indian States: 2005 and 2011**



Source: Debroy, B., Bhandari, L., Aiyar, S.S.A. and A. Gulati. 2013. Economic Freedom of the States of India 2012. Friedrich-Naumann-Stiftung für die Freiheit, Cato Institute and Indicus Analytics. Academic Foundation, New Delhi, India

8.5.1.1.13 International ranking in terms of Economic Freedom Index<sup>18</sup> indicates that Singapore is the 2nd freest country in the world in 2013. The foundations of economic freedom in Singapore are firmly sustained, with strong protection of property rights and effective enforcement of anti-corruption laws. The government is very efficient, with competitive tax rates and low government expenditure. The regulatory environment is flexible and transparent, encouraging vibrant commercial activity. The industrial strategy of Kerala will be to benchmark the State against the top Indian states in the short term and Singapore in the long term in economic freedom. This requires reforms in the system and continuous monitoring of their implementation (See Chapter 24 on Governance).

## Creation of State Investment Board

8.5.1.1.14 The government's responsibility for improving the investment climate in Kerala will be entrusted to the State Investment Board, which may be created by reorganising the existing administrative machinery with the following features:

- This Board will be joined by multiple agencies currently responsible for promoting industrialisation in the State. These agencies will be restructured with clear-cut responsibilities.
- It will be chaired directly by the Chief Minister.

- This institution will also have representation from the private sector and will be responsible for advising policymakers on making policy, its implementation, granting approvals and monitoring the policy.
- Under the Board, a 'Business Environment Unit' will be established. This unit will be responsible for spearheading the State's reform initiatives. It will comprise representatives from different ministries.
- This unit will be made up of working groups focusing on business entry, legislative changes, state taxes and trade logistics, construction permits and property registration. This task force will have representation from the private sector. The working groups will identify the reform opportunities, advise the steering committee and monitor the progress.

## Infrastructure

8.5.1.1.15 Extensive and efficient infrastructure is critical for ensuring the effective functioning of the economy. It is an important factor in determining not only the location of economic activity, but also the kinds of activities or sectors that can develop in a particular instance. India ranks 84 in terms of infrastructure development, with a score of 3.6 in a group of 185 countries.<sup>19</sup> Within India, according to a State Competitiveness Report of the Institute of State Competitiveness,<sup>20</sup> Kerala ranks 16 of 29 Indian states in physical infrastructure and 15 in terms of communication infrastructure.

8.5.1.1.16 It is proposed that the new industrial policy benchmarks the quality of infrastructure against Singapore, which has world-class infrastructure, with excellent roads, ports and air transport facilities. Public-private partnerships (PPPs) will play an important role in infrastructure delivery. The PPP legal framework will be consistent with international best practices. It will be efficient, stable and consistent. The leading international example for government institutional regulation in PPP procurement and utilisation is the Private Finance Initiative (PFI) in the UK. This system, which has been in place and is constantly evolving since 1992, has been a world pioneer in regulating PPPs, and dozens of countries have since modelled their PPP frameworks on the PFI system. India itself is a leading PPP market, with 758 projects worth Rs 3,833 billion awarded as of 2011. The top five states — Gujarat, Andhra Pradesh, Karnataka, Maharashtra and Uttar Pradesh (UP) — account for over 58 per cent of the total value of PPP. Andhra Pradesh is the leading state in terms of both number and value of PPP. It is also the first state to lay down the Infrastructure Development Enabling Act, 2001, which provides guidelines for PPP projects. All the five states have their own elaborate legal framework and administrative machinery in place to implement PPPs.

8.5.1.1.17 It is proposed that Kerala should have an Infrastructure Development Policy and an Infrastructure Development Board, which will have representatives of the State Investment Board in its management. The board will also be responsible for land acquisition policies and their implementation.

## Agglomerations

8.5.1.1.18 There has been an explosion of clusters and cluster policies throughout Asia, particularly in East and South East Asia, with China, Korea, Thailand, Malaysia and Japan achieving spectacular success. There has been a transformation of the traditional systems of activities or industrial districts to new networks ready for global competition and innovation. Of late, these economies have witnessed the development of new agglomerations or scientific knowledge clusters. The Kerala government has already adopted the cluster development approach for industrialisation to reap the benefits of agglomerations. However, it is yet to show results.

8.5.1.1.19 Kerala will benchmark its industrial clusters against those of China and Japan. In both these countries, clusters have been instrumental in driving growth. While Japan adopted the 'One Town One Product' (OTOP) programme, which develops local specialty industries with city and township as units,<sup>21</sup> China carried that model forward to:

- One village one product
- One town one industry

8.5.1.1.20 Kerala can draw useful lessons from the Chinese experiments with cluster-based industrialisation. (Box 8.1)

### Box 8.1 Cluster Branding in China

A cluster economy is made up of professional towns and villages, functioning as production hubs focusing on one product/industry and creating highly specialised large clusters. In China, the cluster policy focuses on branding clusters on the basis of their speciality. These are, for instance, Shengze textiles, Wujiang Hengshan sewing machines, Ningbo costumes, Wenzhou shoes, Shaoxing synthetic textiles, Haining leather coats, Yiwu small commodities, Yongkang hardware and so on. Small firms in the cluster are those employing up to 300 workers and medium ones have 300 to 2,000 workers. Most clusters are developed in such way that they have entire value chains within the cluster. Each firm is specialised and is connected with other firms through production networks. This increases efficiency and survival rate and reduces cost. These clusters, thus, have strong forward and backward linkages through value chains.

In addition to product, upstream and support industries, there are banks, insurance firms, transport firms, customs administration, administration departments, research institutions, and labs. Several clusters have their own logistic business centres, loading dock, warehousing and parking lots. Close to Wenzhou shoe cluster, for example, a large industrial complex — the 'Chinese shoe capital' — has been set up with integrated facilities. A peculiar feature of cluster development in China is that specialised formal markets are developed close to the cluster to bring suppliers, producers, sellers and buyers together to help build the forward and backward linkages. These are developed simultaneously with cluster development or have even kick started the development of a cluster. They offer materials and products, and are constructed and managed by local towns, government departments or private firms. Regulations for types of investment and quality control are strictly enforced. There is a quality control centre in each province that serves several clusters. There are provisions for fines and discontinuation of production in case of substandard production quality. Clusters have their own innovation centres and technology consultancy firms. Support from public innovation facilities and academic institutions is also provided. For instance, Wenzhou shoes cluster is linked with Wenzhou University for testing, technology development, environment management and pollutant treatment; Dongguan IT cluster benefits from its association with Shanghai University and Hong Kong Polytechnic University. There are several incentives to encourage efficiency and punishments for non-performance.

*Source: Zeng, D.Z. 2010. Building Engines for Growth and Competitiveness in China: Experience with Special Economic Zones and Industrial Clusters. World Bank, Washington D.C.*

## Mining

8.5.1.1.21 A sustainable development framework needs to be developed for mining. The motto should be 'Sustainable Mining: Whole Mine, Whole Community, Whole Planet through Industrial Ecology and Community-based Strategies'.<sup>22</sup> Countries like Australia and Sweden are all going towards adopting sustainable mining strategies. Kerala can lead the way for the rest of India by adopting a sustainable development framework in this sector, which includes<sup>23</sup>:

- A mining and minerals industry in harmony with the environment, cultural values and other business activities.

- Greater resource efficiency:
  - A database of mineral resources needs to be developed along with GIS maps and other latest technology.
  - Survey and analysis of the extraction and recycling potential of assets.
  - Land use planning. Spatial strategy for determining mining areas using the database mentioned earlier in this section is needed.
- Better dialogue and synergy with other industries.
  - Co-location (shared use of sites for mixed functions) or mining clusters/ special zones to be encouraged for zero emissions. Local land use planning is then needed.
  - Manual for consultation between various stakeholders.
- Mining communities with attractive natural and cultural environments.
  - Develop, compile and disseminate examples of how the cultural environment in the mining areas can be utilised by the mining and tourism industries.
  - Dialogue, cooperation and innovation to promote growth.
- Promotion of societal development and regional growth:
  - Programme for exchange of knowledge and experiences and coordination when new large-scale mines are being established.
  - Manual for municipalities where mines are to be established.
  - Review of obstacles preventing an increase in housing production to meet the expansion of the mining industry.
  - Methodology for regional material supply planning.
- Clearer distribution of responsibility and better flow of information among actors in the industry:
  - A clearer and more effective regulatory framework.
  - Infrastructure investments.
  - An innovative mining and minerals industry with an excellent knowledge base — biometric subject review, explore increased interaction between academia and industry.
- Research and innovation that creates competitiveness and growth.
- Skills supply that meets the needs of the industry and region:
  - Increase knowledge about the role of geology in society and highlight the industry as a workplace.
  - State level skills platforms are to draw up plans on how to develop the long-term skills supply.

## Promotion of logistics hubs

8.5.1.1.22 It is suggested that Kerala promote hub-type modern logistics parks, including those at ports, and improve infrastructure as an accessory to the modern logistics industry. The objective is to cement the State's role as a centre for international commerce. Kerala's geographical location is a major advantage, which it has not yet leveraged. The logistics hub is a physical facility, which is operated by logistics service providers (LSPs) and focuses on management of physical logistics operations, including shipment consolidation, warehousing, transportation, packing, collaborative replenishment and tax-bonded warehousing. The functional goal of the hub is to integrate supply chain resources, provide real-time material supply, ensure information transparency, improve logistics efficiency and increase customer service quality.

8.5.1.1.23 Antwerp, Rotterdam and Dusseldorf are the best logistics hubs in Europe, according to 'Logistic Cities', the latest report by global property consultants Colliers International.<sup>24</sup> Singapore, Malaysia, Taiwan and South Korea have evolved as the economic and transport hub of Asia. These models need to be studied for developing Kerala into a globally integrated logistics hub.

## Marketing and brand building

8.5.1.1.24 The State will develop a series of specialised conventions and exhibitions with international influences including Kerala Expo, Kerala Hi-Tech Fair, Kerala Small and Medium Enterprises Fair and Kerala International Cultural Industries Fair to create some of the world's premier convention and exhibitions brands and increase the popularity of existing events.

## Regional innovation systems

8.5.1.1.25 The use of technology is key towards achieving the goal of knowledge-driven industrialisation. In general, the State maintains its role as a facilitator and enabler for promotion of innovation and technology, leaving industry and academia to decide what to do; instead of performing a strong leading role in directing R&D, facilitating innovation and its diffusion. However, Kerala is dominated by small enterprises, which, because of their small size, directly depend on state and university support for R&D. The driving force for innovation and technology development can, however, move from a state-led model towards a more integrated approach. Kerala can learn from Taiwan. The Taiwan case has clearly demonstrated a continuum of state-industry-university collaboration, with a growing number of industries/firms in collaborations with the university sector to promote technology/innovation. The new approach for promoting the innovation system will be to:

- Promulgate a 'State Innovation Policy'.
- Develop regional innovation systems by creating supporting R&D institutions and promoting industry-academia linkages in sector-specific industrial parks/estates/SEZs.
- Strengthen industry research and development through the industry value chain.
- Establish venture capital funds.
- Promote a mechanism for incubating and integrating promising research into the commercial realm.
- Enforce strict regulations on research processes.
- Set up high-tech zones in industrial nodes (See Box 8.2 for the highlights of Hsinchu Science park).

### Box 8.2

#### Highlights of Hsinchu Science Park (HSP)

The Hsinchu Science Park (nicknamed Taiwan's Silicon Valley) was created in 1980 to combat brain drain. It has emerged as a 'regional innovation system', which evolved into the major base of high-tech development in Taiwan. The government devised a number of policies to attract firms into the park in the initial stages. These included a five-year tax holiday; a maximum income tax rate of 22 per cent; duty-free imports of machinery, equipment, raw material and semi-finished products; and capitalisation of investors' patents and know-how as equity shares. The government also directly entered industrial production, establishing joint venture companies with private capital.

Many prestigious academic institutions are near the park, such as the Industrial Technology Research Institute, National Tsinghua University, and National Chiao Tung University. All provide high-quality human capital for the science park and valuable on-the-job learning opportunities for employees. The incentives structure has changed over the years. It is currently based on business facilitation. Several top firms line up to enter the park. HSP (653 ha) is full, but there are entries and exits every year. Firms with small R&D (< 2.28% of sales) are asked to leave.

Putting in place an internationally competitive environment for Taiwan's high-tech industry has helped induce an across-the-board upgrade of domestic industry and fostered an expansion of the national economy. In addition to stimulating R&D on the science and technology front, benefits are enjoyed in many other respects — creating clusters of industrial ventures, cultivating talent, bringing prosperity to local communities and enhancing the nation's overall cultural awareness.

Source: World Economic Forum. 2012. Talent Mobility Good Practices: Collaboration at the Core of Driving Economic Growth. [http://www3.weforum.org/docs/WEF\\_PS\\_TalentMobility\\_Report\\_2012.pdf](http://www3.weforum.org/docs/WEF_PS_TalentMobility_Report_2012.pdf)

## Pillar 2: Human Development

### Skill development

8.5.1.1.26 A healthy and educated workforce is vital to a country's competitiveness and productivity. Kerala is at the top among the Indian states in terms of health and education indicators, but it will build on these advantages and improve the quality of higher education and healthcare services. Moving up the value chain beyond simple production processes and products in today's globalising economy requires countries to nurture pools of well-educated workers who are able to adapt rapidly to their changing environment and to the evolving needs of the production system. Staff training and vocational and continuous on-the-job training ensure a constant upgrading of workers' skills. In India, it is estimated that more than 87 per cent of workers have never had vocational training. It has been found that there is a vast mismatch between demand for and supply of skills. In 2005, the 15–29 age group accounted for 27 per cent of the total population, or 289.5 million. Of these, only 11.5 per cent (33.4 million) received any training, formal or informal. But within this 33.4 million, 11.1 million had received (or were receiving) formal training.<sup>25</sup>

8.5.1.1.27 Several proposals have been made to promote skill development in the State in Chapter 10 on Education.

### Entrepreneurship for sustainable development

8.5.1.1.28 In both developed and developing countries, fostering entrepreneurship for sustainable development can improve and create more sustainable consumption and production systems overall. Educating current and potential entrepreneurs enables them to create viable alternatives to existing production and consumption systems, which fail to adequately address sustainability issues such as environmental deterioration along the supply chain and overall quality of life. Entrepreneurial education fosters innovation and helps entrepreneurs build better products, processes and services. It is especially effective when it takes into account the social, economic and ecological complexities of development, the values of sustainability and a long-term perspective.<sup>26</sup> This subject is dealt with in Chapter 12 on Entrepreneurship. The University Grants Commission has started a scheme for setting up Innovation Universities.<sup>27</sup> The basic objective is to promote innovative ways of learning, sharing and collectively growing within and without. The scheme is meant to support bold and big ideas that require substantial support and flexibility, ideas that usually do not fit into any of the existing patterns of funding and do not, therefore, see the light of the day. The scheme will recognise and support localised as well as general innovation. In developed countries, innovation and entrepreneurship are inextricably linked to each other. Box 11.3 in Chapter 11 displays one such example from the University of Michigan, Ann Arbor in the US where students from business, engineering, arts and design work together to develop business ideas. One such idea, which involved recycling waste into useful products, was even commercialised into a mini-business venture.

## Pillar 3: Social Development

### Action Plan 1: Promote socially responsible investment

#### Enforce a social security system

8.5.1.1.29 There are provisions in labour laws for social security systems. In Kerala, social security is offered not only to organised sector workers, but also to unorganised labour. This system calls for some reforms to integrate aspects of competitiveness. It is proposed that the government adopt a comprehensive labour policy with skill development, employability, employment and social security as its components. This is discussed in detail in Chapter 15.

## Strict compliance with providing decent working conditions

8.5.1.1.30 The labour laws contain several provisions for decent working conditions. Kerala already has strong labour unions, which have been instrumental in high wage rates, abolition of child labour and decent working conditions. It is, however, the responsibility of business managers to realise the importance of human capital in business sustainability. The government must, therefore, ensure through regulatory mechanisms that the rules on decent working conditions are enforced. It is proposed here to encourage participation of management in labour unions and vice-versa.

## Action Plan 2: Special attention to small and medium enterprises

8.5.1.1.31 The new knowledge-based economy, aided by the application of the Internet, e-commerce and ICT, will provide small and medium enterprises (SMEs) with a new operating model and enhance the speed and efficiency of business operations. To exploit these opportunities the State should develop a Micro, Small and Medium Enterprise (MSME) Policy. Chapter 9 details the strategy for this sector.

## Action Plan 3: Design special policies for backward regions

8.5.1.1.32 The new development strategy proposes to set up 'Enterprise Zones' in backward regions. An Enterprise Zone is a specific geographic area intended for economic revitalisation. Enterprise Zones stimulate economic growth and investment in backward areas by providing communities with an economic development tool, which offers state and local incentives to existing, new or expanding businesses in these designated areas. The purpose of these zones is to encourage job creation and capital investment in areas of economic distress. They offer strong financial incentives to local authorities and communities to support and encourage local housing and growth. These include:

- Tax credit on qualified machinery and machinery parts.
- Other tax benefits at the state level.
- Preference points in state contracts to Enterprise Zone companies.

8.5.1.1.33 A Regional Growth Fund may be created to give further help to areas where there are particular challenges or opportunities for local growth. These zones will be between 50 and 150 acres. Firms need to be given plug-n-play facilities at highly subsidised rates. Start-up firms may be given priority in these zones. The government will ensure that Enterprise Zones help support real additional growth and create new businesses and new jobs in targeted activities to contribute to building of competitive strengths. These activities will include:

- Manufacturing
- Services, including education in specialised areas (for instance, agriculture, traditional branches of knowledge, bio-tech)
- Innovation

8.5.1.1.34 This model of regional growth was introduced in the UK in the late 1960s. In view of its success, it has been adopted and implemented by other developed countries in Europe and other regions. The US also has a large number of enterprise zones.

## Pillar 4: Environment

8.5.1.1.35 The manufacturing sector generates a number of environmental pressures as listed below:

- Contribution to solid waste through non-degradable packaging material and limited recycling facilities.
- Production of solid and liquid waste from manufacturing processes.
- Worsening of air pollution, particularly in urban areas.

Table 8.6 shows the strategic policies that can be adopted for green development in the State.

**Table 8.6**  
**Strategic Policies for Green Development**

Policy	Impact
Adopt 4-R Policies	Conserve Resources
	Recycle the waste generated
	Recover the useful material
	Reuse them
Promote sustainable production and consumption patterns	Encourage the use of green products through relevant institutions
	Incentivise the production of environment friendly products
Expand the green sector	Encourage investment in green goods and services
	Encourage green sector R&D

*Source: Conceptualised by NCAER.*

### Action Plan 1: Adopt 4-R Policy: Reduce, Recover, Reuse and Recycle

8.5.1.1.36 Shift from end-of-pipe approach to cleaner production approach for mainstreaming environment

8.5.1.1.37 Dealing with pollution resulting from human activity, particularly in industry and agriculture, after it has been generated (the so-called end-of-pipe approach) is costly and quite often ineffective. Cleaner production (CP) is the continuous application of an integrated preventive environmental strategy to processes and products to reduce risks to humans and the environment (Table 8.7). It is a system to increase eco-efficiency and to reduce risks for humans and the environment. The Government of Kerala will, therefore, minimise behaviours and practices that lead to the exclusive application of end-of-pipe technologies and encourage the use of CP in industrial production.

**Table 8.7**  
**The Clean Production System**

For Production Processes	For Products	For Services
<ul style="list-style-type: none"> <li>To reduce the consumption of raw materials and energy used in the production of one unit of product</li> <li>To eliminate, as far as possible, the use of toxic and dangerous materials</li> <li>To reduce at source the quantity and toxicity of all emissions and wastes generated and released</li> </ul>	<ul style="list-style-type: none"> <li>To reduce the environmental, health and safety impacts of products</li> <li>Over their entire life cycles</li> <li>From raw materials extraction through manufacturing and use, to the</li> <li>Ultimate disposal of the product</li> </ul>	<ul style="list-style-type: none"> <li>To incorporate environmental concerns into designing</li> <li>To reduce waste through better design and delivering services</li> <li>To use waste for new products</li> </ul>

*Source: Conceptualised by NCAER*

8.5.1.1.38 The training kit for the development of CP policies is designed by UNIDO under its cleaner production programmes, with crucial aspects of CP planning and CP policy development. A training

kit is also available that facilitates the organisation of modular interactive seminars on CP policy development, trends and instruments. Cleaner production requires changing attitudes, responsible environmental management and evaluating technology options. The strategy to promote sustainable production is now adopted worldwide and is applied in different ways.

8.5.1.1.39 Companies also need to be encouraged to design more environment-friendly products. Further, they are either required or encouraged to conduct CP auditing. For heavily polluting enterprises, CP should be obligatory. Companies can be labelled 'green' in the public disclosure system by eliminating out-dated technology and equipment and reducing resource consumption and pollution discharges, showing that they are environment-friendly enterprises.

### Make it compulsory for corporations to declare their green action plans

8.5.1.1.40 It should be made compulsory for large corporations to declare their green action plans and make them available in the public domain. Currently, many international companies have adopted this strategy as part of their corporate social responsibility. For instance, Apple's commitment to the environment includes finding the most efficient ways to reuse or recycle electronic equipment at the end of its useful life, including the iPhone, iPad, Mac or PCs and displays from any manufacturer. Whether it's an iPhone, iPad, Mac or PC, working or not, the company takes it and determines if it qualifies for reuse and has a monetary value. If it does, the amount will be credited directly into the bank account of the seller. If it doesn't, it is recycled. Ford's 'reduce, reuse and recycle' commitment is part of the company's broader global sustainability strategy to reduce its environmental footprint while at the same time accelerating the development of advanced, fuel-efficient vehicle technology around the world. These efforts need to be institutionalised and made compulsory.

### Develop recycling and waste management industry

8.5.1.1.41 There are abundant opportunities available to take advantage of recycling potential due to more efficient and effective separation techniques, recycling technology and technology to facilitate collection (Box 8.3).

#### Box 8.3

#### Recycling and Reusing: The European Initiatives

Metals ranging from gold to cobalt to rare earth elements such as neodymium are used in electronic equipment, including phones, laptops, headphones, rechargeable batteries and TVs. Most new energy-efficient lighting systems contain rare earths (compact fluorescent lamp, LED, plasma display, LCD display). Substitution is rare, particularly for compact fluorescent lamps. Recycling e-waste is one way to help alleviate the shortage of rare earth material. It is estimated that between now and 2020, the UK will throw away 12 million tonnes of electronic equipment, a quarter of which will be IT equipment and other goods which contain around 63 tonnes of palladium and 17 tonnes of iridium.

The amount of palladium lost would be worth £1 billion in today's market, while the iridium would be worth £380 million. The European Union recently enacted new e-waste recycling rules requiring member states to recycle 45 per cent of all electronic equipment sold, starting in 2016, rising to 65 per cent by 2019. The resource security action plan will provide £200,000 for businesses to come up with new ways of reusing or recycling precious metals and developing new products.

The dependency on foreign resources and uncertainty in their supply will be reduced by supplying the European market with secondary rare earth materials.

*Source: Department of Environment, Food and Rural Affairs. 2012. Golden business opportunity hidden in consumer goods. <https://www.gov.uk/government/news/golden-business-opportunity-hidden-in-consumer-goods>.*

*March 16.*

## Reusing

8.5.1.1.42 There needs to be a policy strategy specifying comprehensive utilisation of:

1. Fly ash, gangue, tailing, lean material, scrap material, exhaust gas and other industrial wastes.
2. Construction wastes.
3. Recycled urban and rural household garbage.
4. End-of-life motor vehicles, mechanical products and machine tools and renovated tyres.

### Action Plan 2: Develop eco-friendly parks

8.5.1.1.43 Develop an eco-industrial network that will benefit both regional production systems and environmental protection. Approaches include, but are not limited to, energy cascading, sharing of local infrastructure and exchanging by-products and recycling waste. The development of eco-industrial parks (EIPs), a typical practice at this level, is very popular in China. More than 100 industrial parks claim to be EIPs, of which about three-quarters have been planned by environmental professionals focusing on the recycling principle. The others were planned by local governments with the help of professionals in chemical engineering, management science, engineering and sociology.

8.5.1.1.44 At the macro level, the development of the eco-city, eco-municipality or eco province is one of the most prominent environmental movements in China. Both sustainable production and consumption are key elements at this level. In China, the difference between the notion of an eco-city and that of an EIP is that eco-cities focus on both production and consumption activities, whereas an EIP focuses on production activity, especially industrial production. Efforts at all levels include the development of resource recovery enterprises and public facilities to support realisation of the recycling principle.

8.5.1.1.45 Virtual eco-industrial parks may also be created: "... a region in which industries are not necessarily co-located, but linked through exchange of waste and collaboration at different levels."<sup>28</sup>

### Action Plan 3: Build an institutional set up

8.5.1.1.46 There will need to be an Act to support the 4-R policy of reduce, recover, recycle and reuse. In China, there are several such laws. The first and most significant is the Cleaner Production Promotion Law put into effect in January 2003.<sup>29</sup> The amended Law on Pollution Prevention and Control of Solid Waste, which took effect on 1 April 2005, also supports the development of the 4-R policy; the law is part of the country's growing demand for strict management of solid waste.

### Action Plan 4: Corporate social responsibility

8.5.1.1.47 The environment is believed to have a significant influence on corporate sustainability. In the business context, CSR has emerged as a form of sustainability governance, with advantages for economic, environmental and social progress. In terms of governance through policy implementation, CSR can be practised in a strategic manner with better understanding. A policy framework can be designed using a mixture of regulations, economic instruments and communication strategies, which significantly affect the environmental and social impacts of corporate activities. New modules on social and environmentally responsible management practices need to be introduced in management courses.

8.5.1.1.48 In short, industrial development will be viewed in a holistic and systemic way. The constraints, competitive issues and opportunities are complex and inclusive of different disciplines and require the participation of various institutions, stakeholders and sectors.

## 8.6 Effective Implementation

8.6.1 The possibility of achieving the objectives identified for the industrial strategy for Kerala depends on the effectiveness of the implementation and monitoring processes, as well as the right policies being designed and decided upon.

### Reorganise the existing administrative machinery

8.6.2 An elaborate administrative system is in place to promote industrialisation in the State. The Department of Industries and Commerce is the apex government body, which is responsible for promoting/sponsoring, registering, financing and advising industries in the State. It is assisted by three parallel departments — Directorate of Industries and Commerce, Directorate of Handlooms and Directorate of Coir. In addition, there are several public sector agencies to assist industrial units by providing financial assistance, infrastructure and training/consultancy services. While some aim at infrastructure development, others focus on enabling services such as finance, marketing and technology development.

8.6.3 This structure may be reorganised to implement the industrial strategy proposed here, after consultation with stakeholders. Some of the best organisational strategies have been provided in Figure 8.15. Examples of organisational arrangements for industrial formulation and implementation are shown in Table 8.8.

**Figure 8.15**  
**Administrative and Supporting Infrastructure for the Industrial Sector**



*Note: CMD is an autonomous institution*

*Source: Relevant Web sites*

**Table 8.8:**  
**Alliance between Leadership and Technocrat Team in East Asia**

Country (period)	Leadership Type	Technocrat Teams	Development & Industrial Vision Formulation
Japan (late 1950s–70s)	Organisational leadership	MOF, EPA, MITI (super-ministry for industrial policy)	Economic and physical plans for vision sharing; industry-specific policies
S. Korea (1960s–70s)	Strong personal leadership	EPB (super-ministry)	5-year plans and plans for targeted industries
Malaysia (1980s–90s)	Strong personal leadership	Prime Minister's Dept. esp. EPU (super-ministry)	Vision 2020, 5-year plans; and Industrial Master Plans (IMP)
Thailand (1980s)	Organisational leadership	Core macro-economic agencies (no super-ministry)	5-year plans; no industry-wide plan (except after financial crisis)

*Source: Ohno, I. 2009. Organisational Arrangements for Industrial Policy Formulation & Implementation: Examples from East Asia. Powerpoint Presentation. GRIPS Development Forum. [http://www.grips.ac.jp/forum/af-growth/support\\_ethiopia/document/Sep09\\_ET%20organization\\_5.pdf](http://www.grips.ac.jp/forum/af-growth/support_ethiopia/document/Sep09_ET%20organization_5.pdf). September.*

## Promoting mutual trust between government and business through partnerships

8.6.4 It is important to establish high-level cooperation between the public and private sectors. This requires:

- Large volume of high quality information flow between government and business.
- Government initiatives in operational management of policy networks and monitoring.
- Existence of mutual confidence and credible commitments.
- Evolving nature of government-business coordination, as the private sector grows.
- Moving from government-led to private sector-led mechanisms for resolving specific problems.

## 8.6.5 Mechanism to frequently review and flexibly adjust policy implementation

- Inter-ministerial coordination mechanism.
- Devise centralised coordination mechanism and instruments.
- Deliberation councils, steering committees (national, sectoral), working groups and special task forces.
- Government-business forums, industry and function-specific 'institutes' and so on.
- Devise special mechanisms to implement and review high priority programmes.
- Experiential learning from East Asian countries.

## 8.6.6 Mechanism for evaluation and monitoring

Every six months, an evaluation/monitoring report will be prepared in order to assess progress. These reports will be presented to a specially constituted Monitoring and Steering Committee. The evaluation and monitoring process of the strategy's actions and targets will cover design, implementation and outcomes. Apart from assessing achievements, it will also look into:

- The reasons for failures and success.
- The sustainability of achievements.

The results will be fed back into policymaking, helping to improve the government's ability to respond to future challenges in the manufacturing sector.

## 8.7 Conclusion

8.7.1 The new industrial strategy requires institutionalised and sustained cooperation between all key stakeholders in its design and implementation. It is based on an integrated framework, which incorporates economic, social and environmental dimensions. The underlying principle is the promotion of sustainable manufacturing driven by knowledge, innovation and competitiveness. It will focus on expanding and upgrading existing industries and nurturing new industries. It requires a well-designed incentive structure in place. However, support to entrepreneurs should not result in the protection of unviable activities. Support should be withdrawn from below average performers and shifted to more promising, dynamic and innovative industrial activities. Support to high performers should be limited in time and based on performance. Further, it requires the government to identify the bottlenecks and initiate interventions that will guide the economy to sustainable industrial prosperity. Finally, the strategy requires continuous learning, which, in turn, calls for coordination mechanisms, capacity building in government and evaluation mechanisms.

### Reference

- <sup>1</sup> *Industry comprises of establishments engaged in manufacturing, construction of buildings or engineering projects, mining and quarrying, and providing utilities (gas, electricity and water).*
- <sup>2</sup> *The Output Multiplier can be defined as the total increase in output for every unit increase in final demand of a particular sector. In the instance of backward linkage, use of a particular commodity induces demand for increased production of inputs which in turn require second stage inputs. These second stage inputs would require further inputs. The geometric progression of "output" at each stage is summed up to obtain the output multiplier effect.*  
*Forward Linkage: On the other hand, an increase in production by other industries leads to an additional output required from industry i to supply inputs to meet the increased demand. This supply function is referred to as "forward linkage" and helps in analysing how a change in the rest of the sectors influences a particular one. An industry with higher forward linkages than other industries means that its production is relatively more sensitive to changes in other industries' output.*
- <sup>3</sup> *Pillai, T.K.V. 1940. Travancore State Manual. Vol. III. Kerala Council for Historical Research (KCHR) Publications.pp.41.*
- <sup>4</sup> *Planning Commission, Government of India.2008.Kerala Development Report.Academic Foundation.*
- <sup>5</sup> *Helper, S., Krueger, T. and H. Wial.Why does Manufacturing Matter? Which Manufacturing Matters?Advanced Industries Series. 1. February.*
- <sup>6</sup> *Skewness is defined as asymmetry in a statistical distribution. Kurtosis is a measure of the "peakedness" of the probability distribution of a real-valued random variable.*
- <sup>7</sup> *Sreekala, K. 1995. Problems and Prospects of Industrialisation and Their Impact on Environment with Special Reference to Kerala: A Gandhian Critique. PhD dissertation submitted to Mahatma Gandhi University, India, 1995.*
- <sup>8</sup> *The reference for this paragraph is Sreekala (1995).*  
*Sreekala, K. 1995. Problems and Prospects of Industrialization and Their Impact on Environment with Special Reference to Kerala: A Gandhian Critique. PhD dissertation submitted to Mahatma Gandhi University, India, 1995.*

- <sup>9</sup> Sreekala (1995) cited the data from this report: Government of Kerala. 1990. Report of the Steering Committee on Industry and Mining 1990. pp.11.
- <sup>10</sup> Only 3.7 per cent of total plan outlay was allotted to industry and mineral in the first plan which increased slowly to 11 per cent by the fifth plan.
- <sup>11</sup> Kerala State Pollution Control Board. 2010. Action Plan for Greater Kochi Area. <http://cpcb.nic.in/divisionsofheadoffice/ess/F-Kochi.pdf>.
- <sup>12</sup> Rodrik, D. 2004. Growth Strategies. Harvard University, August 2004.
- <sup>13</sup> Schwab, K. 2013. The Global Competitiveness Report 2013–14: Full Data Edition. World Economic Forum, Geneva, Switzerland.
- <sup>14</sup> World Bank and International Finance Corporation. 2013. Doing Business 2013: Smarter Regulations for Small and Medium Size Enterprises. World Bank, Washington D.C, USA.
- <sup>15</sup> World Bank and International Finance Corporation. 2013. Doing Business 2013: Smarter Regulations for Small and Medium Size Enterprises. World Bank, Washington D.C, USA.
- <sup>16</sup> Debroy, B., Bhandari, L., Aiyar, S.S.A. and A. Gulati. 2013. Economic Freedom of the States of India 2012. Friedrich-Naumann-Stiftung für die Freiheit, Cato Institute and Indicus Analytics. Academic Foundation, New Delhi, India.
- <sup>17</sup> Kochi remains ranked ten in the Economic Freedom Index 2013.
- <sup>18</sup> The Index of Economic Freedom is an annual index and ranking created by The Heritage Foundation. It measures economic freedom of 185 countries based on trade freedom, business freedom, investment freedom, and property rights.  
Heritage Foundation. 2013. Index of Economic Freedom 2013. <http://www.heritage.org/index/explore?view=by-variables>.
- <sup>19</sup> Schwab, K. 2013. The Global Competitiveness Report 2013–14: Full Data Edition. World Economic Forum, Geneva, Switzerland.
- <sup>20</sup> Institute for Competitiveness. <http://competitiveness.in/wp-content/uploads/2012/01/SCR-2011.pdf>
- <sup>21</sup> Shakya, G. 2011. Understanding One Village One Product in Japan, Thailand and Nepal. Japan International Cooperation (JICA) Nepal Office, Kathmandu, Nepal. September.
- <sup>22</sup> Adapted from Weber, I. 2007.. Actualizing Sustainable Mining: “Whole Mine, Whole Community, Whole Planet” Through “Industrial Ecology” and Community-based Strategies. Salt Lake City, UT: Weber Sustainability Consulting.
- <sup>23</sup> Two references have been used to develop the framework.  
Planning Commission, Government of India. 2013. Twelfth Five Year Plan (2012–17), Economic Sectors; Volume 2. Sage Publications India Pvt. Ltd, New Delhi, India.  
Swedish Ministry of Enterprise, Energy and Communications, Swedish Government. 2013. Sweden’s Minerals Strategy: For sustainable use of Sweden’s mineral resources that creates growth throughout the country. <http://www.government.se/sb/d/2025/a/218986>. June 7.
- <sup>24</sup> Colliers International. 2013. Logistic Cities, a European Comparison. <http://www.colliers.com/en-pl/poland/insights/news/q2-2013/04-06-13-logistic-hubs>. June 4.
- <sup>25</sup> TeamLease and IIJT. 2009. INDIA LABOUR REPORT 2009: A Report: The Geographic Mismatch & A Ranking of Indian States by their Labour Ecosystem. [http://www.teamlease.com/index.php?module=research&event=india\\_Labour\\_Report](http://www.teamlease.com/index.php?module=research&event=india_Labour_Report).
- <sup>26</sup> University of Arizona has started a Centre for Environmentally Sustainable Mining to develop novel technologies in mining: minimise water use and suppress dust generation in mining operations; allow green engineering for environmentally responsible new mine development; create sustainable mine tailings caps; prevent and treat acid rock drainage; allow long-

*term assessment of environmental impacts; assess short- and long-term health risks from contaminated water and air in urban environments near mining operations. Further, a well-trained workforce is key for sustainable mineral resource development. New workers with specialised professional training are critically needed. Just as important is retraining and post-training for workers to ensure that the skills and knowledge required for all aspects of mining, from permitting to health and safety to geology and engineering, are current and can facilitate optimum performance of the mining operation.*

*University of Arizona Web site, <http://superfund.pharmacy.arizona.edu/content/center-environmentally-sustainable-mining-cesm>.*

- <sup>27</sup> *University Grants Commission Website. [http://www.ugc.ac.in/pdfnews/3155745\\_InnovationUniversity.pdf](http://www.ugc.ac.in/pdfnews/3155745_InnovationUniversity.pdf).*
- <sup>28</sup> *Cohen-Rosenthal et al. 1996 cited in Fleig, A. 2000. A Strategy towards Industrial Ecology in Developing and Newly Industrialised Countries. Working Paper etc 11. <http://www.giz.de/Themen/en/dokumente/en-eco-industrial-parks.pdf>. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH. ECO-Industrial Parks.*
- <sup>29</sup> *Yuan, Z., Bi, J. and Y. Moriguchi. 2006. The Circular Economy: A New Development Strategy in China. Journal of Industrial Ecology. 10(1–2). 4–8.*

# TRADITIONAL INDUSTRIES: UNLEASHING THE GROWTH POTENTIAL





## Traditional Industries: Unleashing The Growth Potential

### 9.1 Micro, Small and Medium Enterprises (MSMEs)

#### 9.1.1 Overview<sup>1</sup>

9.1.1.1 The Kerala Economic Review 2013 observes that the Micro, Small and Medium Enterprises (MSME) sector is quickly emerging as a major creator of income and provider of employment in Kerala, with relatively lower investment. Kerala is one of the main centres of MSMEs in the country. As per the MSME Survey and Quick Results of 4th Census, 5.62 per cent of the MSMEs in India are in Kerala. The government provides a range of schemes in the sector, targeting various social groups such as Scheduled Castes (SCs), Scheduled Tribes (STs), women, youth, the physically handicapped and so on. Both the government and banks provide a number of facilities to the sector.

9.1.1.2 Within the MSME, sector there is a significant increase of micro enterprises, both in terms of working enterprises and employment. There are over 6,000 products ranging from traditional to high-tech items that are manufactured in this sector.

9.1.1.3 MSMEs play a critical role in innovation and have the ability to experiment with new technology on a small scale. However, they often suffer from a lack of funds, lack of entrepreneurial spirit, inability to take technology development risks and face the difficulty of attracting skilled manpower. The industries that come under this sector include handicrafts, handloom, khadi, food processing industries, garment making and textile industries and industries related to coir, wood, bamboo, plastic, rubber, leather and clay products. This chapter focuses on the traditional industries within the MSME sector.

#### 9.1.2 Profile

9.1.2.1 The total number of small-scale industries (SSIs)/MSMEs registered in Kerala as of March 2013 was 219,444 against 205,987 in the previous year, indicating a growth of 6.5 per cent. Out of the total SSIs/MSMEs, 4 per cent are promoted by SCs, approximately 1 per cent by STs and 25 per cent by women entrepreneurs. The total investment was Rs 12,12,674 lakh in 2012–13 against Rs 10,83,169 lakh the previous year, showing an increase of almost 12 per cent. The employment generated was 11,03,126, which was over 8 per cent higher than the previous year's figure of 10,21,162.

9.1.2.2 Analysis of the data of the new units formed each year shows that employment and production have increased over the last five years, but investment has declined. This sector received a massive shock during 2008–09 (probably due to the Global Financial Crisis) and has recovered since then. Only in 2011–12, did the number of new units being formed return to the pre-financial crisis level. Total investment and employment have still not returned to the peak of the pre-financial crisis level.

### 9.1.3 The strategy

9.1.3.1 The vision for Kerala (from Chapter 2) is that the State will be a prosperous, knowledge-driven, competitive and eco-efficient economy,<sup>2</sup> among the world's advanced economies with a spirit of entrepreneurship, innovation, social inclusion, tolerance and diversity. The State will be economically prosperous in the sense that the people of Kerala will enjoy a high level of income and living standards. Economic prosperity will be driven by knowledge and entrepreneurship, with a new focus on the role of information technology, innovation and learning in economic performance. It is also envisaged that Kerala will be a globally oriented knowledge hub, among the world's leading knowledge hubs.

9.1.3.2 MSMEs have a key role to play in Kerala's evolution into this knowledge-driven competitive economy. The spirit of innovation and entrepreneurship will drive this process. The traditional industries that make up the MSME sector in Kerala will be knowledge-driven. For example, in the forests sector, it is proposed to create a Bamboo Innovation Centre. There are now at least 1,000 products that can be made from bamboo whereas the product range currently available in Kerala is very limited. This is an issue the proposed innovation centre can address. The knowledge economy will bring engineers, designers and business skills together to create entrepreneurs who sell high value-added products from even the so-called traditional sectors. Second, there will be a move towards entrepreneurs opening MSMEs in the new sectors of the knowledge economy. Consultants in sectors, ranging from agriculture and plumbing to educational consultants and real estate appraisers and assessors (technically trained like in foreign universities), will start MSMEs. Investment and employment will increase. Of course, as has been emphasised throughout KPP 2030, the business environment of Kerala needs to be improved to spawn entrepreneurial activity.

9.1.3.3 The rest of the chapter discusses three MSME sectors in Kerala. Overall, all MSME sectors will strive to move up the value chain with interactions with the knowledge economy. Skill development, infrastructure development, loans, improving the business environment of Kerala, branding and marketing will be the pillars of economic growth.

## 9.2 The Cashew Industry

### 9.2.1 The industry

9.2.1.1 The cashew industry occupies a predominant position in Kerala's economy. It is an important source of income for low income groups, particularly women, in the processing sector. Moreover, this is an export-oriented industry that earns foreign exchange. India is the global leader in cashew processing and Kerala alone accounts for 56 per cent of the total export of cashew kernel from India. Within Kerala, 90 per cent of the industry is concentrated in Kollam district, which has been declared the 'Cashew Town of Export Excellence' by the Ministry of Commerce, Government of India.

### 9.2.2 Strengths and opportunities

#### India's competitive (dis)advantage in the cashew industry

9.2.2.1 India is the world's third largest producer of cashew nuts. In 2011, the total production was 674.6 thousand tonnes, which accounted for 15.8 per cent of the total cashew production of 4,279.7 thousand tonnes. The top ten producers of cashew nuts are Vietnam, Nigeria, India, Côte d'Ivoire, Brazil, Benin, Philippines, Guinea Bissau and Indonesia. "The yield per hectare (ha) in India was 860 kg during 2007–08 as compared to 4,125 kg/ha in Vietnam and 2,000 kg/ha in Nigeria. Major reasons attributing to low productivity in the country were sizeable area under cashew in the country being covered with seedling progenies, planting of cashew in marginal and poor fertile land, non-adoption of recommended package of practices and pest infestation (tea mosquito bug and cashew stem and root borer)," says a report from the National Bank for Agriculture and Rural Development.<sup>3</sup>

## Kerala, the first region to export cashew kernels

9.2.2.2 Cashew was first introduced in Goa in the 16th century from where it spread to other parts of the country. In the 1960s and 1970s, Kerala topped in terms of both production of cashew nuts and productivity. It was followed by Tamil Nadu. Kerala was also among the first regions in the country where cashew processing started as a cottage industry. In the early 20th century, cashew nuts were processed in people's homes or on the streets and commonly sold in markets. In the 1920s, General Foods, an American company discovered its export potential and started importing cashew kernels from Kerala. The State thus emerged as the sole exporter of cashew kernels, with the US being the only importer. While cashew is mostly grown in the north of Kerala, the processing industry is concentrated in Quilon (now Kollam), in the former princely state of Travancore due to the encouragement given by the erstwhile local rulers to industrial development since the early 20th century.<sup>4</sup>

9.2.2.3 Until the early 1970s, India had a near monopoly in the export of cashew kernels to world markets, although it was not the only producer of raw cashew nuts. However, since then, increasing competition from other cashew kernel producing countries such as Brazil, Vietnam, Tanzania and Mozambique has affected India's cashew exports. In addition, competition from other surrogate nuts such as almonds, pistachios, hazelnuts, Brazil nuts, macadamia nuts and the promotional efforts launched on behalf of these tree nut sectors has affected the consumption of cashew worldwide. Further, non-tariff barriers imposed by major developed countries are also a deterrent to its growth.

## Institutional support

9.2.2.4 Cashew Export Promotion Council of India (CEPC) was established by the central government in 1955 to promote the export of cashew kernels and cashew nut shell liquid (CNSL), as well as to serve as a liaison between foreign importers and member exporters. CEPC also offers investment to producers for the purchase of innovative technology and equipment.

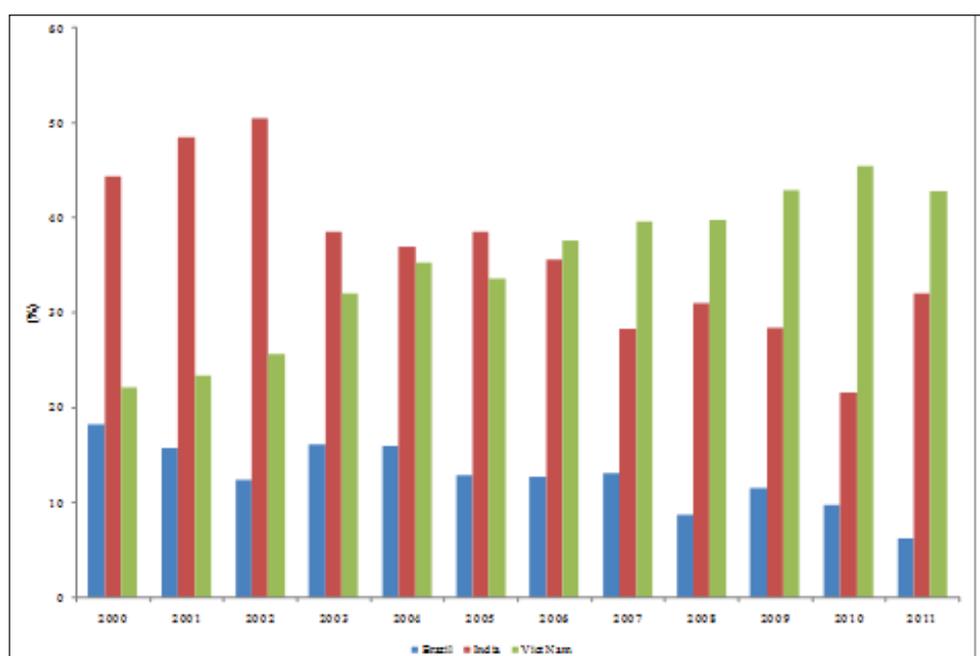
9.2.2.5 CEPC also manages the Department of Commerce's Integrated Scheme for Cashew Quality. This scheme consists of consecutive 5-year plans that include various components. The current plan includes a one-time subsidy for the installation of processing equipment that conforms to international standards and quality requirements of importers. Subsidies are also offered for improvements in facilities to make processing units ISO or HACCP compliant. Finally, the plan provides subsidies to exporters who adopt the flexi-pouch vacuum packing system, which is the packing method most commonly demanded by importers in the US and the UK (importers in the Middle East require tin packaging and this method is commonly adopted by processors specifically for that market). Overall, the rate of subsidies offered by CEPC is 25 per cent of the cost incurred by exporters and the total amount for all subsidies granted cannot exceed Rs 8 lakh (approximately US\$18,000) per exporter during each 5-year period. The scheme's focus on quality is indicative of the challenge processors face in meeting international phyto-sanitary standards. These standards are usually seen as a greater constraint on business growth than traceability requirements. To address the challenges, a Quality Upgradation Lab and Technical Consultancy Centre have been set up in Kollam, India's processing hub. In addition to certifying quality, the lab also provides training to processors.

## 9.2.3. Challenges

### Declining exports and increasing imports

9.2.3.1 Figure 9.1 shows the individual share of three countries — India, Brazil and Vietnam — in total global exports. India was the top exporter of shelled cashew nuts until 2005. Since then it has not only lost the distinction of being the largest producer, but also has continuously lost its share. Vietnam, on the other hand, has been increasing its share despite the fact that its processors are inexperienced and have been unable to deliver on contracts. African countries are also likely to pose a threat in export markets, as starting from 2005, the African Cashew Alliance (ACA) has been trying to build African processing capacity and promote a sustainable global market for African cashews.<sup>5</sup>

**Figure 9.1**  
Share of India, Vietnam and Brazil in Global Exports of Shelled Cashews: 2000–2011 (%)

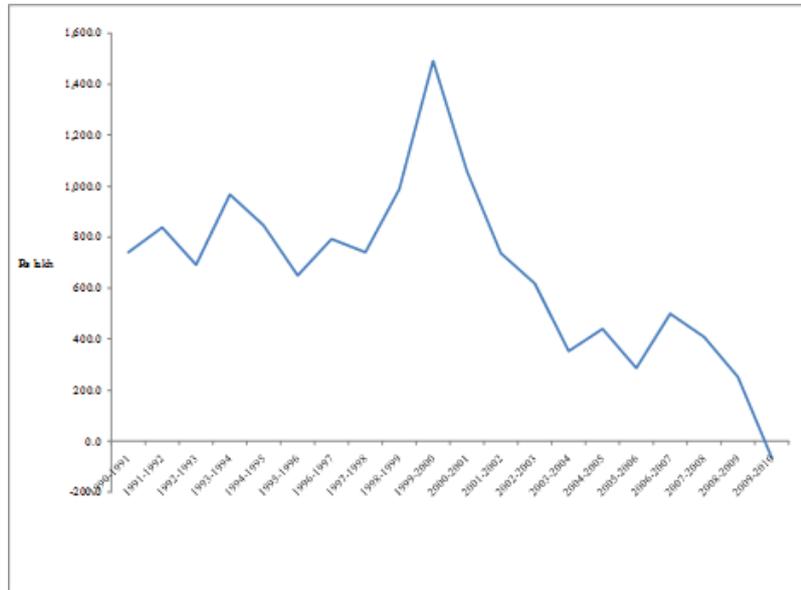


*Note: Netherland is the third largest exporter of shelled cashews in quantity terms but fourth in terms of value right behind Brazil.*

*Source: FAO Statistical database*

While exports are declining, imports are continuously rising, resulting in a decline in foreign exchange earnings (Figure 9.2).

**Figure 9.2**  
**India's Net Exports of Cashew Related Products: 1990-91 to 2009-10**  
 (constant prices -1998-99)

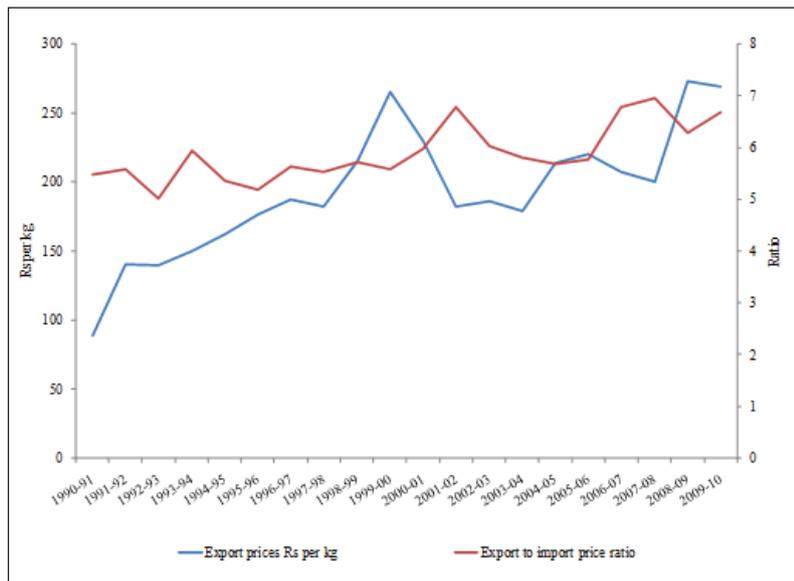


Note: Cashew nut and Cashew nut shell liquid are exported and raw cashew nut is imported

Source: Directorate of Cashew nut & Cocoa Development, Kochi

9.2.3.2 Is the rising gap between exports and imports a manifestation of the diversion of cashew nuts to the domestic markets? Diversion to domestic markets cannot be explained by the export prices. Figure 9.3 shows that export prices have been rising faster than the import prices in international markets. The increasing gap between exports and imports apparently indicates that India is losing its competitive advantage in the cashew value chain.

**Figure 9.3**  
**Export Prices and Export to Import Price Ratio of Cashew Nuts: 1990-91 to 2009-10**

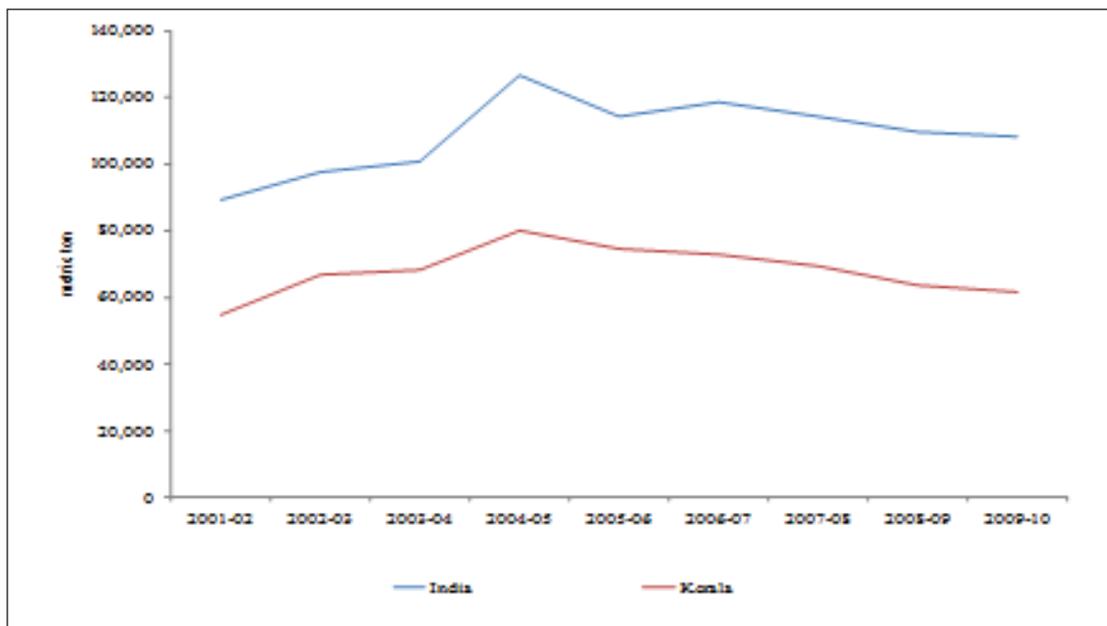


Note: Cashew nut and Cashew nut shell liquid are exported and raw cashew nut is imported

Source: Directorate of Cashew nut & Cocoa Development, Kochi

While exports of cashew kernels from India have been declining, those from Kerala are declining faster both in terms of quantity and value. Kerala is thus losing its share in cashew exports (Figure 9.4).

**Figure 9.4**  
**Exports of Cashew Kernels from Kerala and India: 2000–2001 to 2009–10: (metric ton)**



Sources: Directorate of Cashew nut & Cocoa Development, Kochi & Kerala Economic Review, various issues.

9.2.3.3 This is despite the fact that several initiatives have been taken by the Cashew Export Promotion Council to promote cashew nut exports. Apparently, these efforts are not enough. This means there are deep-rooted constraints that have been affecting cashew nut production as well as cashew nut processing.

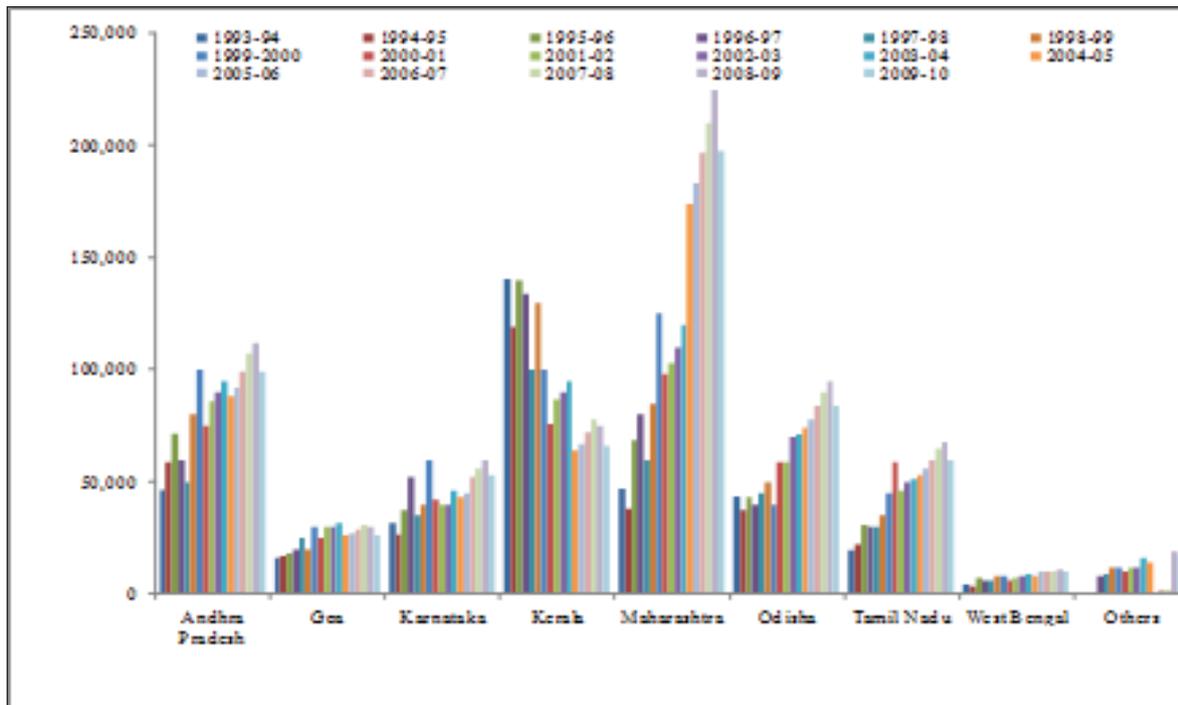
### Declining production of cashew nuts in Kerala

9.2.3.4 Figure 9.5 depicts the production of cashew nuts from 1993–94 to 2009–10. Kerala was at the top in the early 1990s, but gradually slipped in terms of relative ranking. Over time, Maharashtra, Karnataka, Andhra Pradesh and Odisha have overtaken Kerala as the leading producers of raw cashew nuts. It has dropped to the 4th position after Maharashtra, Andhra Pradesh and Odisha. The two factors responsible for the decline in production are: one, a sharp decline in area, and two, stagnant yield per acre.

9.2.3.5 In 1993–94, Kerala had an area of 156,000 ha under cashew cultivation, which continuously declined to 72,000 ha during 2009–10 (Figure 9.6). This may be attributed mainly to the replacement of cashew with remunerative crops such as natural rubber in Kerala. Unlike states such as Maharashtra, where cashew is promoted with the state government's support, in Kerala few incentives are given to this crop as with other plantation crops. In general, lower yield per hectare can be attributed to small agricultural holdings of less than two acres of land that is of poor quality and/or is multi-cropped. In Kerala, this is partly due to a land ceiling law that limited individual land holdings to five acres for cashew production as well as other designated crops and remained in force till 2006. Government-

run plantations are exempt from this regulation, which has led to the recent development of cashew estates on government-owned land. State-level plantation corporations are estimated to manage 10 per cent of all land under cashew cultivation. Private production shifted out of Kerala to more land-abundant states including Maharashtra, Tamil Nadu, Karnataka, Odisha and Andhra Pradesh.

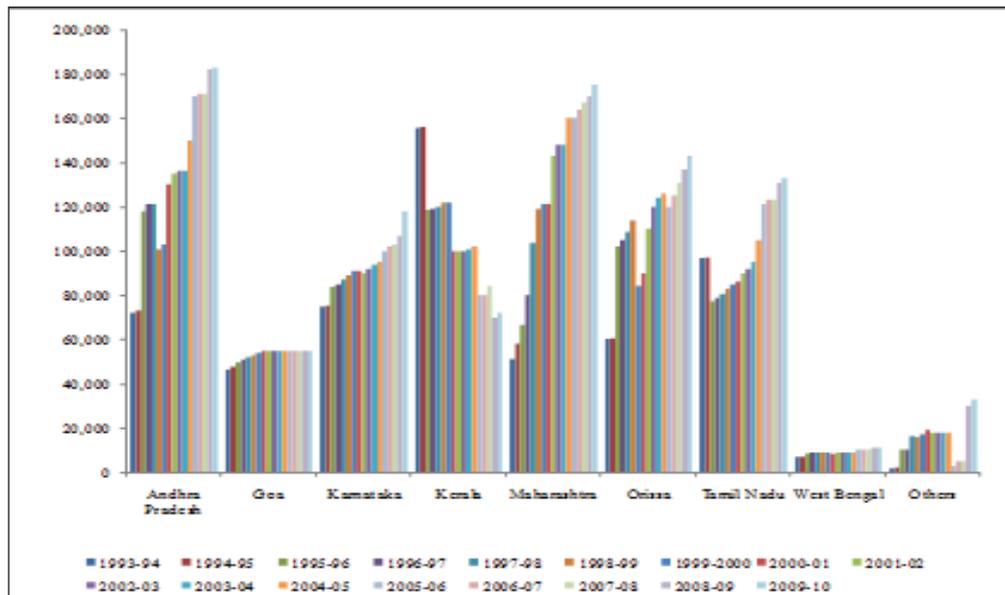
**Figure 9.5**  
**Production of Cashew 1993–94 to 2009–10 ('000 MT)**



Source: Directorate of Cashew nut & Cocoa Development, Kochi

9.2.3.6 In 2007, Kerala State Agency for the Expansion of Cashew Cultivation (KSACC) was formed to implement measures to expand cashew cultivation. It has undertaken several measures to incentivise farmers and provide technical assistance to them to improve yield and expand the area under cashew nut cultivation. Assistance has been given for promoting organic cultivation and establishing cashew apple processing units. The KSACC could bring 12,735 ha under cashew cultivation, involving about 80,000 farmers and other institutions. This could be the reason why the decline in area under cashew stalled over the last two years. Under the mega project, 'Sustainable Production of Cashew Nuts in Kerala', the National Horticulture Mission (NHM) also released Rs 971.8 lakh during 2010–11.

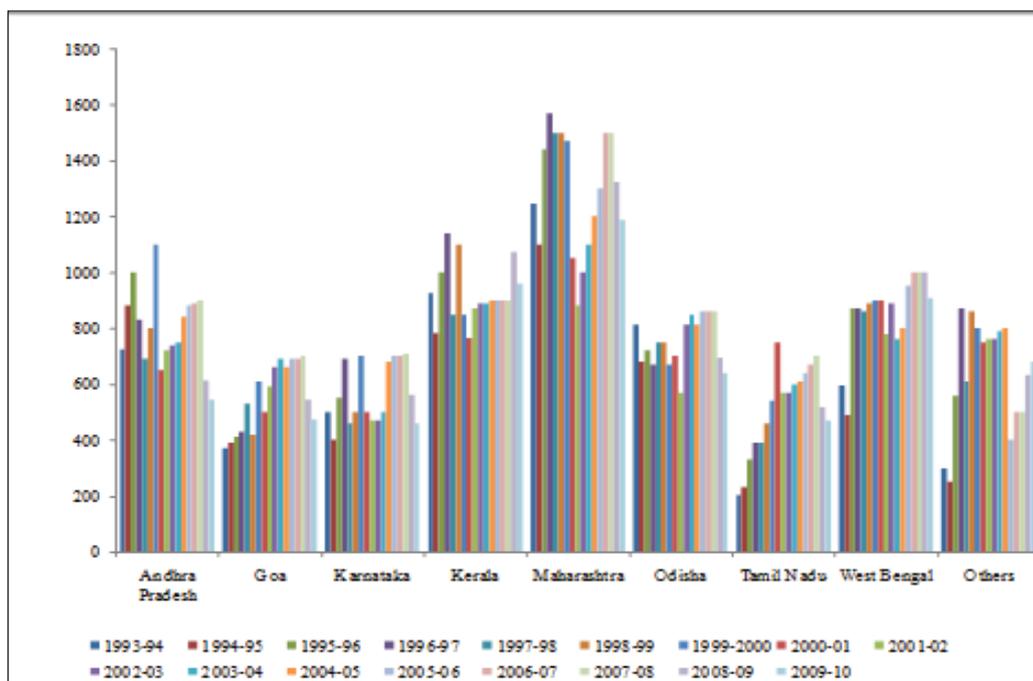
**Figure 9.6**  
**Area under Cashew Cultivation: 1993–94 to 2009–10 (hectare)**



Source: Directorate of Cashew nut & Cocoa Development, Kochi.

9.2.3.7 Yield per acre has been on the decline in Kerala. In contrast, in states such as Maharashtra it has been increasing (Figure 9.7). These states are new to cashew cultivation and, hence, are adopting high yielding varieties of seeds for planting, which gives them a high yield per acre in shorter time periods.

**Figure 9.7**  
**Yield per acre of Cashew: 1993–94 to 2009–10 (kg per ha)**



Source: Directorate of Cashew nut & Cocoa Development, Kochi.

## Mixed success of government initiatives in improving productivity in cashew nut production

9.2.3.8 The government is indeed attempting to enhance domestic production through investment in research and development and agricultural extension. Research on cashew was initiated as far back as in the early 1950s resulting in the development of several production techniques. These efforts were further strengthened in the 1960s and 1970s. However, in the initial phase these activities were a part of the All India Coordinated Spices and Cashew Improvement Project. In 1986, a National Research Centre for Cashew was established at Puttur to increase the production and productivity of cashew with a mission-mode approach, and with this the cashew development component was delinked from the combined All India Coordinated Spices and Cashew Improvement Project. Currently, there are eight research centres and one sub-centre located in eight cashew-growing states in the country. This network of research centres, based at state agricultural universities, seeks to increase cashew production and productivity by developing higher yield trees, creating efficient disease and pest management practices and promoting more efficient planting techniques. These institutions have released between 30 and 40 cultivars with maximum yields of 18–20 kg/tree.<sup>6</sup> Soft-wood grafting is the most widely supported method of propagation. “The Cashew Research Station at Kerala Agricultural University is a leader in research and development and has focused on the development of high yield varieties, bigger nuts and nuts with a higher shelling percentage. Of the fourteen varieties that have been developed in Kerala, eleven were created at the station through hybridisation. These varieties are shared with affiliated institutions in other states. Agricultural extension is primarily conducted by these publicly-funded research centres and universities, although NGOs do provide services in some areas. Farmers can purchase grafts directly from research stations. The Department of Agriculture also buys grafts in bulk and distributes them at the local level at village centres.”<sup>7</sup>

9.2.3.9 Development of hybrid cultivars and extension activities have had mixed success, primarily due to the high cost of replacing trees. Farmers who choose to replace their trees risk losing income for 7–8 years while they wait for the grafts to reach their full yield. Some farmers in Kerala expressed dissatisfaction with the fact that the grafts, while producing higher yields, created smaller nuts that fetched a lower price and also required more intensive fertiliser and chemical use. Utilisation of high yielding varieties has been most successful in Maharashtra, where new plantation development is more common. This may help explain the higher yield per hectare in that state (1,300 kg as compared with the national average of 815 kg per ha).

9.2.3.10 It is apparent that Kerala, which has a long history of cashew production, is facing declining competitiveness. It is an on-going challenge to determine how to provide the right incentives and support that will encourage farmers to invest in replanting higher yield varieties, especially in the face of more lucrative alternatives such as rubber. Although the government has tried to increase output by establishing new publicly-owned plantations with high yield trees, this does not address the needs of the smallholder farmers.

### Cashew nut processing: Decline in private investment

9.2.3.11 State intervention has long been very intense in the cashew processing sector in Kerala, which affects private investment adversely. In 1945, the government declared cashew workplaces to be ‘factories’, even though they did not use power, to protect the labourers. This declaration presented employers with considerable obligations, including adhering to stipulated working hours and paying unemployment compensation, maternity benefits and employees’ state insurance, especially if the factories were categorised as ‘perennial’ factories. In 1956, the government declared all cashew factories to be ‘perennial’ and brought the industry under the purview of the Minimum Wages Act.

9.2.3.12 The announcements threatened the industry’s cheap labour base. The factory owners could have responded by introducing technological changes, but stiff resistance from labour

unions discouraged any such move. The objective of resisting technological change was to protect employment, but it, in fact, resulted in a sharp rise in unemployment. Several factories closed down; others took a number of steps to avoid implementing the legislation, including seasonalising work and resorting to cottage processing. The government responded by banning cottage processing in 1967. The factory owners countered the move by shifting base to the neighbouring state of Tamil Nadu. By 1972 there were 107 factories, primarily located in Kuzhithurai (in Kanyakumari district) in Tamil Nadu. In response, the government resorted to 'cooperativisation'. The Kerala State Cashew Workers Apex Co-operative Society (CAPEX) was formed to engage directly in cashew processing. In 1969, the government set up the Kerala State Cashew Development Corporation (KSCDC). The operations of KSCDC extended from regulation and distribution to direct processing. It took over privately-owned cashew factories to run them. By 1975 it had 34 factories with 30,000 employees (accounting for about one-quarter of the estimated workforce in the sector). The initial years were successful, and it showed reasonable profits. However, this success story no longer prevails. Currently, KSCDC has 30 factories. There are about 18,000 workers and a majority of them are women. CAPEX with its headquarters in Kollam, is the apex body of cashew workers' primary societies and is engaged in the procurement of raw cashew nuts and marketing the processed kernels. It also owns 10 factories with about 6,300 workers working in them. Workers of both KSCDC and CAPEX earn benefits including healthcare and pensions that are estimated to add value to the minimum wage by 68 per cent. The minimum wage before benefits is comparable for both public and privately-owned processing facilities, and is set annually by a committee designated by the state government.

9.2.3.13 These measures have had a two-pronged effect on the cashew processing industry. One, this has caused privately-owned processing companies based in Kerala to shift processing units elsewhere. Two, the level of capacity utilisation has been rather low. In Kerala, there were 432 processing units in 2005–06, with a total installed capacity of 7 lakh tonnes, out of which 3.87 lakh tonnes (55 per cent) was utilised. Compared to this, the utilisation levels in Odisha and Tamil Nadu were 100 and 91.8 per cent respectively.

9.2.3.14 Overall, the industry in Kerala is facing a range of challenges regarding international competitiveness. Yadav (2010) examines the economics of India's cashew industry, in particular, comparing Kerala, Tamil Nadu and Odisha. The state-level comparisons are done between 1993–94 and 2007–08. In contrast to other states of India, area, production and productivity of Kerala show negative compound annual growth rate (CAGR). This is mainly due to the replacement of cashew with rubber. The Nominal Protection Coefficient (NPC) estimates measuring the degree of export competitiveness of cashew during 2005–06 suggested lower export competitive nature of cashew in the selected states. NPC worked out to 1.41 in Kerala, 1.10 for Orissa and 1.07 for Tamil Nadu. Further, "a comparative analysis of seedling and graft varieties of cashew revealed that the net income per ha earned by the sample farmers cultivating grafts was Rs 28,675 in Kerala, Rs 33,325 in Odisha and Rs 37,150 in Tamil Nadu and the same for traditional seedlings was Rs 11,750 in Odisha and Rs 16,175 in Tamil Nadu. The economics of cashew processing per bag of raw nuts (80 kg) revealed the net income of Rs 160 in Kerala, Rs 389 in Odisha and Rs 405 in Tamil Nadu. This variation was due to the difference in the recurring cost (roasting/boiling, moisture conditioning, shelling, drying, peeling, grading) incurred, which was Rs 4,191 in Kerala, Rs 3,777 in Orissa and Rs 3,136 in Tamil Nadu per bag of raw nuts. Recurring cost in Kerala was high due to the high labour cost."<sup>8</sup> Yadav (2010) summarises some of the key initiatives in Cuddalore, Tamil Nadu in the cashew industry:

- Farm science clubs in Tamil Nadu organised by the Krishi Vigyan Kendras (KVK) disseminate technology to the farmers.
- Intensive cultivation practices in Tamil Nadu.
- Public-private partnerships in Tamil Nadu.
- Convergence of efforts of stakeholders such as financial institutions, state government departments and credit-cum-savings groups (SHGs).

9.2.3.15 From the above analysis it is evident that Kerala is losing its competitiveness in the cashew industry throughout the value chain. Given land and labour shortage and better remuneration in other sectors, it is unlikely that Kerala will regain the competitive advantage in the cashew industry. To remain competitive Kerala must make its interventions sustainable and market-oriented. Although the strategic path forward in the next section discusses the overall interventions needed in the sector, the recommendation is that Kerala recognise its comparative advantages in various stages of the value addition process and places relatively more emphasis on those parts. Kollam is the 'World Cashew Capital' and should be projected as such with the integration of the processing and financial industry in the city. Cashew is associated with Kerala and if Kerala can market and brand products as such, it will be a huge win-win strategy for all. Plus, the formidable research infrastructure that Kerala has built up in the cashew industry may be used as a knowledge industry to give advice or provide consultancy to cashew setups in other parts of India and the world.

## 9.2.4 Strategic planning

### Vision

9.2.4.1 The vision is to transform the industry into a modern and high value-added industry. Strategic intervention will be directed towards modernisation of the industry. Modernisation is essential for the development of the cashew industry. Therefore, certain strategies are proposed:

1. Identifying areas where cashew can be grown
2. Improving the yield of cashew in Kerala
3. Restructuring factories
4. Skill development and mechanisation
5. Market promotion activities
6. Upgrading existing units
7. Infrastructure development
8. Financing mechanisms
9. Links with the knowledge economy
10. Value addition
11. Going up the value-chain

A four-pronged strategy will be adopted to upgrade the cashew nut industry.

### Pillar 1: Improving quality and quantity

#### Action Plan 1: Encourage private sector participation in production and processing

9.2.4.2 Competitiveness requires the right balance between the involvement of the public and private sectors, consultancy firms and NGOs in the sector. Each of these players must have clear-cut responsibilities, proper incentives and opportunities to support and invest in the cashew industry. Together, these players must create an environment that enhances competitiveness.

9.2.4.3 First of all, the necessary boost in competitiveness requires robust private sector involvement. As an export-oriented industry, cashew is exposed to global competition. In order to compete, Kerala must increase efficiency and quality, both at the farm and processor-levels by actively engaging private sector players and creating conditions for the markets to determine and implement necessary interventions. Specific suggestions in the farm sector include:

- Since most farmers operate on less than two acres of land, they may be encouraged to work together to farm larger plots of land and build plantations.
- Adopt high-yield varieties with the awareness that the inputs required will also be higher.
- Promote semi-organic and organic farming.

- Further improvements in the agricultural extension activities by the Kerala Agricultural University, including possibly adapting the Farmer Science Club, which promotes adaptation of technology.
- Increase interaction between farmers, processors, researchers and marketing agencies.

9.2.4.4 For the private sector, development subsidies and direct technical assistance should be used restrictively. Greater emphasis should be placed on developing capacity within the private sector to provide necessary business and financial services and promote competition in the market. Competition increases quality and efficiency. A focus on technical assistance that develops private sector markets for business services and assists the public sector in improving the business environment is the basis of market-based development. These indirect methods of intervention use markets to guarantee efficiency and sustainability.

9.2.4.5 The state's role should be to regulate unfair competition and monopolising tendencies. NGOs may help in bringing about this transformation by facilitating and monitoring the process.

## Action Plan 2: Promote Producer Companies and other entrepreneurial forms of agriculture

9.2.4.6 As discussed in the Chapter on Agriculture, promotion of producer companies may be a solution even in cashew. Along with the private corporate sector, producer companies should be promoted. Their emergence will contribute to enhancing competition in this market. An alternative approach is to promote 'special integrated cashew zones' along the lines of Special Agri Zones proposed in the chapter on Agriculture. NGOs can play a major constructive role in promoting these alternative forms of organisation of the industry. The idea that Kerala needs to work on is that once the raw cashew enters Kollam, it should exit the port of Kollam for both national and international markets in branded/packaged form, which yields the highest value.

### Box 9.1

#### Panruti (Cuddalore, Tamil Nadu) Special Integrated Cashew Zone

In Panruti, cashew farmers supplement their own incomes by operating small units in which they process their own harvest as well as nuts purchased from export houses that source raw materials from other parts of India or abroad. Recently, they have deviated from this practice. They have discarded the practice of buying nuts from export houses and selling them independently. Instead, these small processors have formed a cluster in order to increase incomes. The average daily wage for the shelling and peeling stages is Rs 50 (approximately \$1) and skilled workers employed in grading earn about Rs 70 (about \$1.50) per day. They procure raw nuts from other states and share the expense of transporting truckloads of these nuts. Along with shared transport, they are able to rent machinery and other infrastructure within the cluster. Cluster members have also devised risk-sharing schemes that protect them from daily price fluctuations. Because it typically takes 10–15 days for a batch of raw nuts to be processed into kernels, processors in Panruti avoid these price changes that would affect their margins by carrying out only one production sub-process and then selling the semi-finished product immediately. Landless people are involved in the Panruti cluster through wage labour and as collectors of 'free' nuts that become available at the end of the harvest when farm boundaries are no longer enforced. This cluster experience demonstrates how producers with limited resources and even landless people can benefit from primary production and processing when the relationships within the value chain are renegotiated. The involvement of farmers in processing in Panruti is very innovative and distinct, and is an example of how small processors and growers can improve their incomes.

*Source: Hall, M., Patel, P., Sarmiento, G., Smith, N., Sostowski, N. and S. Waxman. 2007. Benchmarking the Global Cashew Industry. Micro and Small Enterprise Trade-Led Growth Programme in Brazil. For Development Alternatives Inc. May.*

9.2.4.7 To sum up, over the next 20 years, the state-owned agencies may gradually withdraw from direct processing and manufacturing. The process will start by privatising the most profitable units, and over a period of five years the industry can be fully privatised.

9.2.4.8 The primary objective of state intervention was to act as a model employer. Over time, with demographic transitions and change in labour market realities, there is no rationale for direct intervention of the state in these activities. Box 9.2 gives the experience of Maharashtra in cashew nut production and processing in Sindhudurg district by involving the public and private sectors and NGOs.

### **Box 9.2** **Maharashtra Success with Cashew Nut Production and Processing**

**Farm production:** The state of Maharashtra is a case study in successful public and private sector support for cashew development, particularly in the Sindhudurg district, which is near the border with Goa. Between 2002–2005, UNIDO helped initiate a strategy to support cashew production in the region following government efforts. The intervention targeted small and marginal farmers, micro-entrepreneurs and women. Even after the project ended, the government continues to play an important role in addressing technical constraints, quality improvement, access to credit, marketing and greater coordination between banks, NGOs and public institutions. In 2002, the Department of Agriculture of the Maharashtra government initiated a District Rural Industries Project through NABARD and an NGO, which included technical assistance in marketing and production, as well as financing of local cooperative and commercial banks for extending credit to microenterprises.

**Processing:** Sindhudurg also has active support centres for processors and other small industries, which help register SMEs, facilitate their access to credit and provide subsidies for equipment upgrades. Several NGOs, some of which are funded by the Indian Council of Agricultural Research, provide training to farmers and processors, including specialised services to enhance fruit processing and organic production. Technical assistance is intended to help standardise production processes throughout the region in order to improve the marketability of nuts and fruit products. Although public funds have helped initiate many of these projects, interventions also help strengthen linkages between commercial banks, farmers, processors and NGOs to enhance capacity in the private sector. This includes the effectiveness of research and development and agricultural extension to address tree yields, planting techniques and land use practices.

*Source: Patil, R.B. 2010. A Geographical Analysis Of Cashew nut Processing Industry In The Sindhudurg District, Maharashtra. Ph.d. Thesis submitted to Tilak Maharashtra Vidyapeeth.*

## **Action Plan 3: Mechanisation of processing**

9.2.4.9 The KCDC proposes partial mechanisation to improve production in the cashew industry. The mechanisation effort will run parallel to the manual system, reducing overall cost of production and thus increasing viability. The main purpose is to enhance output and productivity, while retaining the labour-intensive nature of industry. This mechanisation will be most beneficial in the shelling process, as shelling is heavy work, especially for the present generation who are reluctant to enter this area of cashew processing. It is acknowledged, however, that over time the labour shortage in this industry will grow unless it creates demand for skilled labour. Fully mechanised and niche handcrafted processes may be developed in parallel. However, the output will need to be priced differently, with the latter offered as 'premium cashews'.

## Pillar 2: Differentiation

9.2.4.10 Until recently, the market for value-added products was not considered extensive, although flavouring was common. The future of price-premiums for commodities exists in providing a differentiated product to savvy consumers. For cashews, Kerala must focus on international market demand for quality, the importing country's standards and breaking into niche markets.

### Action Plan 1: Handcrafted cashew nuts

9.2.4.11 The labour-intensive manufacturing process practised in India results in a higher percentage of wholes and avoids blanching that can occur with foot pedal machines (although the latter are also used). However, handcrafted products are not positioned differently and compete with the mechanically processed cashew. Over the next 20 years, Kerala will use both labour and machine-intensive processing in parallel and differentiate the output by positioning handcrafted cashews as a value-added product. Kerala will market handcrafted cashew nuts so that they fetch a higher price.

### Action Plan 2: Packaging

9.2.4.12 It is one way of differentiating the product. The significance of packaging has become huge in global markets. At present, KSCDC has only one packing unit. Exports are made as bulk product. Keeping this in view, KSCDC plans to establish six more packing units. However, over the next 20 years, the State will not export bulk cashews. With entrepreneurial ventures entering the market, packaging will also pick up. The Kerala Agricultural University should do research on different forms of packaging and branding cashew and its by-products.

### Action Plan 3: Organic products

9.2.4.13 Kerala will reposition itself by exploring rising demand for organic products within the country and internationally. The marketing of organic cashews has not been a focus so far and a rough estimate is that certified organics are less than 0.5 per cent of total production. This is primarily due to the difficulty of certification, particularly since the majority of cashews are grown on small, fragmented farms together with other crops. Ironically, most cashews in India are naturally grown organically, but cannot adhere to the stringent requirements of international standards. Proving compliance with standards is difficult in regions that have been growing cashews for nearly a century. In Mangalore and Goa, where newer plantations are being developed, standards may be easier to achieve. Despite these obstacles, the Government of Kerala has shown an interest in exploring organic production, given the estimated 25 per cent price premium. An action plan will be in place to help farmers achieve international standards in the trade in organic cashews.

### Action Plan 4: Organise fair trade

9.2.4.14 The State will set itself apart to attract buyers through fair trade markets and branding itself in the industry. It is a move towards differentiating the product on the basis of social responsibility. Fairtrade is a group of 25 organisations working across the world to secure a better deal for producers. It is headquartered in Bonn, Germany and sets international Fairtrade standards to support Fairtrade producers. These organisations license companies to use the Fairtrade mark and market Fairtrade products. There are 19 labelling initiatives and three marketing organisations covering 27 countries. The cashew Fairtrade market is relatively small in India, but has considerable potential. There is only one agency in the State, Fair Trade Alliance Kerala (FTAK), which was registered in 2006. It works with 3,000 producers. It does away with the system that depends on intermediaries by making farmers directly involved in governance, decision making, and quality monitoring. FTAK's governance structure includes committees at the village, district and state levels, and it mandates

that one-third of the representatives are women. The state committee vets all contracts and decides on the farm gate price. Farmers also operate the 19 collection depots in the State. FTAK hires a truck to transport nuts from these depots to processing units. A strict traceability system is maintained and each bag can be traced according to date, depot origin and the machinery in which it was processed. Farmers are paid at the depot. Most of FTAK's buyers are in the UK and the EU, and business is growing. The US market is currently unexplored. These initiatives will be used to promote trade with social development. Kerala will benefit from catalysing more participation in fair trade markets and in inducing higher quality production by farmers. This can be done by encouraging fair trade buyers to partner small producing and processing units and to be the interface between cooperatives and fair trade organisations in India and abroad.

9.2.4.15 The objective of product differentiation is to move up the value chain and earn a price premium for quality. This requires:

- Imparting training to exporters: In Mozambique, for instance, TechnoServe has implemented a programme that trains intermediaries to ensure price premiums. This will act as an incentive that will enable a shift towards better agricultural practices and adoption of the latest R&D by the producer.
- Dissemination of price information: In Vietnam, the Chamber of Commerce and Industry and the International Labour Organisation are attempting to broadcast pricing information and best practices suggestions via radio and television to help farmers follow market demands. These activities raise the quality and, ergo, the competitiveness of the final product.
- Dissemination of information regarding these possibilities: This will require the participation of NGOs and 'Cashew Nut Producers' Associations', both at the regional and state-levels.

### Pillar 3: Diversification

#### Action Plan 1: Diversify the cashew markets

9.2.4.16 Every part of the cashew plant can be converted into high value-added products.

- **Cashew Nut Shell Liquid (CNSL):** This is a renewable material that can be used to make specialty chemicals and polymers including insulating varnishes and resins. CNSL-based polymers are resistant to cold, water, microbes and termites. There is a high demand for these polymers in coastal areas, where they are used to seal boats. India's largest international buyer of CNSL is the US, followed by Korea and Japan. More markets will be explored over the next 20 years to diversify the markets.
- **Cashew apple:** Marketing of cashew apple by-products is not extensive in India. The alternative uses of the fruit have not been popularised and it is primarily used for household consumption. This is partly due to the vulnerability of the apple, which does not have a protective skin, and must be processed within eight hours of harvesting. Despite extensive research at government centres, jams, jellies and juices are not considered marketable domestically or internationally. Some large private firms attempted to market by-products including jams, but found it difficult. The cashew apple is said to have many medicinal values. Brazil has been successful in creating a market for cashew apple products. In particular, the commercial production of cashew apple syrup has been found to be profitable. Cashew apple is also used for producing organic manure. The action plan will be to initiate major projects in promoting these products successfully.
- **Liquor:** Four grades of cashew liquor have been discovered, but the highest grade, Feni, is only produced in Goa due to government restrictions on commercial sale.
- **Cashew testa:** This can be commercially utilised for manufacturing 'tannin' which is used in leather processing.

- **The cashew shell:** After oil extraction, cashew shell can be used for making heat-resistant 'particle boards', a substitute for plywood, 'nuwood' and so on. The water-resistant wood is used for making boats and ferries.
- **Medicinal value of the plant:** The bark, leaves, gum and shell are all used in medicine. The leaves and bark are commonly used to relieve toothache and sore gums and the boiled water extract of the leaf or bark is used as a mouthwash. A paste of bark ground in water is applied to the skin to cure ringworm; however, in this form it can irritate the skin and should not be applied to sensitive skin or on children. The root has been used as a purgative. Fibre from the leaves can be used to strengthen fishing lines and nets and as folk remedies for calcium deficiency and intestinal colic, as well as a vitamin supplement. CNSL, in addition to having industrial uses, is also used as an expectorant, cough remedy and insect repellent.

## Action Plan 2: Research and development

9.2.4.17 The Kerala Agricultural University and KSCDC should jointly do research on developing new products from cashew and its by-products, especially targeted at the metros and export markets. Cashew apple, cashew nut shell liquid, cashew testa and cashew shell will lead to higher realisation of income for farmers and cashew processors and exporters (Box 9.3). This requires extensive research. KSCDC has introduced four value-added products — cashew vita, cashew soup, cashew bits and cashew powder. Other than tinned cashew, a leading yogurt maker is marketing cashew yogurt (a win-win for the dairy and cashew sectors of Kerala). The industry can experiment with putting cashew in cheese (cashew cheese – 'Made in Kerala') and cashew chocolates. Other options include cashew juice, cashew spread, cashew cocoa spread, cashew nut butter, caramel cashew, cashew biscuits, cashew in breakfast cereals (especially in gluten free ones), oven baked cashews and flavoured cashew (chilli and lime). New products and synergy across sectors needs to be examined and will tremendously boost the MSME sector, where women form a significant share of the workforce. As mentioned earlier, these products can get additional value if they are considered organic and 'Fairtrade'. Given the labour-intensive process that is used, the process itself should be branded and marketed as 'hand picked and packed cashew using sustainable labour practices' (with an emphasis on gender) and 'organically produced cashew – Made in Kerala' to yield higher returns.

### Box 9.3

#### Cashew Apple Processing in Kannur, Kerala

A cashew apple processing unit located in Iritty, Kannur, producing a range of value-added products such as cashew apple syrup, juice, jam and so on, started operations with a term loan of Rs 4 lakh from a commercial bank. Local cashew traders procured cashew apple from farmers at Rs 1.25 per kg, which the unit, in turn, procured from the traders at Rs 2 per kg. The cashew apple is preserved with citric acid and can be utilised for one year without spoiling. The equipment required for cashew apple processing included the boiling cauldron, hand operated juicer, steel container, pulper and so on. The cost incurred by the sample unit on machinery was Rs 1.5 lakh and the total cost of the unit, inclusive of construction cost and machinery cost, was Rs 12 lakh. While the bank loan was Rs 4 lakh, loan from industries department was Rs 2.5 lakh and the remaining amount of Rs 5.5 lakh was margin money. The recurring expenditure consists of labour charges, electricity, bottles, raw materials and so on. The production cost of cashew apple syrup was Rs 56 per litre and it was sold at Rs 76 per litre. Cashew apple processing is still in the nascent stage in the State and more such units are required.

*Source: Yadav, S. 2010. Economics of Cashew in India. Occasional Paper No. 50. Department of Economic Analysis and Research, National Bank for Agriculture and Rural Development. Mumbai.*

9.2.4.18 The knowledge economy in the cashew sector needs to be strengthened. KSCDC and CAPEX will be integrated to provide support services, management training, marketing, research and development and certification. Alongside, NGO participation will also be necessary to incentivise increased research and development and encourage new entrepreneurs and greater competition in the sector. As proposed in the Chapter on Agriculture, private consultancies will need to be promoted, equipped with modern technology and have links to research organisations. These may be partly/fully funded by the government and employed on the basis of bidding systems. For example, the people working in the tea industry in West Bengal provide consultancy to the tea industry in south India. There is no reason why the reverse cannot take place in the cashew industry as it expands in states such as West Bengal and Odisha.

9.2.4.19 To overcome the labour shortage, migrant labour coming to Kerala can be trained in the cashew processing industry. Plus, if there are people who want to move up the value chain in the cashew industry or find jobs in other sectors, retraining needs to be provided. Vocational education can also be linked to the cashew industry.

### Action Plan 3: Certification

9.2.4.19 In India, only relatively few processors have attained ISO (International Organisation for Standardisation), GMP (Good Manufacturing Practice) and HACCP (Hazard Analysis Critical Control Point) certifications.<sup>9</sup> The US and the European countries are placing greater emphasis on possessing standardised quality certification for assured access to their markets. Certification facilities will be improved to sustain exports to these markets.

### Pillar 4: Access to credit

9.2.4.20 Kerala will mitigate the effects of a complex and restrictive financial market by tailoring dynamic approaches. Box 9.4 shows one such practice.<sup>10</sup>

#### Box 9.4 Commodity-based Financing

ICICI Bank is a leading commercial lender to the agriculture sector. It minimises costs through its use of technology and by working through intermediaries such as MFIs, NGOs and cooperatives to deliver services. Its goal is to provide touch points (through a branch, kiosk or affiliate) every 10 km in rural areas. ICICI has developed special low cost ATMs and biometric smart cards with pre-loaded loan limits. Interest is calculated from amounts withdrawn on a given date to avoid the burden of flat interest rates calculated on the entire loan, from the time of initial disbursement. Insurance products for farmers are designed to target specific risks, such as rain, to help reduce premiums. ICICI's products for the cashew sector focus on commodity-based financing. ICICI funds accreditation for warehouses whose records are digitised and interlinked. Farmers' access to credit is based on their deposit at the warehouse, which is verified for volume and quality by an independent agency. Cashew prices are monitored daily and distributed to warehouses to advise clients on when to buy and sell.

*Source: Hall, M., Patel, P., Sarmiento, G., Smith, N., Sostowski, N. and S. Waxman. 2007. Benchmarking the Global Cashew Industry. Micro and Small Enterprise Trade-Led Growth Program in Brazil. For Development Alternatives Inc. May*

## Pillar 5: Development of Markets

### Diversification of international markets

9.2.4.21 It is pertinent to point out that even though India exports to over 60 countries, about 50 per cent of its exports are to the US and about 33 per cent to European countries. Over-dependence on one or two markets is not at all desirable in international trade in any commodity. The prime marketing strategy to be adopted should, therefore, be to strengthen non-traditional markets by exploring new ones.

### Development of mandi in the cashew centre

9.2.4.22 It is, perhaps, desirable to develop a large organised market for raw and processed cashew nuts in Kollam, where buyers and suppliers from national and international markets can interact.

### Marketing tactics

9.2.4.23 It is observed that the promotion of other nuts, particularly walnuts, has resulted in a sharp rise in demand for these in national and international markets. Cashew also needs to be promoted based on its health properties. "Cashew is a unique combination of fat, proteins, carbohydrates, minerals and vitamins. Cashew contains 47 per cent of fat, but 82 per cent of this fat is unsaturated fatty acids. The unsaturated fat content of cashew not only eliminates the possibility of the increase of cholesterol in the blood, but also balances or reduces the cholesterol level. Cashew also contains 21 per cent proteins and 22 per cent carbohydrates, and a right combination of amino acids, minerals, and vitamins. As such, nutritionally, it stands at par with milk, eggs and meat. As cashew has a very low soluble sugar content of one per cent, the consumer of cashew is privileged to get a sweet taste without having to worry about excess calories. Cashew nuts do not lead to obesity and can even help to control diabetes. In short, it is a good appetiser, an excellent nerve tonic, a steady stimulant and a body builder. Like all plant products, cashews are cholesterol free. Raw cashews are also sodium free and contain seven per cent of the recommended daily value for dietary fibre per serving. They contain small amounts of thiamin, riboflavin, niacin and folic acid. Finally, cashews have an excellent fat composition and are a good source of iron, phosphorous and magnesium."<sup>11</sup>

### Packaging and marketing

9.2.4.24 Packaging and marketing may be encouraged in Kerala to promote value-addition. Branding cashews as 'Made in Kerala' may be used to fetch a higher premium for the product. Cashew tourism may be encouraged, starting from tours of plantations to manufacturing to buying high value-added products. Cooking contests, using cashew as the main ingredient, can be one option to promote cashew food tourism in Kerala. Also, Kerala cuisine with cashew in it can be packaged and sold, such as ready-made Malabari sauce or cooking paste. Further, cashews can be dairy or milk replacements. Therefore, people who have allergies to lactic acid may be able to use cashews as a replacement.<sup>12</sup> This needs to be branded, marketed and sold as such. Access niche markets with high-end products nicely branded and packaged should be Kerala's motto.

### Market Kollam as the 'World's Cashew Capital'

9.2.4.25 Kollam, which is already the principal centre for cashew processing in India, should be advertised as such. Road, rail, port and inland water connectivity may help further Kollam's position as the 'cashew capital', especially if international ships can berth at its port. Inland water connectivity may then help cement its position further.

## 9.3 The Handloom Industry

### 9.3.1 Performance of the handloom sector

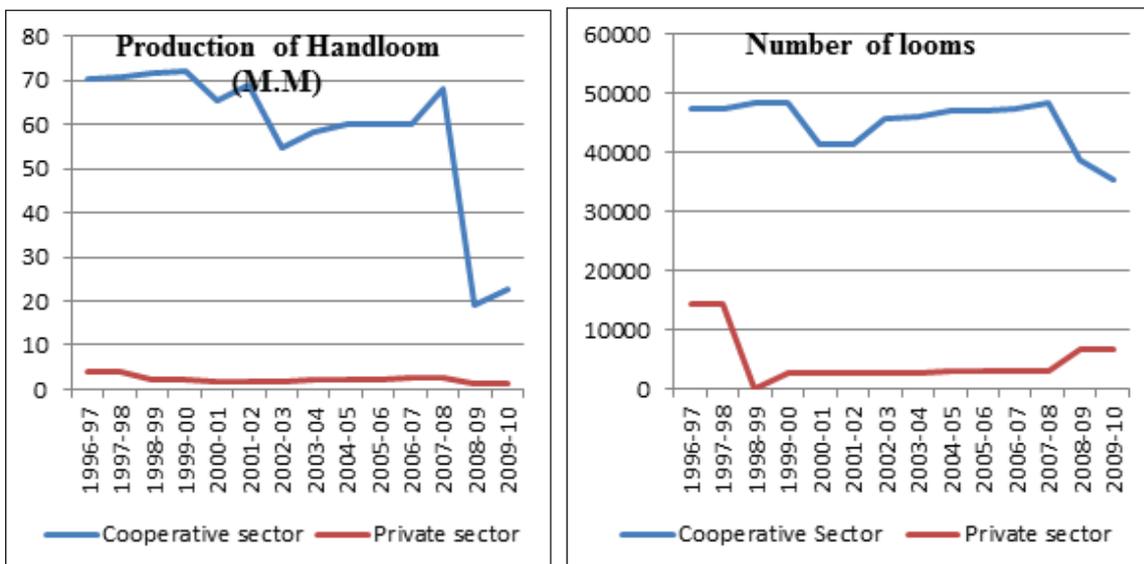
#### A low share in the national handloom industry

9.3.1.1 The handloom industry is a major traditional industry of Kerala. According to the latest Handloom Census, Kerala has 11,690 units employing 14,679 weavers and allied workers and 13,097 handlooms. Kerala's share is a mere 0.3 per cent in employment in this sector and 0.6 per cent in terms of looms. Different sets of statistics are provided by the Directorate of Handloom and Textiles via the Economic Review. It shows that the number of looms in 2007-08 was 52,566, with 1.3 lakh weavers working on them. Indeed, the number of weavers declined sharply post 2007-08, primarily because of the global recession. Yet, even in 2009-10, the State Planning Board reports the figure of 57,000 weavers against 14,000-odd workers reported in the Handloom Census. This discrepancy in data needs attention. The handloom industry in the State is mainly concentrated in Thiruvananthapuram and Kannur districts and in some parts of Kozhikode, Palakkad, Thrissur, Ernakulam, Kollam, and Kasaragod districts. Kerala is also known for its unbleached cotton handloom crepe, popularly known as *kora* cloth, which has entered foreign markets and occupies a place of pride in the garment industry. However, Kerala's share of the national handloom industry remains relatively small, even compared with those of the other Southern states.

#### Declining employment and production

9.3.1.2 It is observed that despite government support, production in Kerala's handloom sector has been declining, with fluctuations, over time. Figure 9.8 shows that the Global Financial Recession of 2008 affected the sector severely and recovery has been slow.

**Figure 9.8**  
Handloom Production and Number of Handlooms in Co-operative and Private Sectors:  
1996-97 to 2009-10

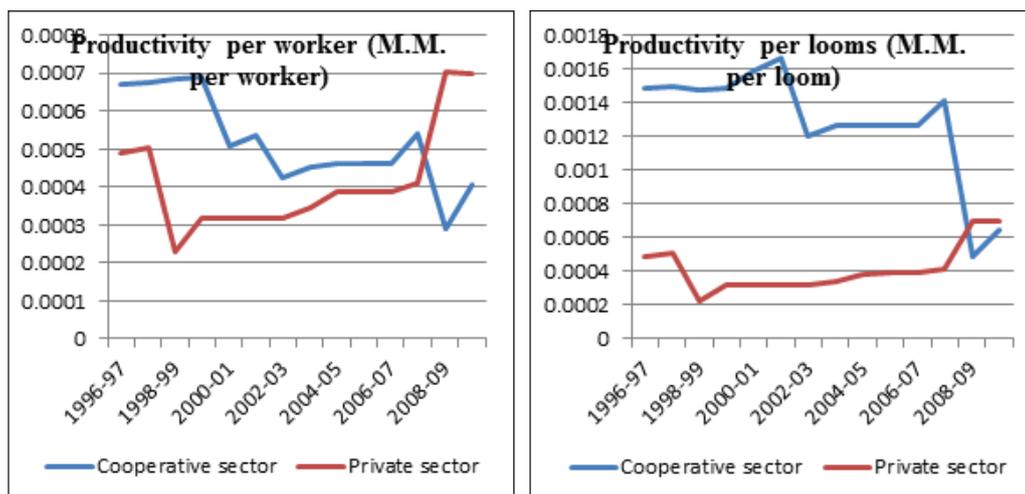


Note: M.M: million metres

Source: Kerala Economic Review, Various Issues

Similarly, productivity, both in terms of workers and looms, has been declining in the cooperative sector. The private sector has, on the other hand, shown a rise in productivity, which is encouraging.

**Figure 9.9**  
**Productivity per worker and per handloom in co-operative and private sectors:**  
**1996-97 to 2008-09**



Note: M.M: million metres

Source: Kerala Economic Review, Various Issues

9.3.1.3 The handloom industry faces a serious crisis, owing to both demand and supply side factors. Table 9.2 lists these factors.

**Table 9.1**  
**Demand and Supply factors affecting the Handloom industry in Kerala**

Demand side	Supply side
<ul style="list-style-type: none"> <li>• Competition from cheap power loom cloth</li> <li>• The shrinking market for handloom fabric in Kerala</li> <li>• Non-demand based production and inadequacy of new designs</li> <li>• Lack of branding and quality control in the face of competition from other countries such as China and Pakistan in marketing their products in major importing markets such as the US, the EU and Japan</li> </ul>	<ul style="list-style-type: none"> <li>• Rising input costs</li> <li>• Sparse credit coverage and high cost</li> <li>• Dearth of innovation and limited dynamism</li> <li>• Infrastructure gaps</li> <li>• Poor policy dissemination</li> </ul>

Source: Conceptualised by NCAER

These bottlenecks need to be addressed in the future strategy.

## 9.3.2. Strategic planning for the handloom sector

9.3.2.1 Kerala does not enjoy a comparative advantage in the handloom sector. Its share in the national handloom sector remains miniscule. Further, over the next 20 years, as Kerala shifts to a new knowledge-based paradigm, the contribution of this sector will possibly erode further. However, the industry is a part of national heritage. Hence, it will be promoted with the primary objective of preserving this ancient craft by protecting those who depend on it from the threat of power looms, fully automatic looms and other machines. This vision is in line with the objectives of the Kerala State Handloom Development Corporation Ltd (KSHDC) as well.

## 9.3.3. Vision and mission

### Vision

9.3.3.1 The vision will be to promote Kerala as “a centre of excellence in the production of exquisite, quality handloom products” to preserve this ancient craft.

### Mission

9.3.3.2 Building on Kerala’s capabilities in ICT and other knowledge-based sectors, the mission will be to tap into available knowledge and expertise and transform the business from the inside. This will be achieved by tailoring special policy support schemes that can deal with the idiosyncratic barriers to innovation that exists in these areas.

## 9.3.4. Strategic Action Plan

9.3.4.1 The new strategy will rest on four pillars. In essence, these draw on the strategic element of the mission of the Directorate of Handloom and Textiles (Box9.5).

### Box 9.5: Mission of the Directorate of Handloom and Textiles

- Strengthen handloom clusters with financial, technical and managerial support to sustain the cluster base for result-oriented production and marketing.
- Develop regional brands for high quality handloom products to compete in the domestic and international markets.
- Create niche markets for handloom products in domestic and international markets.
- Develop high quality infrastructure for the sector, especially for pre-loom processing and post-loom processing.
- Introduce a system of distributing high quality raw material.
- Encourage establishment of handloom units by ‘master weavers’.
- Sustain the well being of handloom weavers in the unorganised sector through welfare measures.

### Pillar 1: Improving competitiveness of the industry

#### Action Plan 1: Encourage organisational transformation

9.3.4.2 In India, the government has encouraged the handloom sector to adopt a cooperative model. The policy has facilitated the formation and operation of primary cooperative societies at the village/ taluk level and apex societies at the state level. Besides, State Handloom Corporations have also

been promoted with a view to supporting individual weavers. It has been envisioned that the apex societies/State Handloom Agencies will, inter-alia, arrange for procurement of yarn from organised mills, supply it to primary societies for producing cloth and, thereafter, also undertake marketing activities. On similar lines, in Kerala, Kerala State Handloom Weavers Cooperative Society (HANTEX), the apex organisation of the cooperatives, and Kerala State Handloom Development Corporation Ltd (with its brand name, HANVEEV) that provide services (especially marketing) to individual weavers, are the principal development agencies assisting the Department of Handlooms and Textiles.

9.3.4.3 However, alongside the cooperative sector, a small private sector also exists. This sector comprises 'master weaver firms'. There are two routes to set up these firms. The first route is to 'inherit' part of the family firm. The second route is that taken by weavers who, after working for an intermediary such as a cooperative, NGO or a master weaver for a while, set up their own firms.<sup>13</sup> In most cases, whatever the route, it is unlikely that the master weavers have any business experience. They learn the elements of managing a business by observing others and learning from their own mistakes. Yet, it has been observed that they perform better than the cooperative societies. The above analysis also shows that while the productivity of the cooperative sector has been declining, it has been rising in the private sector. Evidence suggests that there are two broad sets of factors operating that seem to help the master weavers. First, they strive extensively to keep their transaction costs low so that the price of the final product remains within the budget of the end customer. Second, they stay in touch with the demands of the market by extensively using their social networks of contacts. Their production is generally distributed over a large number of production centres (sometimes up to 10 centres).

9.3.4.4 This clearly illustrates the potential of an entrepreneurial approach to business. Therefore, the government needs to promote:

- Master weaver firms
- Producer companies

Action Plan 2: Develop centres of excellence in handloom industries by establishing handloom villages (HVs) as the major unit for planning

9.3.4.5 These villages will be developed under the 'Integrated Environment-friendly Handloom Village Development Programme'. Each handloom village will have a governance model in place. A dedicated Village Development Executive (VDE) and a Designer-cum-Marketing Executive should be appointed on a full-time contractual basis for each cluster.

9.3.4.6 Over the next several years, five HVs may be set up in Thiruvananthapuram and Kannur based on the following principles:

- Identify the best-performing production nodes based on diagnostic studies in the initial phase.
- Identify the locations with the best potential.
- Assess supply chain management in each location and identify challenges at each level in each of the selected locations.
- Brand each HV: Branding at the firm's level requires investments of entrepreneurs' time and money. If it is done at the village level, it will serve to reduce costs. Perhaps, most important, a new quality inspection centre will be established to randomly check the quality of local products

9.3.4.7 Action Plan 3: Adopt comprehensive and focused approach to develop the handloom villages

- Raw material availability:** For ensuring adequate availability of yarn, a multi-pronged strategy is required. The Mill Gate Price Scheme (MGPS) in the State should focus on the selected handloom villages rather than spread itself thinly across Kerala. The scope, coverage and

guidelines of the scheme should be modified so as to improve service delivery. The governing body will be responsible for the improvement in service delivery in terms of minimising delays in yarn supply and providing desired choice of yarn (mill, quality and type). The role of National Handloom Development Corporation (NHDC), which is implementing the scheme, should be enhanced. More depots should be allocated to the selected villages. It should also take steps to computerise depot operations to make information available.

- **Tax incentives:** These villages may be offered tax incentives. At the state level, for instance, VAT may be waived on domestic procurement of raw materials.
- **Common facilities:** To reap the benefits of economies of scale, upgrades of looms, commissioning of CFCs/dye houses and so on will be encouraged by the government.
- **Credit facility:** Each selected handloom village should have banks, MFIs and other financial service providers. Each weaver will have an ID card and each holder of a 'weaver's ID card' will have a bank account and a weaver credit card.
- **Infrastructure:** The local administration will be responsible for the world class infrastructure in the HVs. These include enhanced energy, water and sanitation management. The common facilities centres may be developed by local authorities. All existing infrastructural aspects (such as interiors, visual merchandising, stock rotation and professional management) should be reviewed and requisite provisions made in existing structures as well as for new structures such as warehouses.

The underlying principle will be to create agglomeration economies.

#### 9.3.4.8 Action Plan 4: Strengthen market support to weavers

- **Development of market place:** For marketing promotion, the new strategy will focus on the development of retail space within each HV. These markets will attract buyers and sellers from all over the country and the world. The economies of scale in production will facilitate the development of these markets. The retail area will comprise wholesale markets and distribution centres to enable exporters, manufacturers and boutique owners to source high-quality handloom fabric and readymade garments.
- **Niche market development:** The thrust should also be on entering niche markets and on enhancing the availability of requisite handloom products, both internationally and within India. There are already mega handloom expos and exhibitions organised in major metros. However, niche market development also requires branding and strict quality control.
- **Handloom village tourism:** The handloom sector's rich traditions should be leveraged to develop tourism potential. This can be done by showcasing the unique skills and products of this sector, with live demonstrations of the craft along with sales counters at strategic locations within the proposed handloom villages.

#### 9.3.4.9 Action Plan 5: Strengthen technical resource support to weavers/artisans.

- **Use of IT:** A Web-portal should be created to provide an e-marketing platform with B2B and B2C facilities. Design studios should also be set up to provide innovative designs and colour forecasts with appropriate linkages to reputed design institutions.

- **Quality control:** Steps should be taken for strict enforcement of the Handloom Mark Scheme under the Act. This will require setting up of a separate accredited testing laboratory for handloom products. Display-cum-CFC and quality testing units should be set up in HVs by internationally accredited testing agencies.
- **Handloom innovation programme:** This is to be initiated to support innovation in the traditional industries. Under the programme, public funding will be given to R&D projects that demonstrate a high technological potential accompanied by commercialisation prospects. Since the industry requires additional vertical or targeted support through the value chain, these companies will be provided with certain benefits while applying to the R&D fund. The condition is that the firm is classified as low or medium-tech and that its R&D investments are up to 7 per cent of its turnover. Knowledge in this sector must be improved too and synergies with institutions such as National Institute of Fashion Technology (NIFT) must be developed. It is not just about creating textiles, but also about creating garments from them, which will add value. Organic clothes (with 'Made in Kerala' branding) may also be promoted.

## Pillar 2: Human development

### 9.3.4.10 Action Plan 1: Arrange for training and education

- **Strengthening training programmes:** All the Weavers' Service Centres (WSC) and the Indian Institutes of Handloom Technology (IIHT) are to install new and improved machinery and further consolidate them with financial, infrastructural and faculty support. WSCs and IIHTs should also undergo regular evaluations. Training will be organised for design institutes and other organisations that have local and regional experience and relevant expertise. Further, collaboration with the Indian Institute of Fashion Technology (IIFT) in Kannur may prove to be fruitful in terms of adding further value to the product.
- **Modern management skills:** Upgrading skills and capacity building throughout the handloom chain will be given high priority for bringing about a positive transformation in the sector. A crucial requirement is to promote a modern approach in production planning, costing, quality control and marketing, as well as in design and technology development. This requires mainstreaming handloom technology and management-related education to turn the sector into a lucrative career option for trained management professionals. Focused training and skill improvement programmes must be instituted to manage weaving and weaving-related production. Existing training modules and schemes should be more inclusive of women workers and it should be ensured that women get equal access to training and infrastructure under the schemes.
- **Information dissemination:** Major institutions providing input-credit, research, technology, management, market development and so on are largely centralised and, hence, unable to reach the dispersed and largely home-based weavers. There has been limited information flow between buyers and sellers. Hence, weavers are often not familiar with the variety in usage of fabrics and thus find themselves unable to respond to dynamic market trends.

## Pillar 3: Social issues

### 9.3.4.11 Action Plan 1: Preserve the craft

- Establish a textile museum/conservatory/resource centre for preserving and reviving the craft, and for archiving and documentation of languishing handloom crafts. Database creation at the state level is one of the requirements and needs to be given priority. Such centres can also become a tourist attraction as a way to pass on the sector's rich cultural heritage to both tourists and future generations.

### 9.3.4.12 Action Plan 2: Transform dramatically, the physical environment of work sites

- Handloom villages will bring about a dramatic transformation in the industry. The old outdated workshops will make way for smart work floors with excellent working conditions for staff. Professionals will be employed at all levels of the industry, from senior management to technically skilled personnel at all levels of production, as well as a rapidly growing number of trained designers who are products of specialised training schools. Traditional looms may be replaced by improved looms, accessories and pre- and post-loom processes to reduce the drudgery of weavers. New cycle-wheel charkha and mechanical winding machines (pre-loom activities), and pneumatic jacquards, multiple shuttle box motion on frame/pit looms, washing and calendaring machines and small jiggers (post-loom activities) should be provided to weavers. Work sheds will have proper lighting and ventilation along with the distribution of low-cost safety equipment kits. Small cost-effective measures such as suitable masks and gloves and ventilation should be provided for workers in dye houses, free of cost.

### 9.3.4.13 Action Plan 3: Promote weaver welfare programmes

- **The health insurance scheme** will be extended to all workers in the HVs. It can be extended beyond a single insurance provider to include multiple service delivery organisations. This will help reduce dependency on one entity and create a pool of service providers. The list of empanelled hospitals should be expanded to include public hospitals and made readily available in the public domain.
- **A pension scheme** is under consideration. It aims at providing the social security of pensions and also to promote small savings during the productive life of the weavers. The scheme will be open to all weavers and ancillary workers in the age group of 18 to 60 years. It may initially cover all the weavers in the village. This may be implemented with the support of the National Social Security Fund. A re-training scheme in other sectors should also be a part of any job scheme.

## Pillar 4: Environmental concerns

9.3.4.14 Suitable arrangements will be made for controlling the disposal of toxic effluents and mitigating water wastage. Waste management training should be extended to all weavers and ancillary workers. Installation of effluent treatment plants (ETP) should be made mandatory for all units; solar powered systems should be provided at subsidised cost for housing units and/or work sheds of weavers.

9.3.4.15 To improve health and safety of weavers and ancillary workers, steps should be taken to promote vegetable dyeing, and suitable training and awareness-building workshops should be conducted for dyeing based on chemical dyes. NHDC should ensure the availability of azo-free dyes (in small packets of 20 grams each) in all yarn depots and yarn banks.

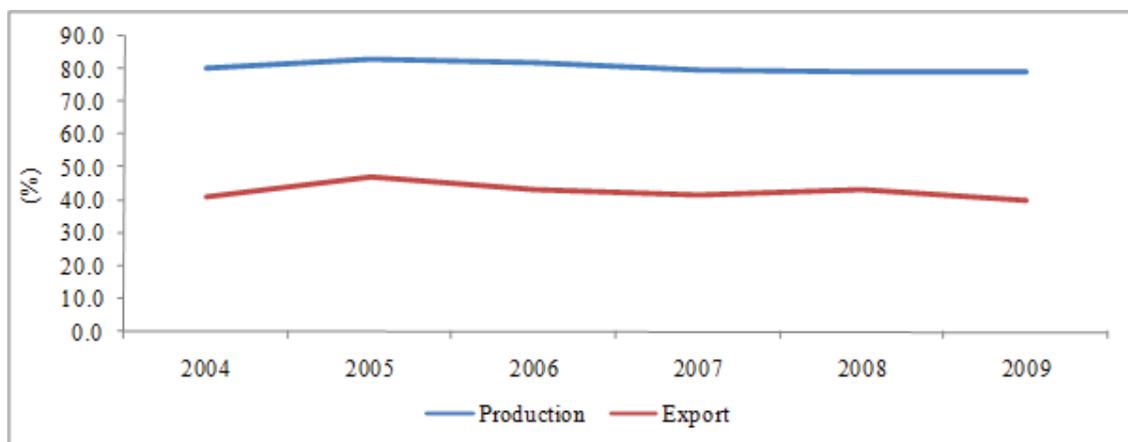
9.3.4.16 Environmental compliance and occupational health and safety issues also need to be built into training and educational modules. Particular emphasis is required to make yarn and handloom dyeing units aware of the ban on azo dyes, as use of these dyes is harmful to both weavers and customers, and it is not desirable to sell products made using these dyes.

## 9.4 The Coir Industry

### 9.4.1 Background

9.4.1.1 The coir industry is one of the traditional cottage industries concentrated in the coconut producing states and union territories of India, with Kerala being the most important of them. It provides employment to 6.97 lakh workers. India accounts for 80 per cent of the world's production of coir and coir products. It also accounts for 40 per cent of the total coir exports. According to FAO statistics, between 2004 and 2009, world production of coir and coir yarn has increased from 725 million tonnes to 1,011 million tonnes while world exports almost doubled from 246 million tonnes to 425 million tonnes. India just managed to keep pace with the rise in world exports and production of coir. Its share remained almost constant (Figure 9.10).

**Figure 9.10**  
Share of India in World Production of Coir Fibre and Yarn and Exports of Coir Fibre and Coir Products (%): 2004 to 2009



*Note: Sri Lankan Production data does not include Coir Pith*

*Source: FAO. 2010. Jute, Kenaf, Sisal, Abaca, Coir and Allied Fibres Statistics. <http://www.fao.org/economic/est/publications/jute-hard-fibres-publications/en/>. 30 June*

9.4.1.2 However, India is the only country where a diversified coir industry has been in existence. India accounts for 96 per cent of the total exports in coir value-added products such as mats, mattresses, flooring and so on. Its share in the production of coir yarn also remains as high as 97 per cent.

9.4.1.3 Kerala is the home of the Indian coir industry. Historically, the coir industry started and flourished in Kerala. However, with the expansion of coconut cultivation, the coir industry has picked up in Tamil Nadu, Karnataka, Andhra Pradesh, Odisha, West Bengal, Assam, Tripura, Puducherry and the Union Territories of Lakshadweep and Andaman and Nicobar Islands through the efforts of the Coir Board.<sup>14</sup> Despite this, Kerala continues to lead the industry, which contributes significantly to its economy. With 10.05 lakh hectares having coconut cultivation in Kerala, this accounts for 45 per cent of the net cropped area. The coir industry is second to agriculture as a source of employment in Kerala, providing work to 3.75 lakh people (in 2011–12), most of whom are women.<sup>15</sup> Furthermore, Kerala is the only state where coir products (mats, mattresses and flooring) have been in existence, though Tamil Nadu is now emerging as its competitor.

## 9.4.2. Government support

### Central government interventions

9.4.2.1 As early as 1953, the Government of India set up the Coir Board for the promotion and development of the coir industry in India as a whole by regulating production and encouraging scientific, technological and economic research.

9.4.2.2 Further, on the basis of the recommendations of the special task force constituted by the Kerala government in April 1990, the National Co-operative Development Corporation (NCDC), the central government and the state government initiated a Joint Coir Developmental Plan.

9.4.2.3 The coir industry is also a part of the Scheme of Fund for Regeneration of Traditional Industries (SFURTI) initiated by the Ministry of Micro, Small and Medium Enterprises. The objective of the scheme was to make traditional industries more competitive with more market driven, productive, profitable and sustained employment for traditional industry artisans and rural entrepreneurs. The scheme envisaged setting up of Common Facility Centres, capacity building measures, product development and design intervention centres, and market promotion assistance including setting up of outlets in selected coir clusters. The duration of the scheme was for five years starting from 2005–06.

### Active involvement of the Kerala government in promoting the industry

9.4.2.4 The Government of Kerala has been extending all help to stakeholders of the coir industry for the overall development of the sector. Production in Kerala is mainly dominated by the cooperative sector. Kerala State Coir Co-operative Marketing Federation (COIRFED) is the apex federation of 833 primary coir cooperative societies. Kerala State Coir Corporation Ltd and Foam Mattings (India) Ltd are the two public sector undertakings in the coir sector in Kerala.

9.4.2.5 The Kerala State Coir Corporation Ltd (KSCC) is a government-owned company set up in 1969 for the systematic development of the coir industry in the State. The corporation has its administrative wing and manufacturing facilities in Alappuzha. KSCC and Foam Mattings (India) Ltd (FOMIL) have been implementing pilot projects from time to time. 'Kerala Coir – the Golden Yarn of God's Own Country' is the brand slogan for Kerala Coir. As part of the popularisation of coir products, the government organised a campaign, 'Oru Veetil Oru Coir Ulpannam', during the Onam season to promote usage of coir products. It also declared 2010 as 'Coir Year'. The coir development department also conducts coir fests/exhibitions.

9.4.2.6 The Alappuzha Coir Cluster Development Project was launched in October 2005 at the Central Coir Research Institute in Alappuzha for creating infrastructure for the sector. It was sanctioned by the Department of Industrial Policy and Promotion (DIPP) for cluster-based development of the coir industry in Kerala, with a central grant of 75 per cent of the project cost, under the Industrial Infrastructure Upgradation Scheme of the department. Now, the state government is also involved in this initiative. The project's thrust areas were: husk collection, fibre extraction, coir yarn production, modern methods of weaving, coir pith processing and common facility service centres.

9.4.2.7 SIDBI's Alappuzha Business Development Services (BDS) Project was launched on 7 July 2007 with the objective of building a self-sustaining loop of specially trained BDS providers (consultants) for the MSMEs of Alappuzha's coir floor-covering industry and to increase the competitiveness and capacity of the MSMEs of the Alappuzha coir cluster. The project is funded by a number of the world's reputed developmental donors including the World Bank, DFID-UK, GTZ and KfW-Germany. The Small Industries Development Bank of India (SIDBI) is playing the role of the nodal agency for this project.

## Massive research and technological infrastructure

9.4.2.8 Central Coir Research Institute (CCRI) is the prime research centre of the Coir Board. It implements all the science and technology programmes targeted at the development of the coir industry. Recognised by the Department of Science and Technology, Government of India, the Central Institute of Coir Technology (CICT) is a research institute under the Ministry of Micro, Small and Medium Enterprises, Government of India. It was established in 1979 for undertaking research in the utilisation of brown coir fibre. Both these institutes do research on different aspects of the coir industry. Coir Testing Laboratories have been set up in Pollachi, Tamil Nadu and Bhubaneswar, Odisha to cater to the testing requirements of this sector.

9.4.2.9 The National Coir Research and Management Institute (NCRMI) is a state government institution, which was set up to strengthen the R&D activities of the coir sector with a view to enabling the industry to produce more value-added products and products with new designs at a reasonable cost.<sup>16</sup>

9.4.2.10 It has, however, been observed that companies in traditional sectors tend not to adopt off-the-shelf technology or R&D done outside the organisation. This tendency needs to be altered.

## Development of coir machinery and development of products for diversification

9.4.2.11 Several technologies have been developed to improve processes, while others are in the pipeline. These include a mobile fibre extraction machine; 'Uday' pneumatic wooden hand loom for weaving coir mats/matting; 'Anugraha', a metallic hand loom for weaving coir geo textiles; 'Anupam', a versatile loom for weaving all types of coir mats and matting; semi-automatic loom for weaving coir matting; bio softening and brightening of coir fibre using 'Coirret manufacture' of two-ply coir yarn on multihead spinning machine; manufacture of coir needled felt; treatment of un-soaked green husk fibre using castor oil emulsion for zero effluent process; softening of fibre; wood logs of coir; automatic spinning unit for two-ply coir yarn; manufacture of fine yarn/fabric by blending coir fibre with other natural fibres; improved bleaching; dyeing; and bio-conversion of coir pith into organic manure.

## Diversification of the industry

9.4.2.12 A number of new products have been launched to expand and diversify the market. For instance, a readymade soilless instant lawn from coir branded 'Cocolawn' has been developed. Further, application of coir geotextiles has been made in construction and reinforcement of unpaved village/rural roads, strengthening of road embankments, reinforcement of rain water harvesting ponds and stream embankments, protection of hill slope embankments, protection of canal embankments and stabilisation of eroded slopes of railway embankments.<sup>17</sup> Similarly, sodium lignosulphonate is extracted from coir pith to be used in lead acid storage in batteries. Coir ply boards, garden materials and table tops are some of the other products created from coir. The Coir Board has been organising EDPs through engagement of professionally competent and reputed organisations.

## 9.4.3 Performance of the industry

### Patterns of growth

9.4.3.1 Despite the government initiatives outlined earlier, the industry has been struggling to survive due to competition from similar products of natural as well as synthetic origin, both in the domestic and international market. Over time, Kerala has also been losing its competitive advantage in this industry. The following patterns emerge:

## Small and stagnant world market

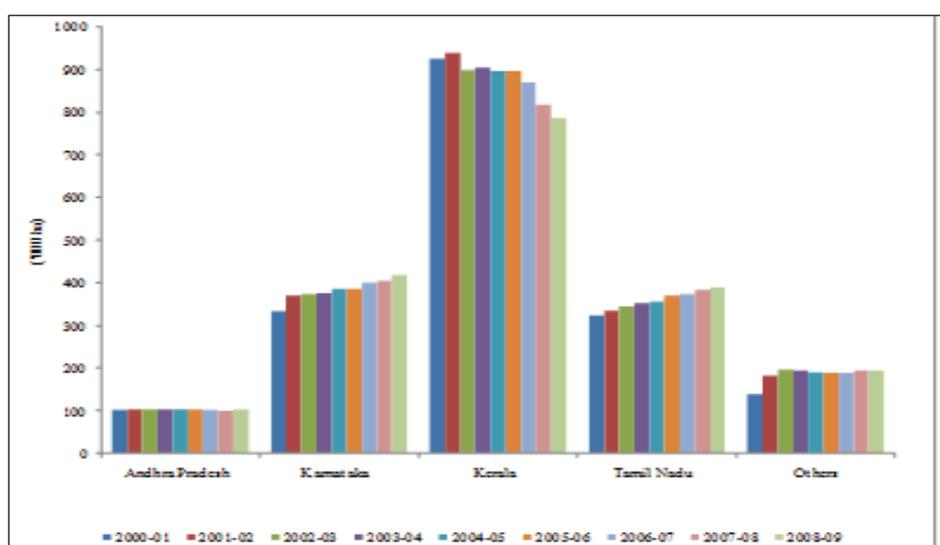
9.4.3.2 The world market for coir and coir products has been growing rather slowly. There are three segments of the market: coir fibre, coir yarn and coir-based products. The only segment that has registered significant growth is coir fibre. This can be attributed to growing demand in China and the US markets. The markets for other products are almost stagnant. Imports of coir yarn have shown a decline in absolute terms from 18.4 metric tonnes (MT) to 13.6 MT between 2004 and 2009. On the demand side, coir products appear to be facing tremendous global competition from other hard fibres. Also, price fluctuations seem to have become a perennial feature of the coir markets.

## Kerala is facing stiff competition

9.4.3.3 India has been facing stiff competition from other countries in coir exports. Its share in the global market has been coming down from over 81 per cent in 1967 to 60 per cent by 1990 and further to 40 per cent in the 2000s. India's exports have increasingly been displaced by Sri Lanka, which accounted for a mere 7 per cent in 1973 and increased its share to 22 per cent in 1990<sup>18</sup> and to 30.9 per cent in 2011.

9.4.3.4 Within India, Kerala is facing competition from Tamil Nadu and Karnataka. In the 1970s and 1980s there was a tremendous increase in the coconut production in states other than Kerala, especially in Tamil Nadu and Karnataka. In 1957–58, all states other than Kerala produced only 28 per cent of the total coconut production in India. In 1990–91, it rose to 53.4 per cent. As raw material has become freely available in these states, the coir industry is developing, with sophisticated machines, in these states. As a result, the coir industry is no more a monopoly of Kerala. Figure 10.11 shows that the area under coconut has been declining continuously in Kerala while that in Tamil Nadu and Karnataka has been rising slowly but steadily. However, only 36 per cent of available coconut husks in India are used for extraction of coir. Therefore, there is enough scope to enhance its application.

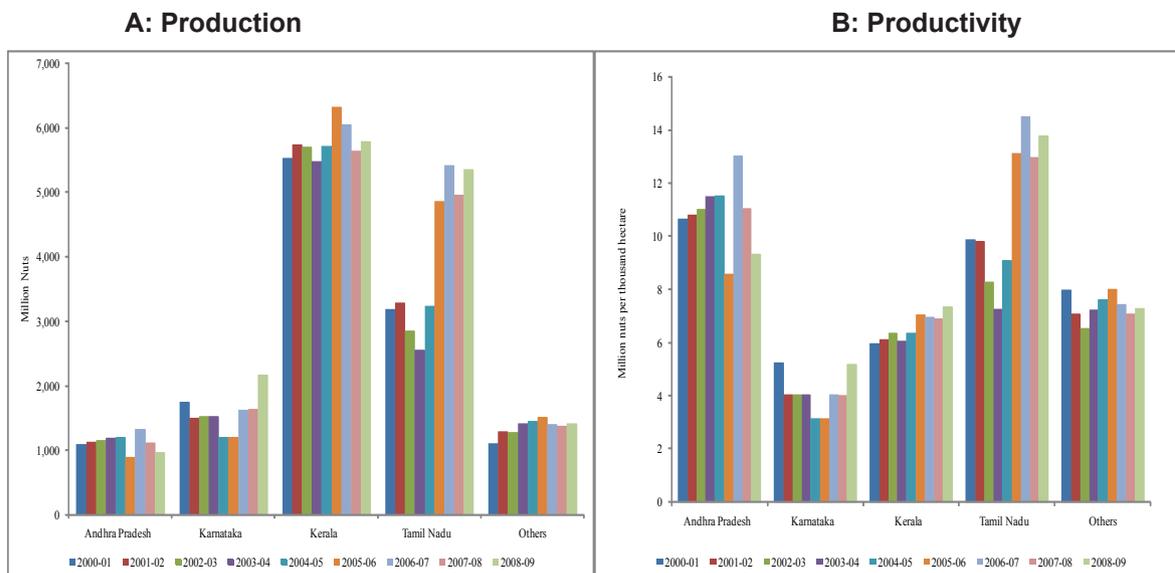
**Figure 9.11**  
Area under Coconut: 2000–01 to 2008–09 ('000 hectare)



Source: Coconut Development Board

9.4.3.5 While other states lag far behind Kerala in terms of area under production, the gap appears small when production is compared. This means that Kerala's productivity is lower than in other states. Low productivity, in turn, manifests itself in Kerala's declining share of coconut production (Figure 9.12).

**Figure 9.12**  
**Production (million nuts) and Productivity of Coconuts (million nuts per 1000 ha):**  
**2000-01 to 2008-09**



Source: Coconut Development Board

### Declining share of Kerala in exports

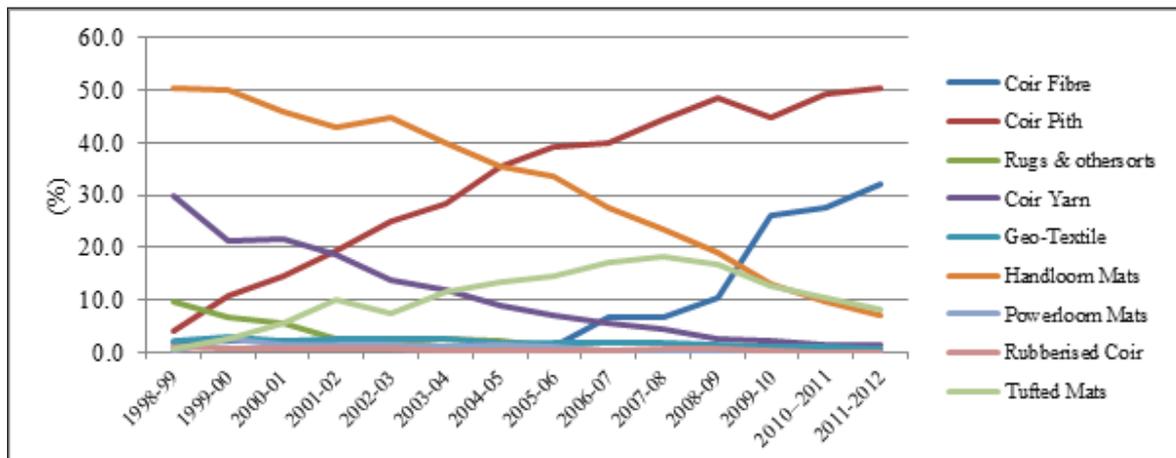
9.4.3.6 Until the late 1970s, Kerala monopolised the coir industry. Strong labour unions, fearing displacement, stalled the modernisation of Kerala's coir industry for many years. The impact of such resistance to modernisation has been severe. The coir industry in Kerala remained insulated and has been characterised by low productivity and traditional technology. Kerala's coir products turned out to be relatively inferior and costly in the world market. Within India, Tamil Nadu has now emerged as a major centre, not only in the fibre sector, but also in weaving.

9.4.3.7 "The State Planning Board of Kerala in 1987 recommended the promotion of mechanisation. Its recommendations emphasised mechanisation on one hand and strengthening of the cooperative organisational structure on the other to infuse new energy into the coir industry."<sup>19</sup> However, little progress was made in that direction. Low productivity in the sector is manifested in Kerala's declining share in total coir exports. However, statistics on Kerala's coir exports are not directly available.

### Small share of value-added products in coir exports

9.4.3.8 The trade in coir yarn and coir products has been regarded as the thrust area of coir, but the share of foreign trade in this segment is small. It is mostly the high-value products that fetch better returns in the export market. Figure 9.13 shows that the export shares of two products that have been growing are coir fibre and coir pith. The share of all other coir products has moved southwards.

**Figure 9.13**  
**Export Shares of Coir Industry by Segment: 1998–99 to 2011–12 (%)**



Source: Coir Board \, Govt. of India

In the recent past, the industry has been stagnating owing to various reasons, some of which are enumerated below:

### Low raw material availability

9.4.3.9 Kerala's traditional coir industry is facing an acute crisis because of fibre shortages due to a labour shortage. The industry feels that there is an untapped stock of husks in rural areas from where collection is difficult as on-site de-fibering is not possible. Local coir mills process only a fraction of the available husks, which accrue more or less around the year as waste during coconut processing. Therefore, there is a need to develop a mobile fibre extraction machine, which can be taken to remote villages so that the vast untapped potential for utilisation of husks from such areas can be leveraged. Neither the coconut farmers nor the end product manufacturers are involved in the primary and extensive activities of husk collection, retting husk, fibre extraction and spinning of yarn.

### Technological obsolescence and lack of timely technology upgrades

9.4.3.10 This is manifested in low productivity, low value addition and lack of innovation and new products. The low degree of mechanisation achieved in the processing sector and the delay in the practical adoption of scientific developments has resulted in the production of lower quality products and lower productivity and diversification. Recognising the disadvantages, policies are now encouraging the move towards full mechanisation.

### Inadequate marketing system

9.4.3.11 The industry is characterised by insufficient marketing, which has added to its already mounting problems. Those who manufacture coir and major coir products have very limited direct access to the markets. Traders and exporters control the entire marketing system due to their greater financial strength, and procure goods only on a job-work basis. The actual producers cannot afford to hold products for a long time before marketing it directly. Due to limited access to the market, traditional yarn and other product manufacturers are always engaged in price wars and are even found to compromise on quality in order to make their products cheaper. Secondly, anti-pollution awareness has increased and enforcement by the government is a threat to the industry, especially

due to the polluting nature of the retting process. Another major concern is the extent of drudgery involved in the processes of retting and fibre extraction. Due to insufficient technological upgrades, the manufacturers have been unable to make these processes less labour intensive and more environment-friendly.

### A high degree of informality

9.4.3.12 Coir has been given the status of a cottage industry. Over 72 per cent of the units in this industry are in the household sector. They are small and cannot reap the benefits of economies of scale. A major handicap of the coir industry in Kerala, which stems from this type of organisational structure, is the continuation of traditional methods of production and the employment of outdated and labour-intensive technology, resulting in low productivity. This has also led to the under-utilisation of the State's husk potential, shortage of yarn and stagnation of the industry.

## 9.4.4 Opportunities

### Growing ecological applications

9.4.4.1 The emphasis of the buyers is gradually shifting from general considerations relating to the product to eco-friendliness, biocompatibility, nature sustainable processes, renewable resources and so on. A significant prospect for coir is this growing global concern to address ecological problems through the use of natural materials for environmental protection.

9.4.4.2 Coir nets or geotextiles and bio-logs or fascines, two of the most important coir products, have proven to be effective materials in controlling steep road slope erosion and are used for riverbank protection in technologically advanced countries.

9.4.4.3 Geotextiles are coir-based matting materials placed on sloping land and embankments to hold soil and permit vegetative growth. It helps in erosion control and soil productivity conservation. Bio-logs or fascines are tubular structures of coir mats or nets filled with dust, peat or coir resembling large rolls or gabions.

### New products

9.4.4.4 Coir can be used for horticulture, hydroponics (See Chapter on Agriculture), pet industry, food, body care products and the industrial sector.<sup>20</sup> The uses of coir for various industrial applications are being explored (Box 9.6).

- Automotive uses: A consultation on natural fibres by the Food and Agriculture Organisation indicated that coir has potential as a natural fibre composite for trucks and in automotive parts as roof liners, floor carpets, seat back trims, engine compartment insulation, package trays, luggage compartments, textile exterior, wheel arc liner, rear and side wall covers and driver cabin liner. Several European firms are testing whether coir can play a role in the growing automotive market as 'bio-composites' or as thermal insulation in house construction.

**Box 9.6**  
**The Scotts Miracle-Gro Company of the US**

The Scotts Miracle-Gro Company is researching how coconut coir, or husks, might be used as a plastic reinforcement. Ford and The Scotts Miracle-Gro Company are researching the use of coconut fibre reinforcement for moulded plastic parts to reduce the use of petroleum and make the parts lighter and more natural looking. The coconut coir, or husks, are a waste stream from Scotts' soil and grass seed products. "This is a win-win situation. We're taking a material that is a waste stream from another industry and using it to increase the sustainability in our vehicles," said the technical expert for plastics research at Ford, Dr Ellen Lee. "We continue to search for innovative renewable technologies that can both reduce our dependence on petroleum as well as improve fuel economy," she added. In vehicle interiors, the material could be used in storage bins, door trim, seat trim or centre console substrates. It could also potentially be used on under body and exterior trim.

*Source: The Scotts Miracle Gro Company Web site*

9.4.4.5 Experiments show that the advantages of coir over other natural materials are its low cost and light weight. Moreover, coir has properties suitable for acoustic insulation, has no abrasive wear, does not irritate skin and is ecologically friendly.

9.4.4.6 Thus, producers in India stand to benefit. The trend in developed countries towards natural fibres in adapted technical applications, where they provide technical, economic and environmental advantages, also offers market opportunities.

### Coir pith

9.4.4.7 Since the early 1990s, coir pith, which used to be an annoying waste, is emerging in horticulture as a durable, highly water absorbent and environment-friendly replacement for peat moss, which is a non-renewable resource. Coco peat maintains excellent air porosity even when saturated and creates better crops with faster developing roots. Coco peat has better water retention qualities than peat and other growing media, and absorbs moisture immediately. Initially, demand for coir pith grew quickly and it made inroads into domestic and commercial horticulture. Unfortunately, quality control didn't keep up with demand. While the high salt content in pith had leached out over time from the originally 'mined' mounds, more recent products had high salt content and caused some crop failure. At the same time, low-cost peat from the Baltics and Canada created stiff competition. Through improved quality control and more aggressive marketing, pith exporters are now regaining export volumes. Coir dust, meanwhile, has gained more attention from overseas gardeners and plant enthusiasts as they now use this material for organic compost and soil conditioner. The agriculture sector, therefore, is a big potential market for coir dust as an organic fertiliser and as a growing medium. Pots made of coir dust with other natural materials as binders can be used to grow cuttings of orchids and seedlings of other plants.

9.4.4.8 At the same time, pith sales have become crucial to the economic survival of many mills since the slow growth in fibre prices was insufficient to balance growing labour costs. Its high compressibility also helps since it can be shipped overseas at reasonable cost. These trends in existing and emerging markets are indicators that coir has the potential to achieve sustainable growth.

## Chinese demand

9.4.4.9 Another big opportunity for the industry is the growing Chinese market for coir and related products. In recent years, China has also discovered coir as a versatile fibre, which serves a less glamorous need of its population — more comfortable bedding. Since 2001, China has significantly increased its imports of mattress fibre. Much of it gets crudely stuffed into mattresses, but China has also set up factories to produce the softer rubberised coir mattresses. As a result, FOB prices for mattress fibre have increased sharply. Furthermore, China has a number of dams, dumpsites, golf courses and riverbanks that may need coco geotextiles for desertification abatement, soil rehabilitation and stabilisation. China may ultimately develop its own coir industry or follow the example set by the West and switch to synthetic foams. However, Chinese demand for coir creates a medium-term opportunity for the rural small-scale coir industry.

9.4.4.10 New machines to further enhance production of coir and improve the quality of coir products have been developed for various operations along the value chain. The 'coco husk micro-decorticator', the 'coco husk mini-decorticator', the 'coco fibre twining machine' and the 'coco husk beating machine' are some of the new machines.

9.4.4.11 Consumption of coir is expected to continue growing, albeit at a slower rate than that of the past decade, as growth in the demand for coir products in India and China may decelerate.

## Export growth

9.4.4.12 Total exports are expected to continue increasing at an annual rate of 1.1 per cent, in line with global demand and consumption trends in established markets such as the US and the European Union.

## 9.4.5. Strategy

### Vision

9.4.5.1 Transform coir into a modern and high value-added industry.

### Mission

9.4.5.2 A modern innovative, rejuvenated coir industry will bring greater growth and equity to the State.

9.4.5.3 It is imperative that the Government of Kerala evolves strategies for research and development in this field and stimulates diversification and growth of the industry through coordinated activities among the functional departments concerned, mainly agriculture, industry and infrastructure development.

9.4.5.4 Coir has many inherent advantages, but the industry is yet to achieve its real potential for want of an integrated approach. Schemes to promote the industry should include programmes to increase husk availability, increase productivity for product innovation and diversification, bring about improvements in standards and quality, increase value addition through innovation and better packaging, improve scientific and technical inputs, provide better financial support for the industry and workers and so on. Research and development efforts in the diversified utilisation of the coconut over the past decades resulted in numerous viable processing technologies. Despite these achievements, the coconut industry in the producing countries is still highly dependent on the production and marketing of traditional products such as copra and coconut oil. This situation contributed to the

main problem of the coconut industry — low returns from coconut farming. Continuous effort must, therefore, be directed to new sources of income through product diversification and improved product quality, with an emphasis on market-oriented technology.

9.4.5.5 This sector is one of Kerala's core competencies and is one that holds a lot of potential for growth and development. Within the value chain of coir production, Kerala must identify its current comparative advantages and strengthen the ones it wants to develop. It is time Kerala concentrates on product improvement, development and diversification through the introduction of value-added products and market promotion of these products.

### Action Plan 1: Identify the problem areas

9.4.5.6 The areas that need urgent attention are the following:

- Husk collection
- Improved and quicker methods of retting
- Increase in productivity in spinning through mechanisation
- Innovation and mechanisation in weaving
- Bleaching and dyeing
- Introduction of new products
- Packaging

9.4.5.7 Complementary to this is the need to focus attention on sustained efforts for enhancing coconut production coupled with aggressive marketing strategies. If these activities are realised, then positive growth of the coconut-producing areas can be achieved, thus improving the livelihood of the many small farm holders who are the main component of the coconut sector.

### Action Plan 2: Design schemes for the development of the industry

9.4.5.8 Schemes for the development of the industry should include:

- Making Kerala a hub for the manufacture of coir and coir products.
- Promoting private investment.
- Encouraging technology upgrades and product innovation.
- Increasing productivity and profitability through mechanisation.
- Enabling government procurement: Coir is eco-friendly and biodegradable, and it promotes vegetation growth as it traps topsoil and keeps its nutrients intact. This could help boost the demand for coir. In the Philippines, all national and local government agencies, bureaus and other institutions, including agricultural institutions and councils, use coco peat or coir dust and coconut fibre material for soil conditioning and erosion control in government projects nationwide. India should also enforce such practices
- Attracting the younger generation to the industry by creating better working conditions and attractive financial packages.
- Encouraging entrepreneurs in this sector.
- Developing links with the knowledge economy to enable invention and innovation in the coir industry.
- Introducing vocational courses in coir making.
- Developing new uses and areas. For example, the energy sector is examining the use of coconut husk as a biogas, which can be a win-win situation for all concerned.
- Developing new regions to market products.

- Issuing Good Manufacturing Practices (GMP) or standard certifications for coconut-related products and branding products as 'Made in Kerala'.
- Marketing Kerala coir more vigorously as 'The Golden Yarn of God's Own Country'.
- Innovation in coir products.
- Facilitate adoption of off-the-shelf technology.
- Use of machinery to harvest coconut husk. Also, encourage coconut picking as a link with the tourism industry.
- Train migrant labour, especially workers from Bengal and Odisha in this sector as they come from geographies that are similar to Kerala.

9.4.5.9 Indeed, Kerala needs to vigorously promote coir and coir-based products in the world market. It is important to showcase the unique properties of coir fibre compared to other fibres.

### Action Plan 3: Promote coir zones

9.4.5.10 It is proposed that the government creates three 'State Investment and Manufacturing Zones' (SIMZs) for traditional industries — Kollam (for cashew); Balaramapuram (for handloom); and Alappuzha (for coir). Physical infrastructure in terms of transport and energy should be well developed in these regions. Each region will have its own special purpose vehicle, which will have representatives from the government, cooperative sector and the private sector. The zones will be equipped with export infrastructure, including facilities to issue quality marks and labelling. These zones will be linked with the regional innovation systems, particularly universities and research organisations. Appropriate funding mechanisms need to be created. They will have formal markets for trading and bringing various stakeholders to one place to facilitate knowledge transfers. The objective will be to develop a modern coir sector that can compete in the world market. Flexibility of regulations is essential to promote entrepreneurship in coir.

9.4.5.11 Coir is the thickest and the most resistant of all commercial natural fibres. The cellular structure of coir makes it more elastic than other natural fibres. The cell walls of coir fibre and pith contain more lignin than any other commercially relevant natural fibre. As a natural polymer, the lignin in coir fibre adds strength and elasticity to the cellulose-based fibre walls. And, since lignin resists biodegradation, high-lignin material such as coir fibre imparts strength and longevity to outdoor applications. These include geotextiles, which have become a very important eco-friendly product, gaining a strong market in the US, Europe and Asian countries in the form of erosion control blankets, nets for slope protection, mulch blankets, roof greening mats, grow sticks, coco logs as well as skeffed coir for river bank/canal bank support. Coconut pith has also gained wide acceptance in many horticultural applications. The demand for mattress fibre, as in China, remains a big market with tremendous opportunities.

## 9.5 Other Traditional Industries

9.5.1 Within the traditional sector, the other industries are — spinning mills, power looms, handicrafts, bamboo industry and khadi and village industries. Overall, Kerala should concentrate on the higher end of the value chain of these products: product design, high value addition, marketing and branding the products. Overall, economic empowerment is discussed for each sector. However for social empowerment, health and pension schemes such as in the handloom sector are suggested.

9.5.2 The bamboo industry has been extensively discussed in the section on forests. Bamboo and reed are among the major forest produce of Kerala. Bamboo and reed and products made from them can be a major revenue earner for Kerala and need a major push in R&D and marketing. The Kerala State Bamboo Corporation Ltd, a government of Kerala undertaking, established in 1971 is involved in the development of the bamboo industry with a particular focus on bamboo workers. It will need

to give greater emphasis to R&D. A visit to the corporation's Web site shows that its focus is only on bamboo boards, mats, flooring tiles and houses. In contrast, a simple search on the Internet shows at least 1,000 products that can be made from bamboo.<sup>21</sup> Bamboo has uses in forestry, wood industry, pulp and paper industry, textiles, bioenergy, food and beverages, automotive, sports and recreation, electronics, high-tech and farming industries.<sup>22</sup> There are people who are willing to pay well for high-end eco-friendly products. Combining the craft skills of local artisans in Kerala with the stamp of sustainable labour practices can double the value of products made from bamboo and reed. Home-grown entrepreneurs innovate to sell home-made products (possibly using e-commerce), creating a virtuous cycle of economic growth for all stakeholders. The Kerala Forest Research Institute (KFRI) can open a bamboo innovation/incubator centre under its 'wood science and technology programme', which may encourage students to develop innovative products in wood and other non-wood products such as bamboo and reed. This may even help the Kerala Bamboo Development Corporation with its social protection programmes. Instead of just protecting them, the company can help the tribes learn the skills needed to work on high-value products.

**9.5.3 Spinning Mills and Power looms:** Other states have comparative advantages in this sector. The spinning sector may be promoted and connected with the handicrafts and khadi and village sectors. Spinning mills have potential if they can be linked to the value chain in the textiles industry in India. Besides, they can try and sell superior quality yarn. Working with designers and the National Institute of Fashion Technology in Kannur may help in product innovation. As for the power loom sector, the government may concentrate on regulating it. Attempts may be made to link Kerala's power looms to the Indian textiles value-chain. The picture on jobs in this sector is not very encouraging, and other sectors such as bamboo hold far more potential. The government may actively develop a programme for re-training labour from these sectors, if they choose to move out.

**9.5.4 Handicrafts:** This sector requires government support, and should be showcased and linked to the market. The government is already facilitating and helping to strengthen the linkages between the handicrafts sector and main sector. Tourist spots in Kerala can also have spaces where the handicrafts associated with the area are showcased. Plus organising handicrafts exhibitions and supporting them to travel to other parts of the country and world are important. Developing public urban spaces such as the 'Dilli Haat' concept will definitely boost this sector, as will e-commerce. The communities associated with the handicrafts sector should be targeted in the following strategic manner (See Chapter 22 for a detailed strategy on socially vulnerable groups):

- **Economic empowerment:** Link the vulnerable groups with the mainstream organised sectors. For example, artisans who make musical instruments may be linked with the tourism and ICT sectors. As part of this process, tourists can be directed to the places where the artisans make their instruments. The government, through the Kudumbashree programme, can assist with marketing and branding the instruments (thereby increasing their value even further) and even help sell them. Organising concerts in which local instruments are played, can help popularise their use. Similarly, local museums can display musical instruments made in Kerala.
- **Human capital:** Encourage vulnerable groups to preserve their particular cultural identity, while mainstreaming them. Avenues for health and education should be provided to them, with a way to upgrade skills. For example, centres of excellence may host artisans for preserving and spreading knowledge, thus creating opportunities for others to learn a particular craft. In short, knowledge in any form must be nurtured.
- **Environmental:** Environmental concerns, if any, should be mainstreamed and be a part of the overall strategy.
- **Social empowerment:** Reduce their vulnerability and make them independent over time. Social security, health financing and other forms of assistance and entitlements can help minimise the groups' vulnerability.

9.5.5 Khadi and village industries: The current perspective on this sector is that it plays a substantial role in protecting employment. Kerala needs to change the mission of this sector from protecting to generating employment. There are many successful examples around the country for Kerala to learn from. The advantage of following a different strategy is that it will both generate employment and higher income instead of just protecting people in the sector. It will also enhance traditional handicrafts and celebrate Kerala's natural capital and products made from them. For example, Delhi houses the Khadi and Village Industries emporium right in the city centre. Its new building is up-scale and product displays are contemporary and well done. The most popular products in the Delhi khadi emporium are the personal care products.<sup>23</sup> The significant thing about the cosmetic products sold in the Delhi khadi emporium is that they are invariably made in Uttarakhand. Handloom cloth and traditional handicrafts (including from Kerala) are also available in the emporium. There are various NGOs that sell herbal products developed in Uttarakhand and then invest the sales proceeds back in the rural communities.<sup>24</sup> In this aspect, Kerala could learn from them.

9.5.6 Kerala's strategy should be about energising this sector. It is about developing innovative and standardised products, branding, marketing and showcasing them. The idea is to celebrate the rich heritage and diversity of Kerala and let people around the world know about it. For example, converting the khadi emporium located on Thiruvananthapuram's arterial M.G. Road into a five-storey 'mall', like its private counterparts, can transform its image and make it an 'attractive' shopping destination. The store can sell ayurvedic products made in Kerala, organic food products and cosmetics (made from the pristine waters of the Western Ghats). All these products can carry the 'Made in Kerala' brand. Further, handicrafts, forest products, handloom cloth and designer and non-designer garments made out of handloom cloth can be sold in the store. Developing backward and forward linkages will immensely help celebrate the heritage of Kerala, generate incomes and employment. Kudumbashree can also play a major role in this sector by setting up MSMEs, which make these products. There is a growing global interest in organic food, sustainably made organic clothes and so on. Kerala, with its immense environmental capital, should capitalise on these trends. It should also forge ties with the khadi industries in Delhi, which will create further markets for its products. Products carrying the khadi label are also sold in private stores in Delhi. Kerala can do the same thing and also look at exporting these products. Last, but not the least, Khadi Kerala can sell its products online (e-commerce). Further, blocks/districts with a concentration of khadi MSMEs can even create a museum or arrange tours for visitors to understand the production process. These will help generate revenue and employment for the people and the community in other ways too. All this will help economic, human, social and environmental development.

## 9.6 Conclusion

9.6.1 In all the three major traditional industries, the strategy for the future is to diversify, increase the value added to products, invent and innovate with other industries. Coir has major potential to propel economic growth in Kerala. The cashew sector holds potential for Kerala, but in the knowledge, innovation and design-based elements of the value chain. Handloom is a niche product of Kerala. In all products, branding is very important. The development of these sectors will bring growth, equity and environmental sustainability for the State.

## Reference

- <sup>1</sup> The reference for this whole section is the following:  
State Planning Board, Government of Kerala. 2014. *Economic Review 2013*. Volume 1. Thiruvananthapuram, Kerala India. January.
- <sup>2</sup> The World Business Council for Sustainable Development (WBCSD) describes eco-efficiency as a management strategy of doing more with less. In practice, eco-efficiency is achieved through the pursuit of three core objectives: (i) increasing product or service value; (ii) optimising the use of resources; and, (iii) reducing environmental impact. (Industry Canada Web site: [http://www.ic.gc.ca/eic/site/ee-ee.nsf/eng/h\\_ef00010.html](http://www.ic.gc.ca/eic/site/ee-ee.nsf/eng/h_ef00010.html))
- <sup>3</sup> Yadav, S. 2010. *Economics of Cashew in India*. Occasional Paper No. 50. Department of Economic Analysis and Research, National Bank for Agriculture and Rural Development. Mumbai.
- <sup>4</sup> It could also be due to the lack of labour legislation and regulations in Travancore, unlike parts of India governed by the British.
- <sup>5</sup> Red River Foods Inc. 2010. *Cashews: Highlights of the Cashew Industry*. <http://www.agoatoolkit.com/agoa/English/Select%20Products/Cashews/Cashew%20Industry%20and%20ExportGuide/03-Cashew-Industry%20Highlights.pdf>. June.
- <sup>6</sup> Hall, M., Patel, P., Sarmiento, G., Smith, N., Sostowski, N. and S. Waxman. 2007. *Benchmarking the Global Cashew Industry*. Micro and Small Enterprise Trade-Led Growth Program in Brazil. For Development Alternatives Inc. May.
- <sup>7</sup> Hall, M., Patel, P., Sarmiento, G., Smith, N., Sostowski, N. and S. Waxman. 2007. *Benchmarking the Global Cashew Industry*. Micro and Small Enterprise Trade-Led Growth Program in Brazil. Client: Development Alternatives, Inc (DAI). May.
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- <sup>9</sup> Red River Foods Inc. 2010. *Cashews: Highlights of the Cashew Industry*. <http://www.agoatoolkit.com/agoa/English/Select%20Products/Cashews/Cashew%20Industry%20and%20ExportGuide/03-Cashew-Industry%20Highlights.pdf>. June.
- <sup>10</sup> Futures trading in cashew has started taking place in Kollam, Kerala, started since March 2005.  
Yadav, S. 2010. *Economics of Cashew in India*. Occasional Paper No. 50. Department of Economic Analysis and Research, National Bank for Agriculture and Rural Development. Mumbai.
- <sup>11</sup> Peter, K.V. and Z. Abraham. 2007. *Biodiversity in Horticultural Crops*. Volume I. Data Publishing House. Delhi.
- <sup>12</sup> Whole Foods Market Web site. <http://www.wholefoodsmarket.com/blog/whole-story/cooking-cashews>.
- <sup>13</sup> Master weavers almost always belong to the weaving community because it is not easy for persons from any other caste to set up these firms.
- <sup>14</sup> Ministry of Micro, Small and Medium Enterprises, Government of India. 2013. *Annual Report 2012-13*.
- <sup>15</sup> State Planning Board. 2013. *Kerala Economic Review 2012*. Government of Kerala, Thiruvananthapuram.
- <sup>16</sup> State Planning Board. 2011. *Kerala Economic Review 2010*. Government of Kerala, Thiruvananthapuram.
- <sup>17</sup> "Under the Prime Minister's Gram Sadak Yojana (Bharat Nirman), it has already been decided to use coir geo textiles for construction of rural roads in nine states. In future, the project is likely to be extended to all 28 States of the country".  
Ministry of Micro, Small and Medium Enterprises. 2012. *Report of Working Group on Micro,*

*Small and Medium Enterprises (MSMEs) Growth for 12th Five Year Plan (2012–17)*. [http://msme.gov.in/Report\\_working\\_group\\_5yearplan-2012-17.pdf](http://msme.gov.in/Report_working_group_5yearplan-2012-17.pdf). New Delhi.

- <sup>18</sup> Thomas, I., Stuijvenberg, T.M. Van., P.A and K.N. Nair. 1991. *The Coir Industry in Kerala-A Study of Modernisation and Employment Protection*, Coir Board, Kochi.
- <sup>19</sup> Sabarinath, K. 2010. *Modernisation of Coir Industry in Kerala: A Multi-Dimensional Impact Analysis*. . Phd Thesis Submitted to Department of Commerce University of Pondicherry, Pondicherry, India.
- <sup>20</sup> Galuku Web site. <http://galuku.com/corporate/index.html#one>.
- <sup>21</sup> Guadua Bamboo Web site. <http://www.guaduabamboo.com/>.
- <sup>22</sup> Guadua Bamboo Web site. <http://www.guaduabamboo.com/uses-of-bamboo.html>.
- <sup>23</sup> Khadi Natural (Gramodaya Ashram) Web site. <http://www.khadinatural.com/>.
- <sup>24</sup> Aarohi website. [www.aarohi.org](http://www.aarohi.org).