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Transformation in Indian Agriculture, Allied Sectors, and Rural India: Is there less *krishi* in Bharat?

Dr Anil K. Sharma

Senior Fellow, NCAER

and

NABARD Chair Professor at NCAER (2011-2014)

February, 2015

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NCAER| National Council of Applied Economic Research
11 Indraprastha Estate, New Delhi 110002
Tel: +91-11-2337-9861 to 63, infor@ncaer.org

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Transformation in Indian Agriculture, Allied Sectors and Rural India: Is there less *krishi* in Bharat?

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Transformation in Indian Agriculture, Allied Sectors, and Rural India: Is there less *krishi* in Bharat? [1]

> India's traditional strength in agriculture has increased manifold on account of the efforts of our farmers and improvements in technology. We need to continue to improve, and move from pure food security to a focus on a mix of agricultural production as well as the actual returns that farmers get from their produce.
>
> Villages … need to be fully integrated institutionally into the development process so that we draw on their vitality and energy. India has more than 50 million small businesses, which are a major source of employment creation. These businesses are particularly important in creating opportunities for the backward and disadvantaged sections of the society. Policymaking must focus on providing necessary support to this sector in terms of skill and knowledge upgrades and access to financial capital and relevant technology.
>
> **Cabinet Resolution setting up the NITI Aayog, Government of India, January 1, 2015.**

1. Backdrop

The experience of the evolution of the agricultural sector over centuries tells us that the sector has evolved from being a basic food gathering (hunting and fishing) activity to an intensive production system due to population growth, increase in income, urbanisation, technological revolution, and liberalisation of international trade. The long-term development process also tells that to begin with the agricultural sector accounts for the bulk of the country's economic output and a large share of the labour force. As countries develop, manufacturing and services sectors expand at a more rapid rate, and as a consequence the shares of these sectors in overall GDP expand. The labour force also starts moving out of agriculture to these sectors. These changes lead to a fall in the share of the agricultural sector in GDP and also the share of labour force employed in the agricultural sector.[2]

The other big change that occurs along with this transformation is that the demand for agricultural products, both food and non-food, also changes. The food demand shifts from basic cereals to high value products such as dairy products, fruits and vegetables, and meat and meat products, and processed products due to income growth, urbanisation, and trade liberalisation. And, as the consumption of high-value agricultural products rises, the output of agriculture-food industry, which includes processing, wholesale, and retail, also expands.

Hence, a main objective of this NCAER paper for NABARD prepared under the NABARD Chair Professor Scheme is to examine the evolution of Indian agriculture and allied sectors in the six decades after independence and the main trends that emerge with a particular focus on the changing contribution of allied

[1] The author would like to express his deep gratitude to Dr Shekhar Shah for his immensely useful comments and suggestions on the draft version of this paper.

[2] Johnston and Mellor (1961), Kuznets (1966), Chenery and Syrquin (1975), and Timmer (2007).

sectors. And, what are the main driving factors that have contributed to this transformation and what policy implications can be drawn?

NABARD is mandated to foster the development of both agriculture and rural India, hence, the second main objective of this NCAER paper for NABARD is to examine whether the transformation of Indian agriculture in recent years has also fundamentally changed the relationship between rural India and agriculture. Historically, the preponderance of agriculture in rural India has meant that agricultural development has been seen as a necessary—and sometimes, even a sufficient—condition for rural development. If this relationship has changed, and there is recent evidence suggesting such change, then promoting agriculture may no longer be synonymous with promoting rural development, and *vice versa*. If indeed this is the case, then NABARD's own strategic thinking and programming has to adapt to this changing reality in order for it to continue to serve its mandate to promote both agricultural development and the advancement of India's rural areas. And while there may be fewer areas of overlap, there may also be new opportunities in the mix of agriculture and non-agricultural activities, say in rural connectivity or the rural non-farm sector, which may contribute to agricultural productivity growth as well as a better investment climate for rural investments in non-farm services and manufacturing. This paper addresses some of these questions using household data from a just released, December 2014 Government of India report based on the NSS 70th Round (January-December 2013).

Section 2 of this paper examines the broad trends in Indian agriculture and its allied sectors by segmenting these trends into three distinct phases of development, followed by a more detailed assessment of the contribution of allied sectors—livestock, forestry, and fishery. It further examines the transformation of these sectors by examining changes in their value of output, information for which is available at a more detailed level for all three phases that are examined here. Section 3 then asks the question about what has driven change in Indian agriculture and allied sectors and how these drivers of change have varied across the three historical phases considered in this paper. In doing so, it examines both supply and demand side factors. Section 4 looks at the question of the transformation of Indian agriculture and rural India from a household perspective using data from the 70th Round of the NSS. Section 5 concludes with a summary of the key developments examined in this paper and their policy implications, including for the future strategy of NABARD in responding to its dual mandates to help develop agriculture and advance rural development.

2. Broad Trends in Indian Agriculture and Allied Sectors

2.1 Agricultural and Allied Sector's Share in GDP and Employment

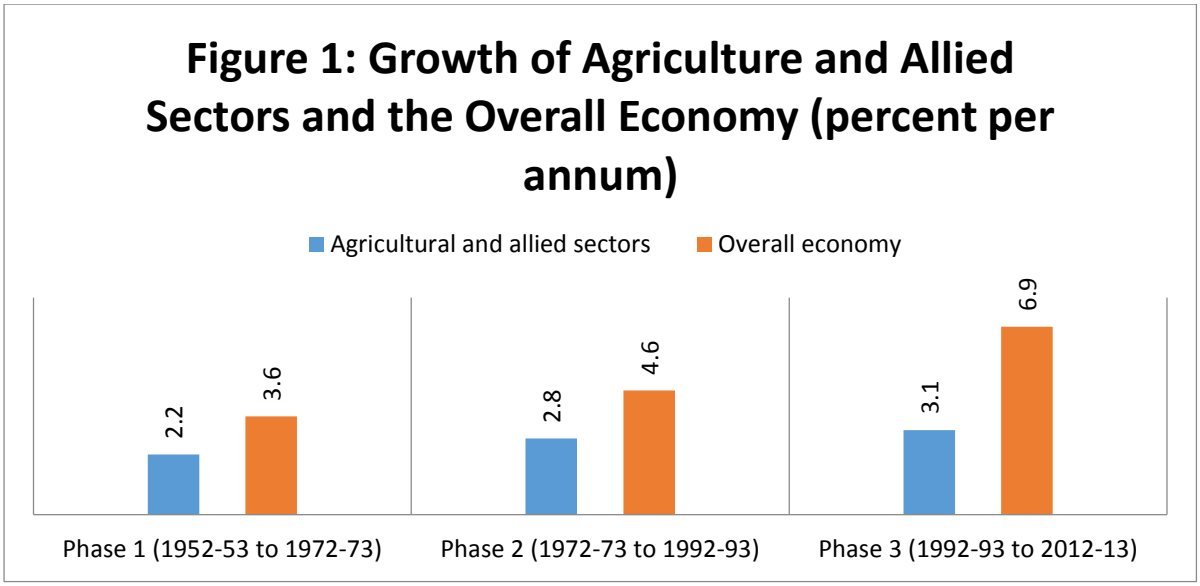
In the early 1950s, in what is termed here as **Phase 1** of India's agricultural development, agricultural and allied sectors constituted about 57 per cent of the country's total GDP and 70 per cent of the workers were engaged in these sectors (Table 1). Even though there was acceleration in agricultural and allied sectors growth, particularly in **Phase 2** (between 1972-73 and 1992-93) and **Phase 3** (between 1992-93 and 2012-13)[3], yet there has also been a sharp fall in the share of agricultural and allied sectors in overall GDP due to slower growth in this sector compared to the overall economy (Figure 1). While the share of agriculture and allied sectors in GDP declined to 44 per cent during early 1970s, to 29 per cent in early 1990s, and finally to about 14 per cent during the more recent period, the share of workers engaged in these sectors has declined very slowly from 70 per cent in the early 1950s to 55 per cent during the more recent period. These are all well-known broad trends in the share of agriculture in GDP and employment.

Table 1: Agricultural and Allied Sectors GDP and Employment

Period (TE=Three Year Ending)	Agriculture and allied sectors GDP at constant 2004-05 prices (Rs. crore)	Workers employed in agricultural and allied sectors (Million)	Share of agriculture and allied sectors in overall GDP (Per cent)	Share of workers engaged in agricultural and allied sectors to total number of workers (Per cent)
TE 1952-53	162,112	97	56.5	69.8
TE 1972-73	258,070	126	43.5	69.7
TE 1992-93	406,404	185	29.3	64.8
TE 2012-13	745,385	263	14.3	54.6

Sources and Notes: (1) Central Statistical Office (CSO): *Annual Accounts* for various years, Ministry of Statistics and Programme Implementation, New Delhi. (2) Registrar General of India: *Census* data for various years, Office of the Registrar General of India, New Delhi. (3) The data for workers are for Census years 1951, 1971, 1991, and 2011.

[3] For the sake of analytical comparison the period from 1950-51 to 2012-13 has been divided into three phases to capture the early phase (1950-72) of agricultural development after Independence, followed by a phase (1973-1992) of expansion of the Green Revolution, and a third phase (1993-2013) that corresponds to the period of economic and policy reforms.



Looking at it more closely suggests that the pace of shift in workers engaged in agricultural and allied sectors to the other sectors of the economy such as industry and services was extremely slow during the period from early 1950s to early 1990s. It is the more recent period, that is, Phase 3 (between TE 1992-93 to TE 2012-13), which coincides with the liberalisation of the economy and launching of the economic reforms, that has witnessed a significant shift in workers out of agriculture and allied sectors. This is an expected outcome of economic reforms, particularly in the context of the extremely sluggish movement of labour out of agriculture and allied sectors witnessed during the period of 40 years between the early 1950s and early 1990s.

2.2 The Contribution of Allied Sectors in Agriculture and Allied Sector GDP

Among the three broad components of agriculture and allied sectors in the National System of Accounts that have existed since early 1950s – agriculture including livestock, forestry, and fishery, while agriculture including livestock continues to account for a major share of the total GDP, this sector has further consolidated its position. And, the combined share of two allied sectors forestry and fisheries has shrunk considerably. The share of agriculture including livestock has increased from 74 per cent in the early 1950s to 83 per cent in early 1990s to 85 per cent in the more recent period (Table 2).

The allied sector that has lost a significant share is the forestry sector the share of which has decreased from 24 per cent in early 1950s to about a half (13 per cent) in early 1990s and to further about 10 per cent in the more recent period (TE 2012-13). On the other hand, though fisheries account for only a small share of the

total pie, the share of this sector has doubled from 2 per cent in early 1950s to 4 per cent in early 1990s and 5 per cent during the more recent period.

It is obvious that the main reason for reduction in the contribution of the two allied sectors forestry and fisheries in total agricultural GDP from 26 per cent in early 1950s to 15 per cent in TE 2012-13, is highly uneven growth in the forestry sector compared to growth in the agricultural and fisheries sectors (Figure 2). The growth performance of the fisheries sector is much healthier compared to even the agricultural sector during all three phases, which explains the increase in share of this sector in total GDP for agricultural and allied sectors.

The information after 1980s when separate estimates of GDP for the livestock sector have started becoming available reveals that the loss in the share of the forestry sector has been made up by the expansion of livestock sector's GDP. The livestock sector now accounts for 23 per cent share of the total GDP of the agricultural and allied sectors, which is roughly close to the share of forestry sector in the early 1950s and 1970s (Table 3). [4] In the early 1980s the livestock sector accounted for only a small share of the total GDP, just about 12 per cent.

Table 2: Agricultural and Allied Sectors GDP

Period (TE=Three Year Ending)	Agriculture and Livestock (Per cent)	Forestry (Per cent)	Fisheries (Per cent)	Total GDP at constant 2004-05 prices (Rs. crore)
TE 1952-53	74.0	24.3	1.8	162,112
TE 1972-73	75.3	22.1	2.7	258,070
TE 1992-93	83.3	12.8	3.9	406,404
TE 2012-13	85.1	9.7	5.2	745,385

Sources and Notes:

1. Central Statistical Office (CSO): *Annual Accounts* for various years, Ministry of Statistics and Programme Implementation, New Delhi.

[4] There are minor differences in the shares of the forestry and fishery sectors in Tables 2 and 3 due variations in the estimates of GDP at current and constant prices.

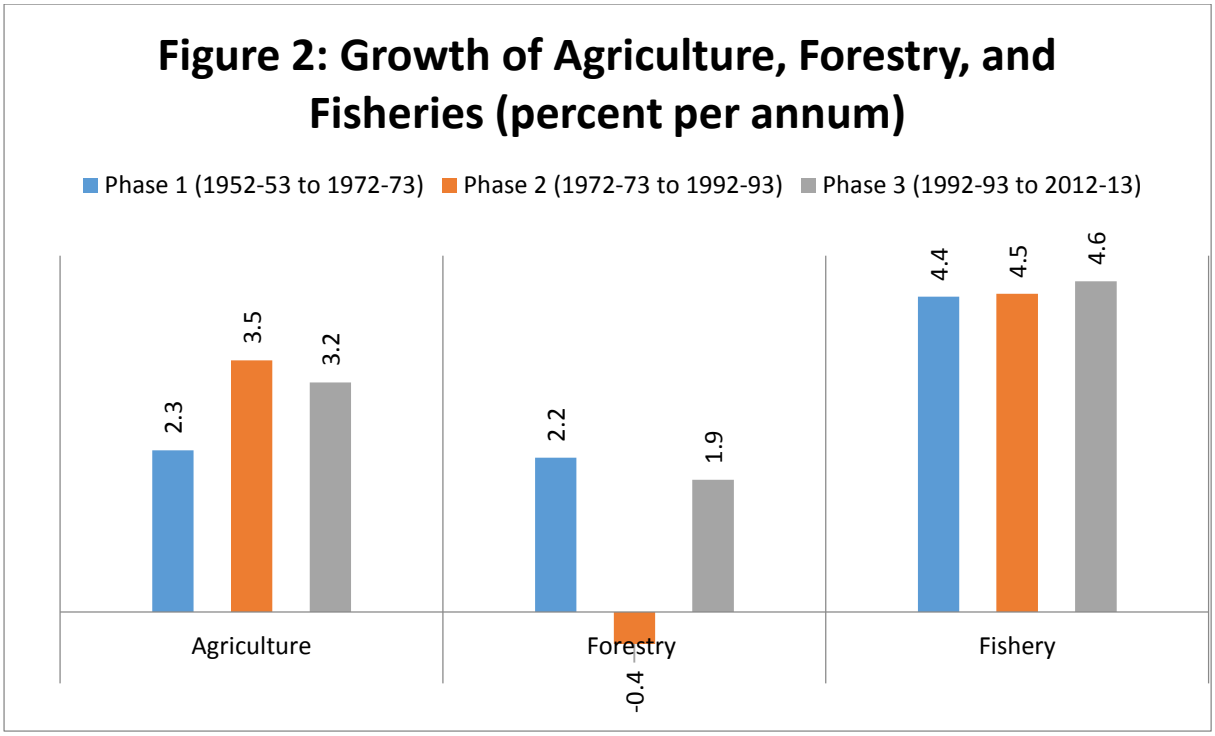


Table 3: Agricultural and Allied Sectors GDP

Period (TE=Three Year Ending)	Agriculture and Livestock (Per cent)	Livestock	Forestry	Fisheries (Per cent)	Total GDP at current prices (Rs. crore)
TE 1982-83	68.9	12.9	16.4	1.8	56027
TE 1992-93	63.9	20.5	12.6	3.0	180985
TE 2002-03	61.3	22.8	11.2	4.8	481436
TE 2012-13	63.8	22.7	9.0	4.5	1487903

Sources and Notes:

1. Central Statistical Office (CSO): Annual Accounts for various years, Ministry of Statistics and Programme Implementation, New Delhi.

2.3 The Contribution of Agriculture, Livestock, Forestry and Fishery in Total Value of Output of Agriculture and Allied Sectors

Due to the lack of disaggregated data on GDP for more components of the agricultural and allied sectors since the 1950s the best way to get a comprehensive view of the transformation of these sectors of the economy is to examine changes in the value of output, information for which is available at a more detailed level for the last sixty years. This information shows that in the early 1950s, crop sector constituted about 58 per cent share of the country's total value of output of agricultural and allied sectors and a major chunk of this share (23 per cent) was accounted for by food grains (cereals and pulses) (Table 4). The shares of other crops such as fruits and vegetables and oilseeds were really small 8 per cent and 5 per cent, respectively.

The livestock sector's share in early 1950s was about 19 per cent, the bulk of which (10 per cent) was contributed by milk, and the share of meat and eggs was about 4 per cent. The contribution of forestry was much larger in the early 1950s (22 per cent), higher than that of livestock and close to the share of food grains. The fisheries sector though had a very low share in the early 1950s (about 2 per cent).

2.3.1 Phase 1: From TE 1952-53 to TE 1972-73

During the period between early 1950s and early 1970s the major part of transformation of agricultural sector was driven by the Green Revolution, which led to a significant growth in output of cereals, mainly wheat, followed then by rice. As a result the value of output of cereals at constant prices nearly doubled and rose by 96 per cent during Phase 1 (between TE 1952-53 and TE 1972-73)[5] thus raising their share in the value of total agricultural output from 17 per cent during Phase 1 (Table 2). Therefore, it is hardly a surprise that nearly 30 per cent growth in value of output of the entire agricultural sector including the allied sectors during this period came from cereals alone (Figure 3).

Apart from cereals, the other two components that made a significant contribution to growth in value of output of the agricultural and allied sectors during Phase 1 were forestry (18 per cent) and fruits and vegetables (17 per cent) as the value of output of these two groups grew by 45 per cent and by 111 per cent, respectively. As a result, forestry sector was able to maintain its share in the total value of output of the agricultural sector and the share of fruits and vegetables went up in TE 1972-73 compared to their in TE 1952-53.

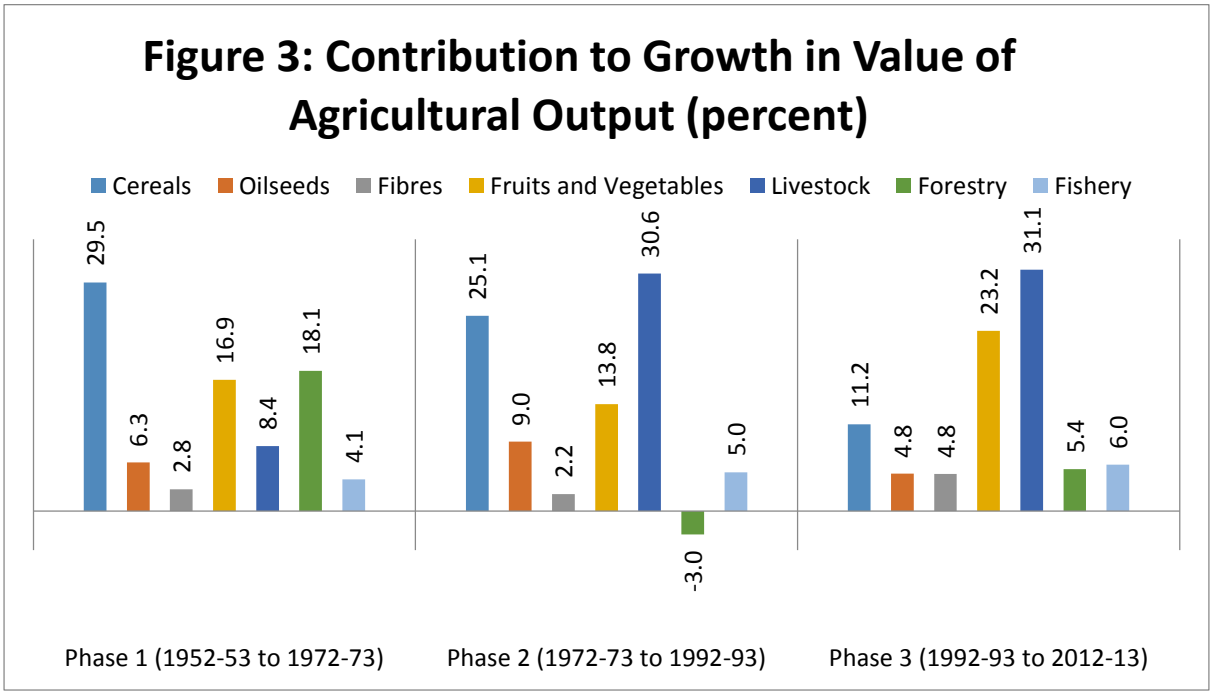
[5] Annex Table 1

Table 4: Shares in value of Output of Agricultural and Allied Sectors								
Period (TE=Three Year Ending)	**Crop sector**	**Cereals**	**Pulses**	**Oilseeds**	**Sugarcane**	**Fibres**	**Fruits and Vegetables**	**Other crops**
TE 1952-53	57.7	16.6	6.2	5.2	2.9	2.0	8.2	24.8
TE 1972-73	61.6	21.2	4.8	5.6	3.4	2.3	11.3	24.7
TE 1992-93	64.0	22.7	3.7	6.9	3.8	2.2	12.3	24.8
TE 2012-13	61.1	17.5	2.7	6.0	3.8	3.4	17.2	27.6

Period (TE=Three Year Ending)	**Livestock**	**Milk**	**Meat**	**Eggs**	**Dung**	**Other livestock products**	**Forestry**	**Fishery**
TE 1952-53	18.8	10.1	3.7	0.2	4.6	0.1	21.9	1.6
TE 1972-73	15.1	8.6	2.7	0.3	3.3	0.2	20.5	2.5
TE 1992-93	21.2	14.0	3.7	0.6	2.5	0.3	11.4	3.5
TE 2012-13	25.6	17.1	4.7	0.9	2.0	1.0	8.7	4.6

Sources and Notes:

1. Central Statistical Office (CSO): *Annual Accounts* for various years, Ministry of Statistics and Programme Implementation, New Delhi.



On the other hand, because output of livestock sector during Phase 1 increased by just 24 per cent, its contribution in growth of value of output of the agricultural and allied sectors during this period was just about 8 per cent. This also explains fall in the share of livestock sector during this period from 19 per cent in TE 1952-53 to 15 per cent in TE 1972-73.

2.3.2 Phase 2: From TE 1972-73 to TE 1992-93

In the next phase, that is, Phase 2 between TE 1972-73 and TE 1992-93, however, it is the livestock sector that contributed a dominant share (31 per cent) of growth in value of output of the agricultural sector due to higher increase in value of livestock sector's output, which increased by 129 per cent during Phase 2 (Figure 3 and Annex Table 1). The main contributing factor that drove output of the livestock sector in this period was a significant increase in milk output, which steered a 166 per cent increase in value of milk output during Phase 2. And, the value of output of meat and eggs also increased significantly during this period. As a consequence of these developments, share of the livestock sector in the total agricultural GDP increased from 15 per cent to 21 per cent during Phase 2 (Table 4).

The cereals also continued their high growth performance during Phase 2 as well. The value of output of cereals between TE 1972-73 and TE 1992-93 increased by 75 per cent and their contribution to overall growth of the agricultural sector's output stood at 25 per cent during this period. As this was slightly lower than the contribution made during Phase 1 (30 per cent), share of cereals in the total value of agricultural output increased only marginally from 21 per cent in Phase 1 to 23 per cent in Phase 2.

In addition to livestock and cereals, fruits and vegetables and oilseeds were the other two crop groups that contributed to growth in value of output of the agricultural and allied sectors during Phase 2. The contribution of fruits and vegetables was 14 per cent and that of oilseeds was 9 per cent. The value of output of oilseeds in particular increased significantly by 103 per cent during this phase.

Because value of output of the forestry sector fell by 9 per cent during Phase 2, share of this sector in the total value of output of the agricultural sector dropped by almost half from 21 per cent in TE 1972-73 to 11 per cent in 1992-93.

2.3.3 Phase 3: From TE 1992-93 to TE 2012-13

In Phase 3, between TE 1992-92 and TE 2012-13, which was a period after economic reforms bulk of the change in agricultural sector was again led by livestock

sector as the value of output of this sector during this period again more than doubled (Annex Table 1). And, a little over 31 per cent of growth in value of output of the entire agricultural sector came from the livestock sector (Figure 3). The livestock sector was closely followed by fruits and vegetables with a contribution of 23 per cent to growth in the total value of output of the agricultural sector during this phase due to highly significant growth (154 per cent) experienced between TE 1992-93 and TE 2012-13. It is clear from these changes that nearly 54 per cent of growth in the agricultural sector during Phase 3 came from dairy and fruits and fruits and vegetables (Figure 3).

Perhaps, the biggest change during this period was an enormous fall in the contribution of cereals to growth in the total value of agricultural output compared to their contribution in Phases 1 and 2 (Figure 3). In Phase 3 the value of output of cereals increased by just 40 per cent compared to 96 per cent and 75 per cent growth witnessed in Phases 1 and 2, respectively. As a result the contribution of cereals in value of output of the entire agricultural sector during Phase 3 was just 11 per cent, a little less than half of the contributions made during Phase 2 (25 per cent).

The other major change during this period was the enormous growth in value of output of fibres due to a significant growth in cotton output after the introduction of *Bt* cotton in 2002. As a result the value of output of fibres during Phase 3 increased by 173 per cent (Annex Table 1) and the contribution of fibres to growth in value of output of the total agricultural sector doubled from a measly 2 per cent during Phase 2 to 4 per cent during Phase 3 (Figure 3).

There was a reversal in trends observed in the value of output of forestry sector that had fallen during Phase 2. In Phase 3, output of the forestry sector increased but growth was much less than that of the fisheries sector. The fisheries sector continued to maintain its high growth, thus share of this sector in the total value of agricultural output increased to 5 per cent in TE 2012-13 and its contribution to increase in the total value of output of the agricultural sector during Phase 3 improved to 6 per cent from 5 per cent in Phase 2.

3. Drivers of the Transformation of Agriculture and Allied Sectors in the Three Growth Phases

The transformation of the Indian agricultural sector has been driven by several factors, in many instances similar to experience worldwide. These include supply side factors such as policies to push growth, better and efficient use of resources like land and labour; introduction of new technology and increased use of modern inputs like chemical fertilisers and expansion of irrigation infrastructure; and, investments in general infrastructure like roads, power as well as demand side factors such as population, income growth, urbanisation, and demand from the rest

of the world through gradual liberalisation of international trade. The specific roles played by these factors have varied during the three phases discussed above.

3.1 Phase 1: From TE 1952-53 to TE 1972-73

The first phase of transformation of Indian agriculture was mainly driven by the need to achieve self-sufficiency in food grains as India was importing a large quantity of cereals, in particular to meet domestic shortages.[6] The area under irrigation was low and there were frequent droughts and the prime objective at that time was to make adequate food supplies available to the increasing population and ensuring provision of raw materials for the expansion of industrial sector. This was sought to be achieved by way of - imports, reorganisation of the agricultural sector, and a series of development measures encompassing expansion of irrigation and extensive as well as intensive farming. These initiatives were given further boost by strengthening agricultural administration and kicking off special area programmes.

The advent of new high yielding varieties ushered in Green Revolution, which in combination with expansion in area under cultivation and usage of chemical fertilisers increased the output of cereals mainly – wheat and rice followed by other coarse cereals such as maize to a certain extent. Thus a combination of technological development, significant investments as well as support by the government led to a significant increase in production of cereals in particular.

Table 5: Drivers of Agricultural Transformation: Supply side

Period (TE=Three Year Ending)	Gross Cropped Area (M. Ha)	Gross Irrigated Area (M. Ha)	Gross fixed capital formation (Rs crore at 2004-05 prices)	Consumption of Fertilisers (Thousand tonnes)	Total Roads (Thousand Km)	Surfaced Roads (Thousand Km)	Electricity Generated (Billion KWH)
TE 1952-53	134.3	23.0	10579	65.6	399.9	157.0	6.6
TE 1972-73	164.4	38.6	22547	2177.0	914.9	398.0	61.2
TE 1992-93	184.6	65.2	44151	12546.2	2327.4	1091.0	289.4
TE 2012-13	194.0	87.2	141023	28122.2	4865.4	2698.6	907.3

Sources and Notes:

1. Central Statistical Office (CSO): *Annual Accounts* for various years, Ministry of Statistics and Programme Implementation, New Delhi.

[6] These imports were mainly financed by PL 480 and free aid.

The gross cropped area during the Phase 1 of transformation expanded by 22 per cent from 134.3 million hectares to 164.4 million hectares and gross irrigated area during the same period increased from 23 million hectares to 39 million hectares, which is an increase of 50 per cent (Table 5). These developments were coupled with a massive 33 times increase in the usage of fertilisers between TE 1952-53 and TE 1972-73. There was also a significant increase in the road network in the country and electricity generation also expanded considerably. All this was made possible by a large 113 per cent increase in investment in the agricultural and allied sectors, mainly in public sector because public sector investment in the early 1960s accounted for roughly half the share in total investment. As a result, supplies of cereals and other commodities such as fruits and vegetables increased significantly.

On the demand side, during Phase 1 it was mainly the population growth, which added 189 million persons to the population that existed in early 1950s (Table 6). There was only a marginal shift in urbanisation as the share of rural population in total population decreased marginally from 83 per cent in the early 1950s to 80 per cent in the early 1970s. The per capita income also expanded at a comparatively slower rate during this period and there was little in terms of foreign demand because India was only a marginal player in international trade.

Table 6: Drivers of Transformation: Demand side

Period (TE=Three Year Ending)	Population (Million)	Share of Rural Population (Per cent)	Per capita Income (Rs at 2004-05 prices)	Exports of Agricultural and Allied Sector (US$ Million)	Imports of Agricultural and Allied Sector (US$)	Net Trade Balance - Agricultural and Allied Sector (US$ Million)
TE 1952-53	365	83	7846	NA	NA	NA
TE 1972-73	554	80	10710	907	497	410
TE 1992-93	856	74	16186	10871	4457	6414
TE 2012-13	1202	69	43391	34677	23300	11377

Sources and Notes:

1. Central Statistical Office (CSO): *Annual Accounts* for various years, Ministry of Statistics and Programme Implementation, New Delhi.
2. Government of India: *Economic Survey* for various years, Department of Economic Affairs, Ministry of Finance, New Delhi.

Figure 4: Growth of Per capita Consumption Expenditure (percent)

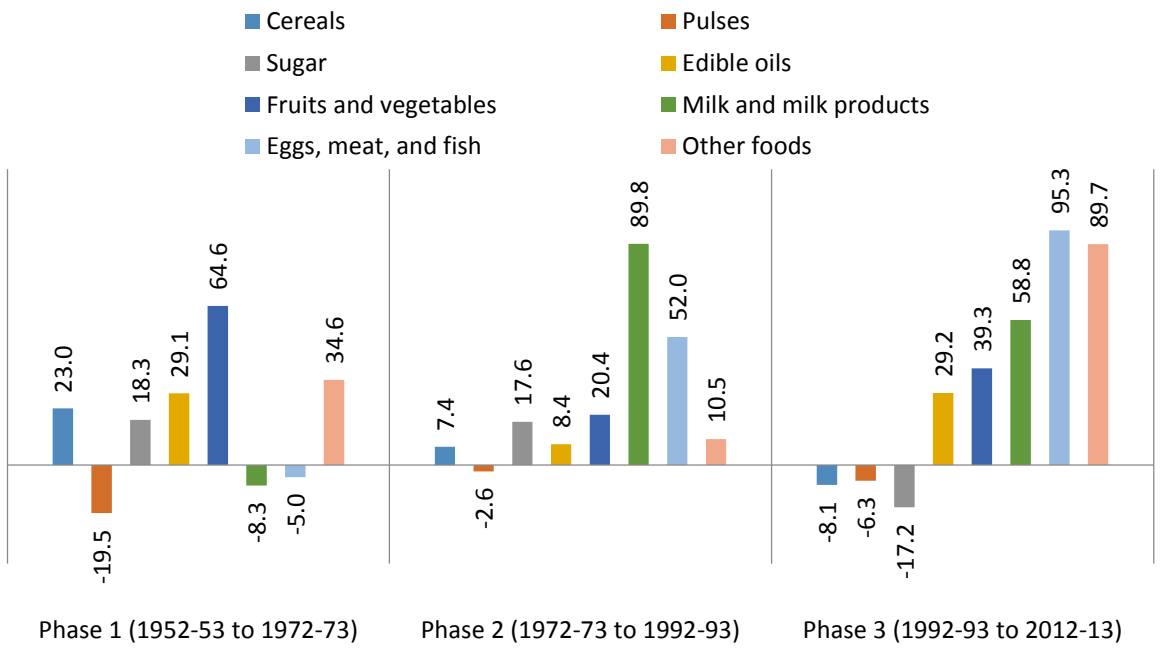
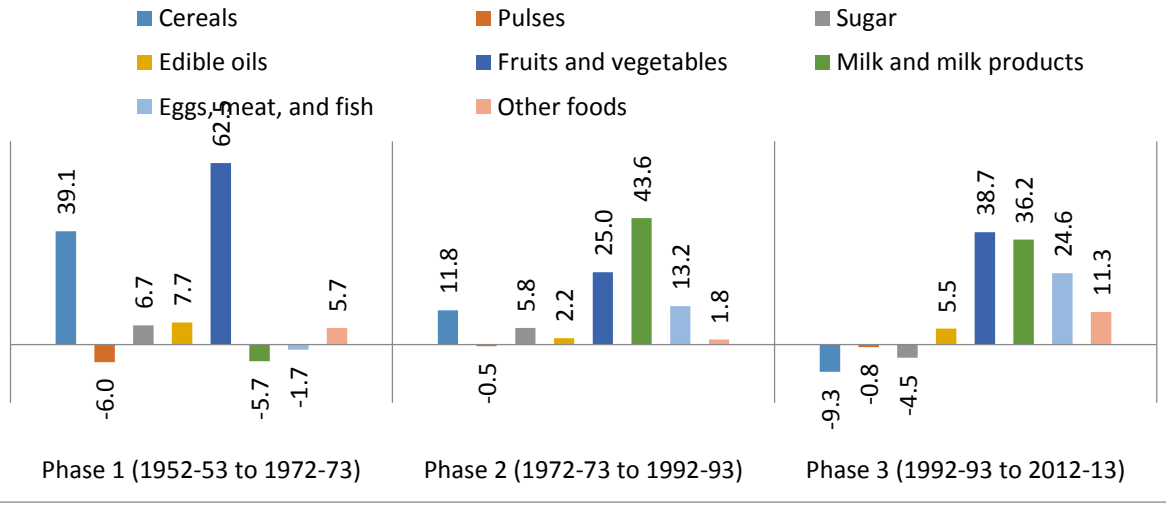


Figure 5: Contribution to Growth in Food Consumption Basket (percent)



Among the items in food basket, per capita consumption expenditure at constant prices on cereals, fruits and vegetables, edible oils, and sugar witnessed significant increase, however, expenditure on two livestock items milk and milk products and eggs, meat, and fish declined during Phase 1 (Figure 4). The bulk of the expansion in food basket during this phase was accounted for by just two groups –

cereals and fruits and vegetables (Figure 5). And, decline in the prominence of the forestry sector is also mainly the consequence of rapid growth in the contribution of cereals and fruits and vegetables.[7]

3.2 Phase 2: From TE 1972-73 to TE 1992-93

The second phase of transformation witnessed a play of a combination of expansion of the Green Revolution into new crops and areas and introduction of the White Revolution, which laid the foundations for consolidation of gains made due to the introduction of the Green Revolution in Phase 1 and enormous growth of milk production in the country in Phase 2. The early phase of green revolution was largely associated with the spread of new technology to better endowed regions, therefore, special efforts were then made to spread new technology into those regions, which had remained outside the fold of technological revolution.

Consequently, special programmes were launched during late 1970s and mid-1980s. The gross cropped area during this phase of transformation expanded by just about 12 per cent from 164 million hectares to 185 million hectares, but gross irrigated area during this period continued the growth momentum witnessed in Phase 1 and added 27 million hectares to 39 million hectares of irrigation capacity that existed in the early 1950s. The other factors such as use of fertilisers, road network, and electricity generation also expanded significantly though at a much slower pace than what was observed in the Phase 1. The investment in the agricultural and allied sectors also maintained its pace and increased by 96 per cent between TE 1972-73 and TE 1992-93.

The other major development during this period was the launching of the White Revolution, made possible through a rare way to develop India's dairy development. The Operation Flood programme launched in 1970s used a combination of food-aid in the form of milk powder and butter oil from the European Economic Community (EEC) to stabilise domestic prices of dairy products and develop dairy cooperatives by creating physical and institutional infrastructure for procurement, processing, and marketing of milk and build linkages with the main cities of the country. This was followed up by financial aid from the World Bank during the second phase of Operation Flood in the 1980s to integrate efforts made by state governments into a national level overall programme.

And, during the 1980s an attempt was also made to increase supplies of oilseeds and reduce imports of edible oils through a Technology Mission on Oilseeds (TMO) in the middle of 1980s. The approach was very much on the lines of dairy development model and the effort was to develop location-specific technologies to boost supplies, create marketing facilities, and modernise edible oil processing technology. The mission was successful in boosting supplies of oilseeds initially

[7] Historically also the evidence suggests that as the agricultural revolution spreads it leads to conversion of forests into cultivable land.

through expansion in area under oilseeds, but there was not much increase in productivity.

The consequence of these changes was that production of cereals increased by 75 per cent from 93 million tonnes in the early 1970s to 162 million tonnes in the early 1990s. The output of milk also increased considerably by 153 per cent from 22 million tonnes in the early 1970s to 56 million tonnes in the early 1990s. The oilseeds output also showed a significant growth and shot up by 122 per cent from 9 million tonnes at the beginning of Phase 2 to 19 million tonnes by the end of Phase 2.

The population also increased by 302 million and there was acceleration in the process of urbanisation as share of the rural population in the total population decreased from 80 per cent in the early 1970s to 74 per cent in the early 1990s, a significant change compared to progress made in Phase 1. The per capita income also increased at a higher rate during this phase, 2.4 per cent per annum compared to just 1.5 per cent growth witnessed during Phase 1. And the external demand also went up considerably as net trade balance of the agricultural and allied products increased from US$ 410 million to US$ 6.4 billion.

As the per capita income grew at a higher rate during this phase the consumption expenditure at constant prices on food items such as milk and milk products and meat products (eggs, meat, and fish), and fruits and vegetables increased (Figure 4) and a substantive part of growth in the food basket was, therefore, contributed by these three broad groups (Figure 5). The contribution of cereals was much less in comparison to both milk and milk products and fruits and vegetables and also in comparison to the contribution made by cereals in Phase 1.

3.3 Phase 3: From TE 1992-93 to TE 2012-13

In the most recent phase of transformation, Phase 3 between TE 1992-93 to TE 2012-13, which witnessed the launching of economic reforms and liberalisation of the economy, there was a significant shift in the drivers of transformation from the supply side factors to the demand side factors. Though there was a respectable growth in gross irrigated area, which increased from 65 million hectares to 87 million hectares, yet growth in the gross cropped area slowed down considerably (Table 4). Similarly, the immense increase in the usage of fertilisers experienced in Phases 1 and 2 also decelerated. Although there was an increase in the road network and electricity generation and investment in the agricultural and allied sectors also expanded.[8]

But the supplies of all main commodities like cereals, oilseeds, and sugarcane did not show much increase. The only exceptions were fruits and vegetables and cotton the supplies of which increased significantly during this period. Similarly,

[8] For details about the success of dairy industry see Aneja (1994).

supplies of livestock products – milk, eggs, and meat maintained their growth momentum even during this phase.

As the per capita income grew at a much higher rate in comparison to the earlier two phases, for this reason the per capita consumption expenditure on food items such as meat and meat products (eggs, meat, and fish), dairy products, fruits and vegetables, and other food items increased significantly (Figure 4). The main leading development of this phase was a decline in per capita consumption expenditure on cereals. As a result, much like in Phase 2 the bulk of growth in food consumption basket came from the contribution of fruits and vegetables, dairy products, and meat products (Figure 5). The other significant development was the emergence of external demand with significant increase in exports from agricultural and allied sector. While the share of the agricultural exports in total export is low, but the country has emerged as a net exporter of a range of agricultural and allied products (Annex Table 2).

4. Is there less *krishi* in Bharat now? Evidence from Recent Household Surveys

Agriculture will always be rural by definition but is rural always agriculture? Much of India's policy framework for rural development has been built around agriculture and allied sectors and around farmer households. But India's rural areas are changing. If the changes in the Indian economy and in rural areas in particular are slowly but surely reducing the role of agriculture and allied sectors as principal sources of income, then this will have profound implications for government policy and for agencies like NABARD mandated to promote both agricultural and rural development.

The National Sample Survey Organisation has been conducting a *Situation Assessment Survey of Agricultural Households* (SAS) in India to assess levels of living as measured by their income, consumer expenditure, productive assets, indebtedness, and farming practices and preferences. The 59th NSS Round, which collected information for the agricultural year 2002-03, was the first such survey (SAS 2003), which has now been repeated after 10 years with the 70th NSS Round and has captured data for the agricultural year 2012-13, now giving us SAS 2013.

The two surveys are unfortunately not directly comparable because of basic changes in the definition of a farmer household between the 59th Round (a household that operates some land, either owned or leased-in) and the 70th Round (a household receiving more than Rs 3,000 from farming activities (cultivation plus animal husbandry) and with at least one member of the household self-employed in agriculture in principal or subsidiary status in the previous 365 days)[9]. In SAS 2003

[9] There are other differences in the two surveys. For example, SAS 2003 collected data for *kharif* and *rabi* seasons from each household, SAS 2013 collected data for the July-December and January-June periods from each household.

possession of land was an essential condition for being considered a farmer, in SAS 2013 it was not. Information for SAS 2013 is available as yet only for a very limited set of variables. As detailed reports and unit record data are released, further analysis will be possible beyond the discussion here on the proportion of agricultural households, their income and expenditures, and their indebtedness. Since there is considerable variation among states in their households' dependence on farming and allied activity, this diversity is best captured by combining states into three groups in Table 7 based on the shares of rural households that have agriculture and allied sectors as their principal source of income[10]: Group 1 states (more than 50 percent of rural households reporting agriculture and allied sectors as their principal source of income), Group 2 states (25 per cent to 50 percent), and Group 3 states (less than 25 per cent).

4.1 Household Income from Agriculture & Allied Sector Incomes & Indebtedness

Four states (Chhattisgarh, Madhya Pradesh, Assam, and Uttar Pradesh) have a majority of their rural households dependent on farming as a major source of income (Table 7). Census 2011 data show that 77 percent of the population of these states lived in rural areas and the SAS 2013 shows that 72 per cent of rural households are engaged in farming. Despite such a high proportion of agricultural households in rural areas of these Group 1 states, only 53 per cent of all rural households are dependent on agriculture and allied activity as their principal source of income.

Thirteen states, the largest number, belong to Group 2, where 25 to 50 percent of rural households are dependent on agriculture. On average, 69 percent of the population in these states lives in rural areas and 55 per cent of rural households are engaged in agriculture. However, only 38 per cent of all rural households in these states are dependent upon agriculture as their principal source of income.

Group 3 has two states (Kerala, and Tamil Nadu), which are the most urbanised major states. About 52 per cent of the population in these states lives in rural areas and about 32 per cent of rural households are agricultural. As a result of a smaller percentage of rural households, only 19 percent of all rural households depend on farming as the principal source of income.

[10] Principal source of income is defined as the source that provides maximum income during a year.

Table 7: Agricultural Households and their Dependence on Agriculture and Allied Sectors as the Principal Source of Income in Major Indian States: 2012-13

Group	States (orderd by column 3)	Rural Population as share of Total Population Census 2011 %	Situational Assessment Survey SAS 2013						
			Rural Households		Agricultural Households				
			Agricultural Households % (1)	Households reporting Farming as Principal Income Source % (3 = 1x2)	Households reporting Farming as Principal Income Source % (2)	Income from Farming as share of total income %	Av. Monthly income Rs	Av. Monthly expenditure Rs	Indebted households %
1	Chhattisgarh	76.8	68.3	55.4	81.1	64.3	5,177	4,489	37.2
	Madhya Pradesh	72.4	70.8	55.2	77.9	76.5	6,210	5,019	45.7
	Assam	85.9	65.2	53.8	82.5	74.8	6,695	5,766	17.5
	Uttar Pradesh	77.7	74.8	51.2	68.5	69.0	4,923	6,230	43.8
2	Gujarat	57.4	66.9	45.6	68.1	61.4	7,926	7,672	42.6
	Jharkhand	76.0	59.5	43.7	73.4	56.0	4,721	4,688	28.9
	Maharashtra	54.8	56.7	42.5	74.9	59.5	7,386	5,762	57.3
	Haryana	65.1	60.7	42.0	69.1	72.8	14,434	10,637	42.3
	Karnataka	61.3	54.8	41.9	76.5	62.6	8,832	5,889	77.3
	Rajasthan	75.1	78.4	41.4	52.8	55.9	7,350	7,521	61.8
	Uttarakhand	69.8	64.3	40.6	63.2	71.9	4,701	5,784	50.8
	Bihar	88.7	50.5	36.8	72.9	56.0	3,558	5,485	42.5
	Odisha	83.3	57.5	35.9	62.4	54.7	4,976	4,307	57.5
	Andhra Pradesh+	66.6	45.1	33.9	65.4	51.8	6,116	5,569	91.3
	Punjab	62.5	51.1	28.4	55.6	69.3	18,059	13,311	53.2
	Himachal Pradesh	90.0	66.5	27.1	40.7	44.7	8,777	7,134	27.9
	West Bengal	68.1	45.0	26.4	58.7	30.3	3,980	5,888	51.5
3	Tamil Nadu	51.6	34.7	22.9	66.1	43.2	6,980	5,803	82.5
	Kerala	52.3	27.3	10.7	39.0	34.5	11,888	11,008	77.7
	AVERAGES								
	Group 1	**77.2**	**72.2**	**52.7**	**73.0**	**70.8**	**5,404**	**5,787**	**40.6**
	Group 2	**69.2**	**55.1**	**37.7**	**67.0**	**55.7**	**6,614**	**6,284**	**57.3**
	Group 3	**51.8**	**32.1**	**19.2**	**57.9**	**40.6**	**8,463**	**7,375**	**81.1**
	All India*	**68.8**	**57.8**	**39.5**	**68.3**	**59.8**	**6,426**	**6,223**	**51.9**

Sources: National Sample Survey Organisation (2005); 2. National Sample Survey Organisation (2014); Registrar General and Census Commissioner (2011). Author's calculations. + Including Telengana. *Based on all Indian states & UTs. "Farming" is Cultivation and Animal Husbandry.

At the national level 58 per cent of the households in rural areas are now engaged in agricultural and allied activities, only 40 per cent of all households living in rural areas depend on agriculture and allied sectors as their principal source of income. This has also been demonstrated in other household surveys, including National Council of Applied Economic Research's own National Survey of Household Income and Expenditure (NSHIE 2012).

The information for 2012-13 from SAS 2013 reveals that agricultural households in the Group 3 states earned more than the agricultural households living in Group 1 or Group 2 states. Agricultural households in states where majority of the rural households are dependent on farming as a major source of income earned 19 per cent less than the agricultural households living in the Group 2 states and 71 per cent less than the agricultural households living in the Group 3 states (Table 7). Likewise, the consumption expenditure of agricultural households in states where majority of the rural households depend on agriculture as their main source of income was 5 per cent less than the agricultural households living in the Group 2 states and 32 per cent less than the agricultural households living in the Group 3 states.

Based on the summary statistics that have been released, SAS 2013 suggests that about 52 percent of agricultural households in India are indebted, with the average size of loan outstanding at Rs 47,000. At the national level, about 60 percent of outstanding loans were from institutional sources, which included government (2.1 percent), co-operative societies (14.8 percent), and banks (42.9 percent). Agricultural/professional money lenders accounted for 25.8 percent of outstanding loans. Though the evidence is very tentative, the data in Table 7 suggest that indebtedness is higher in states where the average household is less engaged in farming, and that it may be the shift from farming to non-farming that may be partially related to this.

Though this would be of considerable value, due to the changes in definitions between SAS 2003 and SAS 2013, it is not possible to do a direct comparison between the two surveys. Considerable further analytical work would be required at the unit record data level to try to adjust the data to ensure that any comparisons are sensible and track actual developments on the ground rather than being statistical artefacts. Such detailed analytical work is beyond the scope of this first assessment of the condition of agricultural households in India.

4.2 Household employment and wages

Changes in rural employment can also show the transformation that is underway in rural India. Fortunately, NCAER's own India Human Development Survey (IHDS-II) is a national, longitudinal panel survey (the same households were polled in 2011-12 that were polled in 2004-05) allowing considerable comparability across the second half of the decade of the 2000's. The IHDS is the largest independent household sample survey in the country. IHDS covers 42,000

households across the country: 83 percent of these households were also surveyed for the previous round of the IHDS in 2004-05. Evidence from IHDS-II shows that employment in agriculture has fallen sharply over the last seven years and a combination of farm oriented and nonfarm work is now the most common form of rural employment.

The IHDS's findings on employment show that the fall in agricultural employment—documented in the 2011 Census as well—is much larger than was previously believed. In 2004-05, half of all rural men and 83 per cent of rural women worked only on farms, making it the most common form of rural employment. But by 2011-12, the IHDS findings show that nonfarm work is now a bigger employer for rural men in Punjab, Haryana, Assam, northeastern States, Kerala, and Tamil Nadu. This is also true for rural women in Kerala and Tamil Nadu. But overall, exclusive farm-oriented work is still the most prevalent form of employment among rural women, engaging 66 per cent of women nationally.

Furthermore, the IHDS evidence confirms a disturbing trend—also noted by NSS data—of a fall in the participation of women of age 15-59 in the workforce from 47 percent in 2004-05 to 44 percent in 2011-12. The participation rate, which considers all those employed or looking for work, for has fallen for women even in their 20s and 30s, when typically participation rates are observed to be rising with development. The participation rate for men also fell marginally from 79 per cent to 77 per cent, but this is primarily explained by rising enrolment in higher education, which is not the case for women.

The IHDS confirms that wages have grown exponentially over the last decade. The daily agricultural labour wage for men nearly tripled in the last seven years, while the nonagricultural wage more than doubled. Women's wages, though much less than male wages, also grew similarly, so this cannot be a cause of the decline in the female participation rate.

4.3 Is there's less krishi in Bharat now?

As noted above (Table 7), SAS 2013 suggests that only 57.8 percent of rural households (some 9.02 crore households out of the country's estimated 15.61 crore rural households) are engaged in farming activity (i.e. cultivation, livestock rearing and other agricultural activity). Even more revealing is the SAS 2013 finding on the composition of income of these agricultural households. Net receipts from cultivation, rearing animals and other agricultural activity accounted for just 59.8 percent of the average farming family's monthly income. The remaining income came from wage and salaried employment, nonfarm business, and other sources such as remittances, interest, and dividends. So, even for the 58 percent of rural households that are agricultural, over 40 percent of their income comes from non-farm economic activities.

Consistent with this finding, of these agricultural households only 68.3 percent reported farming as their principal source of income. Combining these figures suggests that only 39.5 per cent of all rural households are now dependent on agriculture as the principal source of income.

These findings challenge the popular perception that India's rural areas are stagnating. This perception is often based on the notion that agriculture generates just 15 per cent of India's GDP (data for 2012- 13) despite rural India containing 68.8 percent of its people as noted in the 2011 Census. Such a view, reinforcing concerns of a widening Bharat-India (or rural-urban) divide, assumes rural to be synonymous with agriculture. There may be considerable scope for boosting agricultural productivity, which has plateaued in many instances, but that does not imply that rural India is stagnating.

This household evidence also confirms what is often obvious when studying rural areas. On the ground, the decline in agriculture's share in GDP relative to that of the rural population in total population does not mean that people are being displaced out of agriculture without alternative sources of employment and income. They are rapidly shifting to non-farm and non-agricultural pursuits in rural areas, so indeed, there is definitely less *krishi* in India's rural areas. While 69 per cent of India is still rural, the notion of rural meaning simply wheat or mustard fields, appears to be no longer true.

The NSS data suggest that the most obvious examples of the weakening association of rural with agriculture are in Kerala, Tamil Nadu, Andhra Pradesh and, perhaps surprisingly, West Bengal and Bihar. For example, just over a quarter of Kerala's rural households are agricultural, and even for them, only a third of income originates from farming (Table 7). Rajasthan has the highest share of agricultural-to-rural households, at more than 78 per cent, but agricultural households derive almost about 45 per cent of monthly income from non-farming pursuits.

One reason for the growing chasm between "rural" and "agricultural" has to do with the definition of rural, which is residual, Under the Census, any area not urban is deemed to be rural. Urban, on the other hand, refers to any place having a minimum population of 5,000, a population density above 400 per square km, and at least 75 per cent of the male working population engaged in non-agricultural pursuits. Such a wide definition implies that even if only a quarter of households in a particular place are agricultural—which is roughly the levels reached in Kerala—it will continue to be classified as rural. As a result, while the farm sector's share of GDP will keep falling—it was 25 percent until two decades ago—rural wouldn't register as steep a decline, though it may become less and less agricultural.

What is agriculture's share within India's *rural* GDP? Is it already as low as 25 per cent as some analysts claim? What per cent of new factories and new manufacturing jobs were created in the last decade in rural areas? Is it as high as 75 per cent of all factories and 70 percent of all manufacturing jobs? These are the type of questions that are thrown up by the new NCAER and NSSO data, and require

further work to be done to understand the transformation of rural India and agriculture in order to provide policy and strategic guidance to agencies such as NABARD for adapting its 10-15 year future strategy.

Overall, what this implies is that rural development is now less and less synonymous with the agricultural sector. Hence, the approach to promoting rural development should also begin to change from an exclusive focus on boosting agricultural production to promoting more inclusive rural development, which has other economic and social dimensions of the non-farm sector. It should be recognised that just as overall economic development is the best antidote to reduce overall poverty, economic development of both farm and nonfarm sectors is the best strategy to promote rural development and reduce rural poverty. Hence, it is essential to pay attention to both the farm and the rural nonfarm economies to achieve higher rural economic growth rates.

For example, this implies that the focus of rural interventions should be on high quality physical and social infrastructure and more responsive and effective institutions that cater to both farm as well as the non-farm sectors. A glaring example of the lack of effective institutions in rural areas is evident in the poor provision of institutional credit. A significant proportion of the people living in rural areas are still being compelled to rely on either informal sources or self-financing through friends and relatives to meet their demand for credit. This is in spite of several government interventions and the increased push for directed lending for the agricultural sector. This calls for a review and expansion of the scope of formal financial services and increasing their scale of outreach to both agricultural as well as non-agricultural households.

5. Outcomes and Policy Implications

This paper highlights a number of significant elements in the transformation of Indian agricultural and allied sectors and of rural India over the six decades from the early 1950s. There are some highly positive and encouraging developments, and, inevitably, there are also challenges that remain and poor outcomes that should be addressed.

5.1 Outcomes in Agriculture, Allied Sectors, and Rural India

1. Even though agricultural and allied sectors have grown at a slower rate than the rest of the economy, yet there has been an acceleration of growth from Phase 1 to Phase 2 and from Phase 2 to Phase 3.
2. Agricultural and allied sectors have witnessed a significant transformation: on the one hand an allied sector like **forestry** has lost a significant share in the total value of agricultural and allied sectors output due to highly uneven growth, but on the other hand, allied sectors like **livestock and fishery** have gained a significant share due to consistent higher growth, particularly during

Phase 2 and Phase 3. On balance, though, the share of the allied sectors (livestock, forestry, and fishery) in the total value of agricultural output has remained more or less the same, with livestock taking over the share lost by forestry.

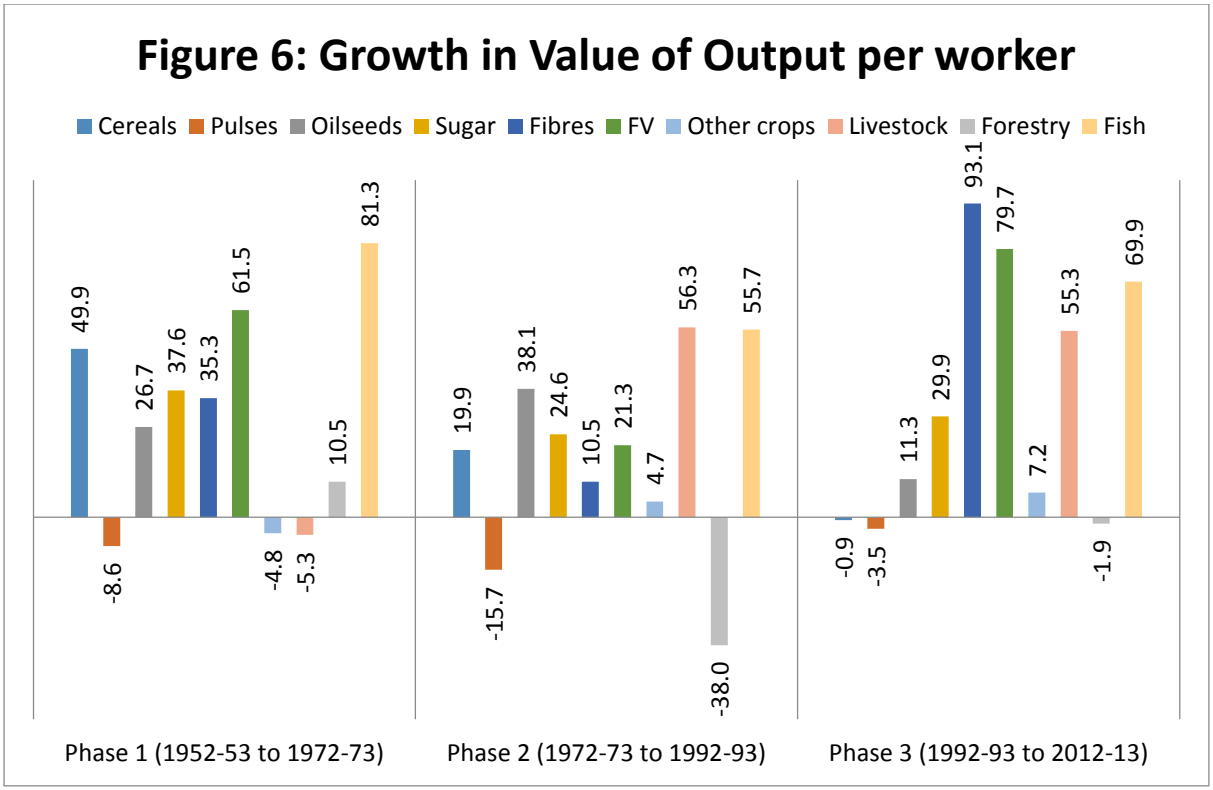
3. Within agriculture, cereals, after gaining a significant share of the value of output during Phase 1 and Phase 2, have lost considerable momentum in Phase 3. The loss in the share of cereals in the total value of agricultural output has been made up mainly by **fruits and vegetables**. The fruits and vegetable sector now accounts for more than double the share in the total value of agricultural output that it accounted for in the early 1950s. The tremendous growth in fruits and vegetables output during the three phases has brought their share in the value of agricultural production on par with cereals.
4. Other **non-food grains** like **oilseeds, sugarcane, cotton, and other crops** have also gained marginally during this transformation—oilseeds in Phase 2 and cotton and other remaining crops in Phase 3.
5. Much like elsewhere in the world, the transformation of Indian agriculture has been driven by both **supply side interventions** and policies to push growth, technological developments, and investments, as well as **demand side pulls** such as population growth, urbanisation, income growth, and the gradual liberalisation of international trade in agricultural and allied products. Phase 1 of the transformation was essentially driven by supply side pushes, but demand side pulls have started dominating this process in Phases 2 and 3 as urbanisation and income growth took place at a much faster rate compared to the Phase 1.
6. The other consequences of this transformation have been that the country has not only been able to achieve self-sufficiency in food, but has also emerged as a **net exporter of food and other allied agricultural products** such as cereals, fish and fish products, meat and meat products, cotton, oilcakes, vegetable extracts, and many others (Annex Table 2). And, with increased irrigation capacity and diversification of the sector, the adverse impact of droughts on the agricultural and allied sectors output has lessened. This is reflected in comparatively lower dips in agricultural output experienced during the recent droughts in 2002-03 and 2009-10, compared to the slumps witnessed during earlier drought years during the fifties, sixties, and even seventies.
7. The consequence of comparatively slower growth in agricultural and allied sectors compared to the rest of the economy has been that the **share of agricultural and allied sectors in the overall GDP** has fallen at a much faster rate compared to the fall in share of workers engaged in these sectors. On the face of it, it would appear that the agricultural and allied sectors are

therefore bearing the burden of a disproportionately large number of rural workers, resulting in low productivity employment. Recent household survey data however shows that **India's rural areas are becoming less and less agricultural** with the rise of non-farm and SME enterprises. This has major consequences for poverty reduction and for policy. Countries such as China that have done well in terms of growth and created more rural jobs in non-agricultural rural areas have experienced faster poverty reduction.[11]

8. Of course, the increased pressure of population more generally is leading to continued **fragmentation of land holdings** and the average land holding size has come down to about 1.2 hectares. The share of marginal and small holdings (less than 2 hectares) has increased, and now stands at 85 per cent of all holdings in the country. On top of it, further growth in land under cultivation has virtually come to a standstill and the intensive use of both land as well as water, have led to increased environmental concerns.
9. **Labour productivity growth in agriculture and allied sectors**, which was the main driver of technological progress in the agricultural sector in Phase 1 and Phase 2, has unfortunately plateaued. Average productivity growth in Phase 3 has slowed down considerably and even fallen in some cases (Figure 6). Low rates of yield growth seem to have become a norm in recent years. The only bright spot during Phase 3 has been cotton, which has witnessed an exceptionally high rate of productivity growth after the introduction of *Bt* technology. Apart from this, the overall outlook does not look very promising for most of the crops despite significant gaps in productivity between India and some of the other comparable large emerging economies of the world.[12]
10. Despite large investments in the agricultural sector the **development of rural infrastructure** in general has not kept pace with increasing requirements. Poor infrastructure in rural areas (roads, power, storage, transport systems, and communication) is continuing to lead to a large wastage of agricultural and allied products, which in some cases like perishable products (fruits and vegetables in particular) continues to remain very high, close to 25 per cent or so.

[11] The shares of employment in agriculture of the total employment in some of the other comparable emerging economies such as Brazil, China, and South Africa are much smaller at 15 per cent, 35 per cent, and 5 per cent respectively (WDI 2014).

[12] The yields of cereals in Brazil, China, and South Africa were 4038 kg per ha, 5701 kg per ha, and 4024 kg per ha in 2011. During the same period the yield of cereals in India was much lower at 2862 kg per ha.



5.2 Policy Implications

1. Indian agriculture and India's rural areas are undergoing considerable change, evident from the sector and output data as well as the household surveys analysed in this report. Rural India is becoming less and less agricultural, even as there is a serious need to improve the productivity of crop and non-crop agriculture. To reduce the burden of the still large number of workers dependent on the agricultural sector for employment, the overall development of rural areas and creating productive jobs in the non-agricultural sector is becoming more and more critical for India. The linkages between agricultural and allied production and the rest of the economy can only be enhanced through the development of rural non-agricultural enterprises, particularly manufacturing that includes processing industries and SMEs in peri-urban areas. This has to be on top of the reform agenda for the future and has implications for agencies like NABARD mandated to help develop both agriculture and rural India.
2. As the most recent household survey results suggest, to some extent this is happening already as India's rural areas are becoming less agricultural and as employment increases in a number of nonfarm activities. Government programs and policies need to support this transformation of India's rural areas while at the same time assisting productivity growth in agriculture and allied sectors.

3. Maintaining productivity growth to sustain the growth of food crops and allied products that form the main staples of the population is essential for a more balanced growth of these sectors. Policies should focus on measures that provide incentives for efficient utilisation of both capital investments as well as natural resources. Increasing productivity calls for investments in technology, extension, research and logistics. The need of the hour is to make intelligent investments and design incentive programs that raise output through efficient use of natural resources and minimise wastage.
4. Shifts in consumer preferences and growing incomes have altered the domestic demand for agricultural and allied products and the liberalisation of trade has connected these Indian sectors to international markets. As a result, the demand for dairy products, meat and meat products, fruits and vegetables and their processed products is growing fast and will continue to do so in the future. To meet this growing demand and maintain competitiveness, more investments in the entire chain that involves collection, grading, storage, packaging, and transport to help take produce from farms to markets and factories is the key to the future growth of the agricultural and allied sectors. While attempts have certainly been made in this direction, a more focussed and integrated strategy is needed to meet this challenge. NABARD would be strategically well placed to take leadership in this area.
5. In some cases, policies to protect the poor are relying on assumptions about who the poor are and what they need, for example, to tackle the serious problem of persistent malnutrition in India. India adopted a rights based approach to food security, and while the goal itself is laudable, it is not clear how the thinking on the Right to Food and the Ordinance that supports it is likely to deliver that goal (See Box 1). Any schemes for protecting the poor and vulnerable and for addressing India's malnutrition problem need to be designed and implemented so that they deliver needed benefits to those who should be targeted, do not distort food and labour markets, do not over-deplete natural resources, and create opportunities for those who can enter the labour force in productive jobs. This is extremely critical in view of the climatic and economic challenges that are likely to emerge in the medium to long-term in the future.

6. To smoothen this transition, investments in ancillary infrastructure and rural

Box 1
The National Food Security Ordinance 2013: A Step Backwards

The National Food Security Bill passed through an ordinance route in July 2013 entitles priority households covering 75 per cent of rural population and 50 per cent of urban population to get 5 kg of food grains per person at highly subsidised prices at the rate of Rupees 1 per kg for coarse grains to Rupees 3 per kg for rice. Notwithstanding the laudable intentions of addressing malnutrition and providing food security the bill needs to be reviewed on the following grounds.

First, people who really need food subsidies are the poor who cannot afford and do not get two square meals a day. The expanded coverage under the bill, however, is much higher than even what the poverty estimates reveal – according to the latest estimates for 2011-12 the population benefiting from subsidised food should not exceed 22 per cent (26 per cent in rural areas and 14 per cent in urban areas).

Second, problems of malnutrition and food security cannot be addressed through the provision of subsidies on food alone because these require a combination of policies on health, sanitation, and awareness of better nutrition. The problem of malnutrition in India is more due to poor public health facilities, abysmal sanitation, and inadequate nutrition.

Third, there are questions about the government's ability to implement the Bill because the mechanism of providing subsidised food is the same Public Distribution System (PDS), which has been a source of large scale inefficiencies in procurement, storage, and distribution of food grains for the last of four to five decades. It is not clear how making food security a right is going to address these concerns.

Fourth, because the overall cost of funding this initiative is likely to be much higher than what is claimed, the better way to handle nutrition and food security is to create more employment opportunities, better infrastructure facilities, and improve agricultural productivity. These will have a long lasting impact on under nutrition and food security.

Fifth, instead of relying on an age old system, which has serious problems in delivering food, the government can provide cash transfers to the poor. This would eliminate the enormous leakages in the current system and also empower the poor and allow them to buy what they need – food which has high proteins and other micronutrients (milk, eggs, meat, fruits and vegetables). This will also help the growth of allied sectors as alluded to in the analysis carried out in the paper.

Source: Sharma (2013)

industries are required and the magnitude of the investments that are necessary to bring the required infrastructure to an adequate level of development is large. Even though governments and development institutions such as NABARD are trying their best to promote rural infrastructure, more needs to be done.

7. The fragmentation of land holdings means that to achieve economies of scale, bulk-buying and sale of produce have become extremely important to generate more income. Therefore, large-scale retail and supermarket operations can lead to the development of necessary infrastructure that improves supply logistics and also help in dealing with price volatility through risk pooling.
8. Set against these developments in agriculture and allied sectors and the transformation of India's rural areas that is underway, the role of NABARD has become even more important. Since its inception in the 1980s NABARD has been providing financial and technical assistance to the agricultural sector –both directly and indirectly through refinance to institutions providing rural investment and production credit and building institutions for improving the absorptive capacity of rural credit and its delivery. In addition to infrastructure like roads and small irrigation projects that is being built through RIDF and other NABARD initiatives, NABARD can help in developing new institutional formations such as groups of smallholders that can help farmers come together to improve their access to markets and develop the new kind of infrastructure that is needed to collect, grade, store, package, and transport agricultural produce from villages to cities and other distribution centres. There may be potential for fruitful partnerships between the National Dairy Development Board and NABARD that allow NABARD to leverage NDDB's success in other agricultural and allied sectors.
9. While several attempts have been made in the past, however, a large number of problems that affect agricultural and allied sectors have their roots in poor planning and implementation. These are reflected in the slippages in the achievements of various targets set under various programmes such as RIDF, Bharat Nirman, and others. For the desired changes to take place there is a need to look beyond allocations and intentions, and focus on implementation and raising efficiency of investments that are being made in the agricultural and rural sector. In turn, to understand what is working and what is not working, NABARD should invest in its evaluation capacity and create a network of external researchers who can assist NABARD in this endeavour to learn from success and failure. The NABARD Chair Professor program was one such effort. Though the program is now being revamped in desirable ways, NABARD's purpose should remain its support for creating capacity in India to scientifically assess the efficacy of government and NABARD's programs for the development of agriculture and allied sectors and for India's rural areas.

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Annex Table 1: Value of output of Agricultural and Allied Sectors
(Rs crore at 2004-05 prices)

Period (TE=Three Year Ending)	Crop sector	Cereals	Pulses	Oilseeds	Sugarcane	Fibres	Fruits and Vegetables	Other crops
TE 1952-53	141261	35649	13387	11095	6178	4235	17645	53072
TE 1972-73	241795	69924	15994	18387	11137	7513	37330	81510
TE 1992-93	412991	122955	19767	37280	20318	12157	66391	134124
TE 2012-13	767740	172147	26971	58558	37287	33159	168503	271114

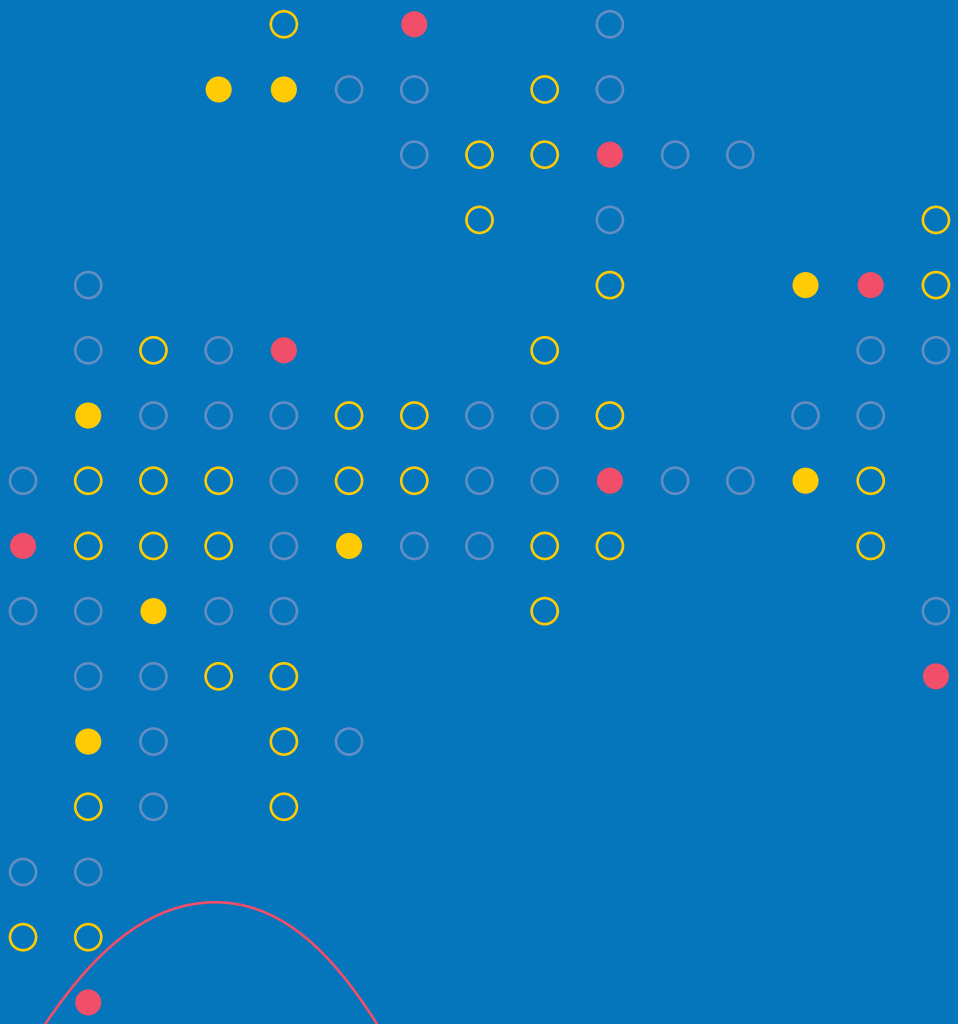
Sources and Notes: Central Statistical Office (CSO): *Annual Accounts* for various years, Ministry of Statistics and Programme Implementation, New Delhi.

Annex Table 1: Value of output of Agricultural and Allied Sectors
(Rs crore at 2004-05 prices)

Period (TE=Three Year Ending)	Livestock	Milk	Meat	Eggs	Dung	Other livestock products	Forestry	Fishery
TE 1952-53	40022	21558	7876	433	9943	211	46862	3467
TE 1972-73	49719	28401	8991	877	10828	623	67871	8236
TE 1992-93	114317	75613	19939	3307	13807	1651	61589	18786
TE 2012-13	250906	167720	46123	8425	19260	9377	85383	45084

Sources and Notes: Central Statistical Office (CSO): *Annual Accounts* for various years, Ministry of Statistics and Programme Implementation, New Delhi.

Annex Table 2: Net exports of Agricultural and Allied Products (TE 2013-14)				
S. No.	Products	Exports (US $)	Imports (US $)	Net Exports (US $)
1	Cereals	8829.6	17.2	8812.3
2	Fish and fish products	3810.7	71.3	3739.4
3	Meat and meat products	3558.7	1.9	3556.8
4	Cotton	3904.4	357.8	3546.6
5	Vegetable extracts	3472.0	151.1	3320.8
6	Residues of food industry	2936.7	281.2	2655.5
7	Coffee and tea	2850.8	505.3	2345.6
8	Oilseeds	1815.5	264.8	1550.7
9	Sugar and sugar products	1704.5	421.0	1283.5
10	Tobacco and products	923.0	41.3	881.6
11	Essential Oils	855.8	222.9	632.9
12	Raw hides and skins	1138.0	579.9	558.1
13	Miscellaneous edible preparations	503.7	117.1	386.6
14	Preparations of cereals	420.1	42.8	377.2
15	Dairy products	441.2	107.7	333.6
16	Preparations of fruits	406.3	76.2	330.1
17	Products of milling industry	226.5	45.3	181.2
18	Albumins	224.9	94.4	130.6
19	Preparations of meat and fish	112.4	4.4	107.9
20	Products of animal origin	141.9	40.7	101.2
21	Live trees	76.5	16.2	60.4
22	Vegetable planting material	57.0	12.2	44.8
23	Beverages	360.0	354.7	5.3
24	Live animals	11.6	10.3	1.3
25	Flax and other fibres	0.6	18.4	-17.7
26	Cocoa and cocoa preparations	61.5	188.2	-126.7
27	Silk	13.3	205.9	-192.6
28	Wool	62.7	358.2	-295.5
29	Fruits and nuts	1517.3	2110.0	-592.7
30	Pulses	1133.9	2191.0	-1057.1
31	Animal and vegetables oils and fats	975.0	10168.6	-9193.6
Source: Developed from DGCIS: *Annual Trade Statistics*, Ministry of Commerce and Industry, DGCIS, Calcutta.				



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NATIONAL COUNCIL OF APPLIED ECONOMIC RESEARCH

11 Indraprastha Estate New Delhi 110 002 India
T +91 11 2337 9861-3 F +91 11 2337 0164 E infor@ncaer.org W www.ncaer.org