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Product Market Strategy to Maximise Impact of Air-Freight Subsidy in Exports of Fresh Fruits & Cut Flowers

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Product Market Strategy to Maximise Impact of Air-Freight Subsidy in Exports of Fresh Fruits & Cut Flowers

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Preface

The international trade in horticultural commodities such as cut flowers, fresh fruits and vegetables is expanding at a higher rate than trade in other commodities. No wonder there has been a great deal of interest in APEDA in the role of horticultural products as an important means of agricultural diversification and foreign exchange earnings in India especially considering the negative growth in world exports of traditional items such as spices, coffee, tea. Between the exports of fresh fruits and vegetables in the world, fresh fruits occupy the premier position both in the domestic and international scenarios. The purpose of the project was to prioritise perishable commodities, especially cut flowers and fresh fruits, that could effectively utilise export incentives for air transportation for a viable long-term export market.

The focus is on investigating the scope and potential for specific perishable product market combinations based on an analysis of factor conditions, market conditions, and supporting infrastructure to identify possible APEDA and participating firms' strategy in developing markets for perishables which would include floriculture products and fresh fruits.

The source of competitiveness of perishables is determined by interaction of *factor conditions* such as agro climatic conditions, existing volume of production in relation to total world production, existence of exotic varieties etc., with *market conditions* such as share of imports in total supply, income and price elasticities of demand (import behaviour differentiated among commodities as well as sources of supply

of each commodity). The presence of *related infrastructure support services* such as sterilisation facilities, availability of cargo space, cold storage, and post-harvest facilities identifies the feasible area that takes into account the market conditions and factor conditions. The three interactive conditions yield possible product-market combinations. The APEDA strategy such as freight subsidy, quality certification, inventory financed consignment programme etc., are possible strategy options that can be exercised by various firms operating in the export of floriculture products and fresh fruits. Thus the methodology adopted leads not only to prioritisation of product-market combinations but also to detailing action plans for APEDA to actualise the desirable options. Since an analysis of market and factor conditions is involved, the analysis is both inward-looking (factor conditions) as well as based on external environment scan (market conditions, competitor strategy etc.).

I am positive that the results of this final study, as also the methodological framework in analysis of issues, would prove to be of interest to APEDA and policy makers.

The study was conducted by a team of researchers under the overall guidance of Mr. R. Venkatesan.

New Delhi
December, 1995

S. L. Rao
Director-General

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Executive Summary

1.0 Determinants of Competitive Advantage of Indian Horticulture

Competitiveness of Indian Horticulture

Competitive advantage in export of horticultural commodities is the most important economic issue analysed in this study. Natural endowments, interest rates, currency's value, wage rates, etc., do not explain the competitive advantage; if factor conditions were to determine the competitiveness, then India, the largest producer of fresh fruits (FAO 1993), should have been the lead player in international trade of fresh fruits. Holland which is the world's export leader in cultivation, packaging and shipping of cut flowers owes its pre-eminent position to its premier research institute and not so much to its factor conditions.

Following this line of argument, this report examines export competitiveness of fresh fruits such as mango, grapes, banana, sapota, lychee through an analysis of :

1. *Factor Conditions:* such as Nominal Protection Coefficient(NPC), Revealed Comparative Advantage(RCA), country's position in factors of production.

2. *Demand Conditions:* such as product-market specific price elasticity, import as a percentage of domestic availability, competitors' strategy in supplying to the import market, export barriers such as quarantine regulations. In describing the market economy's demand for fresh fruits it has been found useful to

consider consumption of fresh fruits in three ways:

(i) Fresh fruits for commercial use, e.g., imports by fruit processors.

(ii) Fresh fruits for institutional use such as restaurants.

(iii) Fresh fruits for individual use either as gifts or for domestic consumption.

Further, this demand has to be also segmented into Asian (Far East), Middle East, European and other markets. For instance, Alphonso would be catering to the individual gifts market in Far East, individual domestic consumption in Europe and Middle East while the other varieties would serve the institutional and commercial sectors. Lychees would serve the institutional market such as restaurants.

3. *Related Supporting Industries*: The presence or absence of service industries such as pre-cooling facilities to extend shelf life, vapour heat treatment plant to meet quarantine requirements, refrigerated transportation facilities and other related industries.

4. *APEDA Strategy*: The conditions in the perishables sector governing how firms are created, organized and managed, as well as the nature of competition would be determined by the APEDA strategy.

The above attributes work as a system in creating the environment for achieving international competitiveness. Thus, the object of this study was to isolate the feasible product-market combinations as well as the required complementary APEDA strategy to create and sustain the export market in fresh fruits.

2.0 Relative Importance of Horticultural Exports in Agricultural Trade: World Scenario

An analysis of the world scenario indicates that within the agricultural sector, the positive growth rate in world exports is restricted to the horticultural sector in contrast to negative growth rate observed in the traditional agricultural export items such as coffee, tea and spices. Within the horticultural sector the competitive advantage for developing nations exists in export of fresh fruit rather than in fresh vegetables.

No wonder there has been a great deal of interest among policy makers and trade analysts in the role of horticultural products as an important means of agricultural diversification and foreign exchange earnings.

Between the fresh fruits and vegetable exports of the world, fresh fruits occupy the premier position. Besides, two-thirds of fresh fruit imports in developed markets emanate from developing countries. The growth rate of imports of fresh fruits from developing nations in value terms exceed the growth rate in quantity terms indicating, that developing nations are exporting more and more expensive fresh fruits. The priority of this study is on examining the feasibility of exports of fresh fruits and prioritisation of products within fresh fruits for identified/potential markets.

3.0 Relative Importance of Horticultural Exports in Agricultural Trade: Indian Scenario

Even in India's case, export of fruits and vegetables is likely to be the future star item as the scenario is not different from the one that is prevailing the world over. Barring cashew kernels and de-oiled cakes, exports of traditional items such as coffee, tea, spices (in dollar terms) have shown negative

growth rates (CARG) vis-a-vis the 23% growth rate exhibited by the fresh fruit and vegetable sector. India is the largest producer of fresh fruits in the world. For instance, India's share of world production in mangoes is as high as 56%; similarly, India accounts for around 14% fresh banana production. India's position in production of pineapples and fresh oranges is third and sixth respectively. Yet India is a marginal player in the international trade accounting for less than 1% of world exports. In order to examine the anomaly, the Industry Competitiveness Analysis framework developed by Prof. Porter was adopted.

METHODOLOGY

Factor Conditions

(a) Nominal Protection Coefficient (NPC):

Nominal Protection Coefficient (hereafter NPC) is the ratio of domestic price to the border price. Symbolically,

$$NPC = P_d/P_b$$

where,

NPC= Nominal Protection Coefficient of the commodity under consideration

P_d = Domestic price of commodity

P_b = Border or reference price of commodity after taking care of transportation and marketing expenses.

NPC basically helps in measuring the divergence of domestic price from the international price and thus determines the degree of export/import competitiveness of the

commodities in question. Prices of output being "a catch all" variable do incorporate the influence of various inefficiencies/ distortions in different segments of the commodity sectors. But it must be admitted that, while measuring true export competitiveness, one must adjust for distortions in input prices that are often caused by tax/subsidy policies in different countries. Since this study does not go into these issues in that great detail, measuring export competitiveness through a summary measure of NPC should be treated more as indicative of the level and nature of competitiveness than reflecting an exact degree of competitiveness. (An index of export competitiveness can be obtained using NPC as under:

$$[(1\text{-NPC})/\text{NPC}]$$

NPC can be estimated under two main hypotheses, i.e., under importable hypothesis and under exportable hypothesis. Under *exportable hypothesis* the commodity in question is treated as an exportable and competes with the domestically produced commodity at a foreign port. The relevant border or reference price under this hypothesis is obtained after deducting the transportation costs (both domestic and international), port clearance charges, marketing costs and trader's margin and processing costs necessary to make the commodity tradeable. Under exportable hypothesis, competition is assumed to take place at a foreign port and therefore the domestic commodity has to be extra efficient to the tune of international transportation costs at least. If the NPC coefficient under this hypothesis is less than one, then the commodity in question has competitive advantage in export, i.e., the commodity under consideration is export competitive.

NPC for Fruits

Fruit	*Year*					
	1988-89	*1989-90*	*1990-91*	*1991-92*	*1992-93*	*1993-94*
Mango						
NPC		0.59	1.31	1.25	0.86	0.82
NPC*		0.47	1.08	0.99	0.68	0.68
Lychee						
NPC(1993)					0.55	
Grapes						
NPC	0.90	0.63	0.81	0.86	0.72	0.71
NPC*	0.73	0.52	0.66	0.70	0.59	0.59
Bananas						
NPC			0.98	0.60	0.39	0.21
NPC*			0.76	0.48	0.32	0.18
Apple						
NPC			2.11	1.82	1.64	1.31
NPC*			1.69	1.47	1.33	1.10
Sapota						
NPC(A)						0.68
NPC* (A)						0.57
NPC (B)					0.67	
Pomegranates						
NPC (Middle east & Asia Pacific)						>1
NPC (Europe)						<1

* Using shadow exchange rate of 1.2 times official exchange rate, i.e., assuming a premium of 20 per cent.

Source: (i) Wholesale price from *Horticultural Statistics 1992-93;* f.o.b. value from DGCIS, Calcutta;Approximate packaging, handling and transport cost from exporters.

(ii) Exporter, Mr R.N. Singh, Delhi.

(b) Revealed Comparative Advantage (RCA)

The Heckscher-Ohlin theory of factor endowment states

that a country tends to export goods in which it has comparative advantage. The attempt here was to identify commodities and markets where India has a distinct comparative advantage. In this exercise, Revealed Comparative Advantage is measured by the following index of comparative advantage:

$$RCA = (E_i/E^m)/(W^i/W),$$

Revealed Comparative Advantage Index (RCA)

Fruit	*Year*	*RCA Index*
Mango	1992	58.8
	1993	67.5
Grapes	1992	2.2
	1993	2.3
Bananas	1992	0.05
	1993	0.04
Apples	1992	0.49
	1993	0.53
Lychee	1993	1.00
Citrus Fruits	1992	0.21
	1993	0.15
Pineapple	1992	0.08
	1993	0.08
Sapota		>1
Pomegranates		>1

where

RCA refers to the revealed comparative advantage index,

E_i is the country's export value of the perishable (fresh fruit) commodity i,

E^m is the country's total perishable (fresh fruits)export value,

W^i is the world export value of the perishable (fresh fruit) commodity i, and

W is total world perishable (fresh fruits)export value.

RCA value of greater than one reveals comparative advantage of the country in that perishable (fresh fruit) commodity.

Analysis of factor conditions reveal comparative advantage in exports of mango, grapes, lychee, sapota, pomegranate. However market conditions have to be considered to analyse competitive advantage and product-market combinations that warrant immediate attention.

Market Conditions

(c) Market Attractiveness

The following ratio defined as imports of the perishable commodity in terms of a percentage of domestic availability in the importing nations was calculated to determine which countries are the potential markets for Indian fruit exports:

Ratio: [Imports / (production + imports)] x 100

A value of 100% of this ratio implies total dependence of

a country on imports for the consumption of the commodity in question. This would indicate greater scope for India to penetrate this market.

(d) Double Log Regression Model (Price Elasticity)

Demand models were estimated in double log form for bananas, mangoes, grapes, sapota, and pomegranates for individual importing countries to obtain countrywise estimates of price elasticity of demand for exports of these fruits. Data on export price and the quantity of the fruit exported were utilized in estimating the demand models. Unit value realization, defined as the ratio of the value of exports to the quantity exported, was used as a proxy for export price. The estimated price coefficient in the model is the elasticity of demand for exports, which indicates the degree of responsiveness of exports to changes in the export price of the fruits. Thus, an elasticity of greater than one indicates that a one percent decline in the export price would result in a more than one percent increase in the volume of exports.

Market Attractiveness Ratio

Country	*Imports in 1993 (MT)*	*Ratio of Import to Domestic Supply*	*Market Growth Since 1986*
Mangoes			
France	10120	100%	64%
England	10623	100%	20%
Holland	17367	100%	290%
Japan	9000	100%	61%
Hongkong	27895	100%	NA
Singapore	10300	100%	NA
N. America	90000		
Middle East	27000		

(Continued)

Market Attractiveness Ratio (Contd.)

Country	*Imports in 1993 (MT)*		*Ratio of Import to Domestic Supply*	*Market Growth Since 1986*
Grapes				
Germany	336574	(19)	100%	8%
France	154316	(8.7)	100%	14%
England	124123	(7)	100%	32%
Holland	98610	(5.5)	99%	80%
Switzerland	41368	(2.3)	20%	10%
Japan	7000	(0.3)		
Hongkong	35000	(1.7)		
Singapore	12000	(0.7)		
U.S.A	321467	(18)	5%	
Canada	154377	(8.7)	70%	
S. Arabia	30000	(1.7)	100%	
Oman	12636	(0.7)	100%	
Bananas				
Germany	1179812	(11)	100%	
France	613798	(5.5)	100%	
England	648972	(6)	100%	
Italy	509579	(4.45)	100%	
Japan	913335	(9)	100%	
Korea	146045	(1.3)	100%	
U.S.A	3670129	(33)	99%	
S. Arabia	130000	(1.2)	100%	
Apples				
Germany	4209950	(17)	100%	
England	409996	(10)	100%	
Holland	256328	(6)	33%	
Austria	249299	(6)	100%	
Benlux	193972	(5)	100%	
Spain	147317	(3.5)	14%	
S. Arabia	126000	(3)	100%	

Note : Figures in brackets indicate the per cent share in the world imports.

Price Elasticity

Country	*Fruit*				
	Mango	*Grapes*	*Bananas*	*Sapota*	*Pomegranates*
Holland	-4.37				
Maldives	-4.21	-2.90			
Malaysia	-2.83	-2.40			
Hongkong	-1.74	-5.88			
Bahrain	-1.59	-8.02	-6.94	-4.34	-2.48
Germany	-1.50		-9.08		
Qatar	-1.34		-7.34		
Singapore	-1.09				
UAE		-4.02			
Saudi Arabia		-3.03	-5.69	-4.59	-7.52
Oman		-3.07			-1.55
Bangladesh		-1.03			
Kuwait			-1.93	-3.76	-4.42
Nepal			-1.16		
UK				-4.35	
Switzerland					-3.36
Canada					-1.46
Australia					-1.83

CONCLUDING REMARKS

APEDA has a lead role to play in shaping the context and institutional structure surrounding firms involved in exports of perishables especially cut flowers and fresh fruits and in creating an environment that stimulates firms to gain competitive advantage. There are many instances where institutions have played a catalytic role in creating an environment for firms to gain competitive advantage, such as Holland's premier research institution in cultivation, packaging and shipping of flowers, the ministry of communication and

transportation of Thailand allotting 50% of its air cargo capacities in the national airways to perishables or the case of the Philippines government which adopted the vapour heat treatment, a process about ten times more expensive than traditional treatments to overcome entry barriers. We foresee APEDA's role in a similar vein.

The analysis carried out so far revealed Mangoes, Grapes, Lychees, Sapota, Pomegranates as products with high RCA and low NPC values as promising products to target air freight subsidy.

Now it is time to look at the actual performance of fresh fruits in various markets during 1993-94 to form possible hypotheses:

(i) The proportion of fresh fruits air freighted to export markets to total exports of fresh fruits is near unity in case of products with high perishability index such as Sapota, Lychees, etc., while it is not insignificant in the case of Mangoes and Grapes. Barring apples, where exports are restricted to neighbouring countries (as NPC>1), in all other cases air freight subsidy has played its catalytic role.

(ii) The f.o.b. realisation from products exported through air shipments nearly matches the f.o.b. realisation through the conventional mode of transport (quantity exports and f.o.b. value exports roughly equal each other) thus enabling us to hypothesise that air freighted commodities command a higher c.i.f. price enabling it to realise equivalent f.o.b. prices.

(iii) Air freight subsidy has been the catalyst in enabling Indian fresh fruit exporters exploring the new markets.

Even in traditional markets there is a market preference for air-freighted commodities as shown below in tables entitled Proportion of the Export Market Met by Exports (air-freight) destination-wise.

Exports by Air

Fruit	*Exports by Air 1993-94*		*Total Exports 1993-94*		*Exports by Air as % of Total Exports*	
	Qty. (Tonnes)	*Value* (Rs.million)	*Qty.* (Tonnes)	*Value* (Rs.million)	*Qty.*	*Value*
Banana	395.4	4.67	1086	14.731	36%	32%
Pineapples (fresh)	59.51	0.85	120	1.29	50%	66%
Guava	69.6	0.93	319	7.24	22%	13%
Mangoes	9808	195.04	22793	438.7	43%	44%
Grapes	1665	33.12	15932	339.3	10.4%	9.8%
Apples	13.2	0.19	5988	68.7	0.22%	0.28%
Pomegranates	689.5	10.55	2623.2	36.72	26.2%	28.7%
Sapota	1978.2	20.98	2008	21.38	98.5%	98.1%
Sitafal	1474	19.87	1478	21.38	99.7%	93%
Custard Apple	178	2.11	183	2.14	97%	98.5%

Proportion of the Market Met by Exports (Air)

Country	*Mangoes (Qty)*	*Grapes (Qty)*	*Fresh Bananas (Qty)*
Saudi Arabia	91%	38%	100%
Kuwait	89%	26%	100%
UK	90%		100%
UAE	14%	61%	100%
Bahrain	73%		100%
Qatar	93%		100%
USA		32%	
S. Africa	100%		
France	100%	100%	
Austria	100%	100%	
Italy	100%		
Asia Pacific			
Indonesia	100%		
Malaysia	97%		
Mauritius	100%		
Maldives			100%
Singapore		27%	
Switzerland		100%	
Oman			100%

(iv) Finally, if we were to develop an index of effectiveness of air freight subsidy (f.o.b. exports-subsidy)/subsidy, the export performance of various fresh fruits

in export markets can be summarised as under:

Commodity	*Index (Exports-AF Subsidy) / AF Subsidy*
Bananas	0.96
Mangoes	1.24
Oranges	- 0.30
Grapes	2.40
Pomegranates	1.98
Sapota	0.18
Sitafal	1.70
Custard Apple	2.10
Pineapple Fresh	-0.30
Apples	-0.20
Bore	1.81
Guava	0.95

An analysis of effectiveness index destination-wise for Mangoes reveals that the index at 7 for Switzerland and Belgium is the highest; for Middle-East region the ratio ranges between 1.1 to 1.5. In Europe ,the index for UK destination is only 0.6 reflecting, probably, the severe competition from Pakistan varieties while for Germany the index is negative.

For fresh bananas, the index is highest for U.K. and Switzerland reflecting that the air-freighted, fully ripe, sweet fresh bananas can be an interesting variant to the conventional international market supply of unripened bananas from exporting countries. For guava, the markets of Switzerland and Austria are most rewarding. For fresh grapes, the markets of UK, Germany, Bahrain and Oman exhibit fairly high indices. For pomegranates, markets of Portugal, Switzerland in Europe

and Saudi Arabia, Bahrain and UAE in Middle-East yield high returns on air-freight subsidy. For sapota, markets of Albania, Belgium and Switzerland in Europe are rewarding in terms of returns to subsidy while in the Middle-Eastern region, barring UAE, others have responded favourably to air-freight subsidy. For bore, the indices are high in Albania, Portugal, Saudi Arabia, Bahrain, Kuwait and Malaysia.

Product	*Markets to Focus*	*Elements of Strategy*
Mango	(Price elsticity of demand for exports is high) Holland Maldives Malaysia Hongkong Bahrain Germany Qatar Singapore	• Air freight subsidy would improve NPC at margin, making it quite attractive to export; besides a depreciation of rupee against dollar (envisaged at about 5% per annum) would ensure that the air freight subsidy initially, would develop a healthy export market.
	Note : In Japan mangoes are replacing bananas as the luxury fruit (personal gift market). Income elasticity of mangoes is large; however quarantive regulations in Japan requiring vapour heat treatment (of disinfection) is an entry barrier to this otherwise most lucrative market in the long run.	• Concerted action to premium quality Alphonso in Europe through air freight subsidy. • APEDA to assume active role to install VHT facilities to penetrate the Japanese market—Maybe investments in these could be treated at par with venture capital funds. • APEDA to "buy and lease back" air cargo space for perishables especially mangoes.

(Continued)

Product	*Markets to Focus*	*Elements of Strategy*
Lychee	Singapore France USA (summer months) *APEDA would have to liaise with APHIS in USA to obtain phytosanitary approval. Export to USA is conditional to APEDA obtaining this approval.	• Lychee is considered the most popular imported Asian speciality fruit in Europe registering a market growth rate of 20%. • Although lychees are grown in Florida the gap between demand and supply has been increasing. • Since India produces a quarter million of lychees, APEDA must ensure that exports are regulated preferably through a canalisation policy. • Buy cargo space & lease back • Involve the corporate sector in exports of lychee.
Grapes	Bahrain Hongkong UAE Oman Saudi Arabia Maldives Malaysia	• Grapes are next to mangoes in importance in the fruit export basket of India • The main export variety is Thompson Seedless (green) • The perishability index is not high; Grapes can have a storage life of 3 to 5 months if the prevailing temperature is 30 to 32 degrees F; however air freighted grapes attract higher prices which compensate the high freight rates. • APEDA strategy could be to meet EU and US imports as these are mega markets (0.13 and 0.3 million ton markets respectively) by

(Continued)

Product	*Markets to Focus*	*Elements of Strategy*
		targetting air freight subsidy to these markets.
Sapota	Bahrain Saudi Arabia UK Kuwait Canada Germany	• Low NPC and an estimated RCA exceeding one suggests that this is one of the important fresh fruits, for APEDA to focus promotional efforts. • There has been a spurt in demand for exports during 1983-84 and since India is one of the leading exporters (others being Australia and Thailand) & since it has a strong foothold in Saudi Arabia & Bahrain, air freight subsidy would be the key element in promoting export of this perishable commodity.
Pomegranates Fresh	UAE Saudi Arabia Bahrain Kuwait UK Switzerland	• Pomegranates at present is a "marginal" product in terms of attractiveness to exports as the criterion. However the NPC is likely to be higher if exported to Europe because of the price realisation in Europe vis-a-vis the Middle Eastern region. However, air freight subsidy should continue for next 5 years when the marginal depreciation of rupee vis-a-vis dollar would drive NPC lower & increase export attractiveness of pomegranates.

(Continued)

Product	*Markets to Focus*	*Elements of Strategy*
Pineapples Fresh		• India is a marginal player (RCA 0.08); thus provision of air freight subsidy may not aid in development of sustainable export markets.
Apples	Bangaladesh Sri Lanka	• Degree of export competitiveness of Indian apples is not high (NPC>1); hence air freight subsidy to far off locations would not be in the interest of development of viable export markets.
Banana	Germany Qatar Bahrain Saudi Arabia Kuwait	• The low NPC makes this financially attractive product for Indian farmers & traders to resort to exports; however the very low RCA suggests their attempts may not be very successful in view of the entrenched international market. The low NPC suggests that air freighting fully ripe, sweet, bananas to export markets could be an interesting proposition considering that all other exporters ripen fruits at export market centres.

Floriculture

Two vital questions posed and answered in the Floriculture sector are:

(i) If product-market combinations are identified, does export of cut-flowers become a long-term viable propo-

sition for Indian exporters.

(ii) How does the provision of air freight subsidy to promote exports of floriculture compare with other schemes specifically geared to export production such as Export Promotion Capital Goods Scheme.

- *The yield on investments in floriculture ranging between 22 and 25% compares well with alternatives for private borrowers especially if you consider that exports of fresh agricultural produce yield tax benefits.*

- *The promotional investment involved in developing floriculture is 7% per unit of foreign exchange earning The premium implicitly assumed in Export Promotion Capital Goods Scheme is around 16% indicating the attractiveness of providing air freight subsidy through APEDA.*

While Rose and Carnations to Japan would be the best medium-long term promotional plan, participation in Netherlands auction, exports to Europe and the Middle East could be the immediate short term options. Also, New Zealand and Australia could be cultivated as promising markets. While expanding products to include Orchids, Gladioli, Anthurium, etc., care should be taken of the intense competition and likely lower price realisation. For instance, Thailand is the major supplier of Orchids and Hawaii is the principal supplier of Anthurium. Exports to USA may be feasible only if air freight subsidy is increased. While auctions could be the interim route to Japan, for better price realisation one may have to sell directly to wholesalers in Europe on a fixed price basis. (*Basis:* Secondary literature survey, field interviews of major exporters and in-depth analysis of the Japanese market.)

It is agreed that the scope for increasing exports mainly lie in cut flowers and fresh fruits especially from India's view point in the agricultural sector. Since air freight subsidy is the necessary promotional expense in developing viable long term export markets for cut flowers, we examine the present value of subsidies against the present value of foreign exchange earnings discounting the operating cost through use of standard conversion factor which brings out that the promotional investment involved to earn foreign exchange is 7% (in other words foreign exchange can be valued at a premium of 7%).

The premium involved in other programmes to earn foreign exchange is far higher indicating the higher productivity of air freight subsidy. For instance, one important scheme specifically geared to export production, is Export Promotion Capital Goods Scheme. Manufacturing firms can import capital goods at a concessional rate of 15% as against 65% general rate on condition that they export four times the c.i.f. value over the next five years. This would implicitly mean that the foreign exchange is valued at 16% premium in the normal scenario.

Introduction

Relative Importance of Horticultural Exports in Agricultural Trade

WORLD SCENARIO

International trade in horticultural commodities such as cut flowers, fresh fruits and vegetables is expanding at a higher rate than trade in other agricultural commodities.

Table 1: Compounded Annual Rate of Growth in World Exports

(Agricultural Commodities, period 1988-1992)

Fresh Fruits	10.70 %
Fresh Vegetables	9.17 %
Coffee	- 8.90 %
Tea	1.50 %
Spices	- 2.10 %
Rice	- 0.30 %

No wonder there has been a great deal of interest among policy makers, trade analysts in the role of horticultural products as an important means of agricultural diversification and foreign exchange earnings in developing countries. India, which had been concentrating on spices, coffee and tea, may have to recognise the need to diversify into fresh fruits to augment foreign exchange earnings considering that the growth rate in the world exports of these traditional items has been negative.

Between the fresh fruits and vegetables exports of the world, fresh fruits occupy the premier position as shown below:

Table 2: Share of Fruits and Vegetables in Total World Exports

	1988	*1989*	*1990*	*1991*	*1992*
Fresh Fruits (% Share)	53.6	53.0	52.4	53.8	54.9
Vegetables (% Share)	46.5	46.5	47.6	46.2	45.1

During 1988, roughly two-thirds of fresh fruit imports were from the developing countries while only 40% of fresh vegetable imports originated from developing countries. An analysis of growth rates of imports of fresh fruits and fresh vegetables by market economies (case study - Japan) during 1980 through 1988 reveals that the growth rate in value terms for fresh fruits is substantially higher than the growth rate in quantity terms indicating that developing countries are exporting more and more expensive fresh fruits. In contrast, the quantity growth rate for fresh vegetable imports from developing countries is about the same as the value growth rate, meaning that the developing countries are exporting less expensive fresh vegetables to the market economies while other countries are shifting to exports of more expensive fresh vegetables.

In other words, competitive advantage for developing nations lies in export of fresh fruits rather than fresh vegetables (Table 3). Besides, the unit value realisation from sale of fruits had been consistently higher by about 30% (UN/FAO statistics, various issues)

An analysis of the world scenario indicates that within the agricultural sector the positive growth rate in world exports is restricted to the horticultural sector in contrast to the negative growth rate observed in the traditional agricultural export

Table 3: Horticulture Imports by Japan from Developing Countries, by Commodity Group, 1980 & 1988

Imports/ Country Group	*1980*		*1988*		*Growth Rate/ Year (%)*	
	*Value**	*Quantity***	*Value**	*Quantity***	*Value*	*Quantity*
Cut Flowers from						
– Developing countries	151	40	534	99	17.1	11.9
– Others	38	4	550	39	39.6	32.2
Fresh Vegetables from						
– Developing countries	1868	2533	3130	4199	6.7	6.5
– Others	1860	2724	5215	5391	13.8	8.9
Fresh Fruits from						
– Developing countries	2592	8429	6150	9297	11.4	1.2
– Others	3853	3885	9350	6769	11.7	7.2

* in US $100,000
** in 100,000 metric tons
Source: M. Honma, *Growth in Japan's Horticultural Trade with Developing Countries,* Research Report 1989, IFPRI.

items such as coffee, tea and spices; and within the horticultural sector the competitive advantage for developing nations exists in export of fresh fruit rather than fresh vegetables. The focus of this study is, thus, on examining the feasibility of exports of fresh fruits and prioritisation of products within the fresh fruits category for identified/potential markets.

INDIAN SCENARIO

India has varied agro-climatic conditions and diverse soils, providing potential for growing a large array of fruits, vegetables and flowers. The country has made significant

achievements in the production of horticulture crops, both quantity-wise and quality-wise. During the year 1992-93, the total area under fruits and vegetables was 3.2 million hectares and 5.1 million hectares with production being 32.9 million tonnes and 71 million tonnes respectively. According to the *FAO Production Year Book* (1993) India is the largest producer of fruits in the world accounting for roughly 8.58% of the world fruit production.

Table 4: India's Agricultural Exports, 1985-86 Through 1993-94

(US dollar million)

Commodity	*1985-86*	*1990-91*	*1992-93*	*1993-94*	*Share*	*CARG*
Agriculture & Allied Products, *of which:*	2467	3521	3265	4151	100%	7%
Coffee	217	141	130	174	4%	-3%
Tea & Mate	512	596	337	338	8%	-5%
Oil Cakes	110	339	534	741	18%	27%
Tobacco	139	147	164	147	4%	1%
Cashew Kernels	184	249	258	334	8%	8%
Spices	227	133	136	181	4%	-3%
Sugar & Molasses	13	21	122	57	1%	20%
Raw Cotton	56	471	63	209	5%	18%
Rice	160	257	337	410	10%	12%
Fish and Fish Preparations	334	535	602	814	20%	12%
Meat and Meat Preparations	60	78	89	78	2%	3%
Fruits Vegetables	NA	NA	108	133	3%	23%
Misc Processed Foods (incl. processed foods and juices)	67	119	129	150	4%	11%

Even in India's case, export of fruits and vegetables is likely to be the future star item as Table 4 reveals; the scenario is not different from the one that is prevailing the world over.

Barring cashew kernels, exports of traditional items such as coffee, tea, spices have shown negative growth rates (CARG) vis-a-vis the 23 per cent growth rate exhibited in by the fresh fruits and vegetables sector. The other star performer has been the de-oiled cakes which had a negligible share in India's export basket prior to 1985.

FRESH FRUITS

Background

The production of fruits in India is estimated to be around 32 million tonnes for the year 1992-93. The annual growth rate of fruit production is estimated to be around 1.66 per cent during the Seventh Five Year Plan (1985-86 – 1989-90).

However, the proposed annual growth rate for the Eighth Five Year Plan (1992-93 – 1996-97) is 6.97 (Chadha, 1992), which is quite ambitious and poses a challenge to our scientists, policy makers and farmers.

The major fruits in terms of their area and production in India are mango, banana, citrus fruits, apple, guava, pineapple and grapes (Table 5). Mango is also the major export earner among fresh fruits, grapes being the next as shown in Table 5.

Table 5: Share of Major Fruits in Total Fruit Production, Area and Export in India, 1993

(Per Cent)

Fruit	*Production*	*Area*	*Export Value*
Mango	28.0	35.5	39.1
Banana	31.7	12.4	1.3
Citrus	9.0	11.5	3.8
Apple	3.5	5.97	5.9
Guava	3.7	3.5	0.6
Pineapple	2.5	1.7	0.1
Grapes	2.0	1.0	30.2
Others	19.6	28.5	19.0
TOTAL	*100.0* (32 mill.tonnes)	*100.0* (3.3 mill.ha)	*100.0* (1123 mill.Rs)

Note: Figures in parentheses represent actuals.

Source: *APEDA Export Statistics 1993-94; Data Base* 1992-93 National Horticultural Board.

India ranks first in terms of total fruit production, cont ributing about 8.5 per cent to world fruit production (FAO, 1993). However, fruit export performance of India at world level is much less encouraging (Table 6).

Table 6: India's Share in World Production and Export of Major Fruits, 1993

Fruit	Production *(Per cent)*	Rank	Export *(Per cent)*
Mango	56.35	1	13.00
Grapes	0.37	–	0.30
Banana	14.23	1	0.02
Apple	2.83	–	0.13
Pineapples	6.81	3	
Oranges	3.52	6	
ALL FRUITS	*8.58*	*1*	*<1.0*

Source: *APEDA Export Statistics, 1993-94.*
FAO Year Book 1993.

Except in the case of mango, India's share in world exports is less than one per cent, the least being in the case of banana; a mere 0.02 per cent. However, in terms of fruit export performance vis-a-vis their respective production in India, grapes are on the top, followed by mango, apple and banana. But, in absolute terms, mango exports are the highest among fresh fruits followed by grapes (Table 5).

The share of fresh fruits in total value of horticultural exports has ranged between 15 and 30 per cent during 1986-92 (Table 7)

It seems that fruits form a sizeable proportion of total horticultural exports of India. The horticultural products here include fresh mangoes, grapes, other fruits, onions, other

Table 7: Share of Fruit Exports in Total Horticultural Exports of India, 1986-87–1991-92

Year	*Share of Fresh Fruits* (Per Cent)	*Total Hort. Exports* (Rs.million)
1986-87	18.61	1661.8
1987-88	30.01	1448.5
1988-89	18.91	1979.0
1989-90	17.62	2379.8
1990-91	19.42	2615.0
1991-92	15.05	5120.0
1993-94	17.2	6539.3

Source: *APEDA Export Statistics, 1993-94.*

Table 8: Exports of Major Horticultural Items from India (TE 1993-94)

Item	*Value* (Rs million)	*Share* (Per Cent)
Mango	438.7	6.7
Grapes	339.3	5.2
Other Fruits	344.6	5.3
Onion	1826.8	28.0
Other Vegetables	904.9	13.8
Mango Pulp	579.8	9.0
Other Processed Fruits and Vegetables	2105.0	32.2
TOTAL FRUITS & VEG.	*3854.3*	*59.0*
TOTAL PROCESSED FRUITS & VEG.	*2685.0*	*41.0*
GRAND TOTAL	**6539.3**	**100.0**

Source: *APEDA Export Statistics, 1993-94.*

vegetables, mango pulp and other processed fruits and vegetables (Table 8). The share of fresh fruits and vegetables in total horticultural exports is about 59 per cent and the remaining 41 per cent is contributed by processed fruits and vegetables (Table 8).

Thus, apriori, it would seem, that the Agricultural and Processed Food Products Export Development Authority (APEDA), under the aegis of Ministry of Commerce, Government of India, has rightly chosen fruits and cut flowers along with other horticultural products for export promotion during the Eighth Five Year Plan (1992-93 to 1996-97). The export competitiveness of **mango, grapes, banana, apple, sapota** and **lychee** is discussed separately in the following sections.

General Methodology

While there have been a plethora of reports/general descriptive information on Indian fruit and vegetable sector, there has been no specific study on either investigation of factor conditions specific to products that affect export competitiveness, or investigation of market conditions. Similarly, an analysis of market conditions such as product market specific elasticities, competitors' strategies such as that of Brazil, Thailand, Philippines are important for determining the APEDA strategy to promote exports of fresh fruits. Also, the role of support industries such as precooling facilities to extend the shelf life of the product, technologies for exterminating the pests such as vapour heat treatment (VHT) for mangoes to meet the quarantine regulations of the importing countries need to be assessed before prioritising the product-market combinations and the appropriate APEDA strategy. In other words, this study would address critical

questions rather than merely analysing statistics on market information to outline the precise nature of action needed.

The basic hypothesis is that competitive advantage can be created and sustained through APEDA's choice of appropriate strategy. For instance, Holland has a premier catalytic organisation in the form of its research institutions in the cultivation, packaging and shipping of flowers, where it is the world's export leader. Similarly India's lead position in de-oiled cakes came through sustained efforts of NDDB/NCDC through its creation of oil-seed co-operatives for processing of soyabean. In other words, it is just not enough to rely on country's natural endowments; catalytic institutions are also needed to create competitive advantage. Following this line of argument, this report analyses:

1. *Factor Conditions:* Such as Nominal Protection Coefficient (NPC), Revealed Comparative Advantage (RCA), country's position in factors of production.

2. *Demand Conditions:* Such as product-market specific price elasticity, import as a percentage of domestic availability, competitors' strategy in supplying to the import market, export barriers such as quarantine regulations. In describing the market economy's demand for fresh fruits it is useful to consider consumption of fresh fruits in three ways:

    (i) Fresh fruits for commercial use, e.g. imports by fruit processors.

    (ii) Fresh fruits for institutional use such as restaurants.

    (iii) Fresh fruits for individual use either as gifts or for domestic consumption.

Further, this demand has to be also segmented into Asian (Far East), Middle East, European and other markets. For instance, Alphonso would be catering to the individual gifts market in Far East, individual domestic consumption in Europe and Middle East while the other varieties would serve the institutional and commercial sectors. Lychees would serve the institutional market such as restaurants. For details on product-market segmentation see Chart 1.

3. *Related Supporting Industries:* The presence or absence of service industries such as pre-cooling facilities to extend shelf life, vapour heat treatment plant to meet quarantine requirements, refrigerated transportation facilities and other related industries.

4. *APEDA Strategy:* The conditions in the perishables sector governing how firms are created, organized and managed, as well as the nature of competition would be determined by the APEDA strategy.

The above attributes work as a system in creating the environment for achieving international competitiveness. Thus, the object of this study would be to isolate the feasible product-market combinations as well as the required complementary APEDA strategy to create and sustain the export market in perishables (See Chart 2).

Methodology

(a) Nominal Protection Coefficient (NPC)

Nominal Protection Coefficient (hereafter NPC) is the ratio of domestic price to the border price.

Chart 1

PRODUCT-MARKET SEGMENTATION – FRESH FRUITS

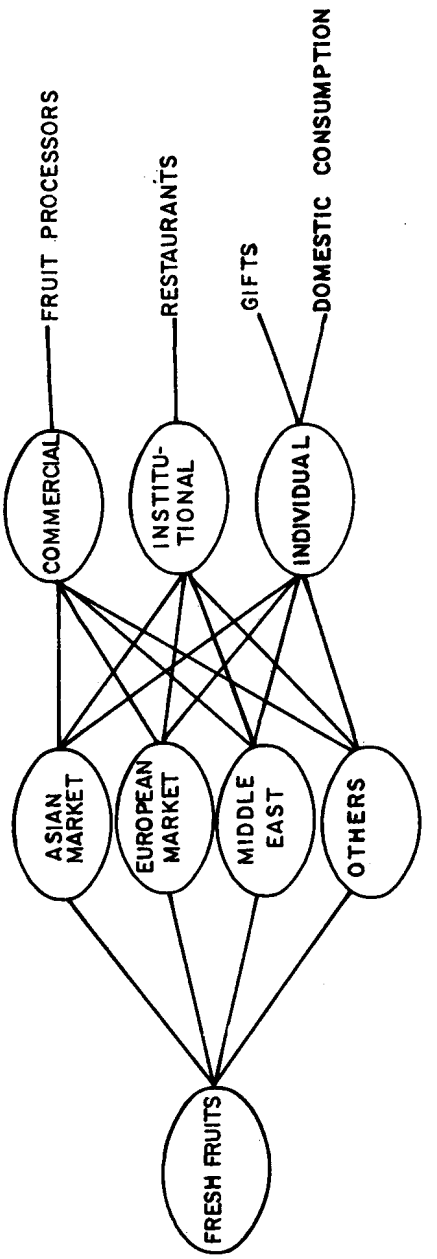
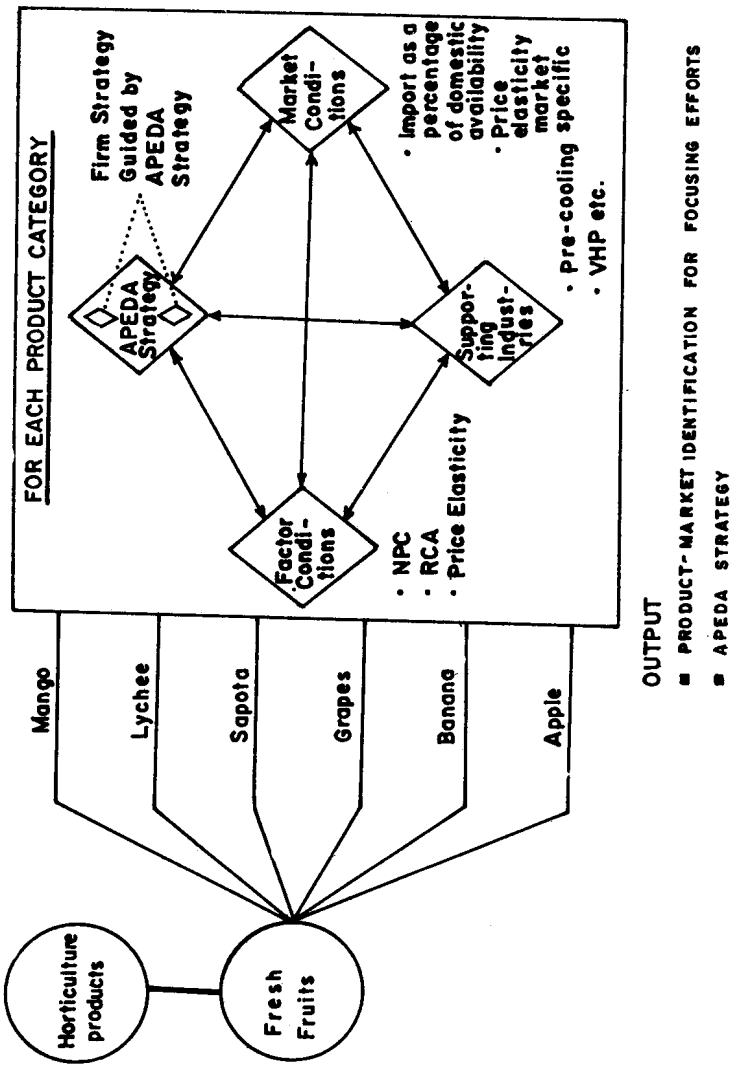


Chart 2

DECISION TREE FOR FRESH FRUIT EXPORTS



Symbolically,

$$NPC = P_d/P_b$$

where,

NPC= Nominal Protection Coefficient of the commodity under consideration

P_d = Domestic price of commodity

P_b = Border or reference price of commodity after taking care of transportation and marketing expenses.

NPC basically helps in measuring the divergence of domestic price from the international price and thus determines the degree of export/import competitiveness of the commodities in question. Prices of output being a 'catch all' variable do incorporate the influence of various inefficiencies/ distortions in different segments of the commodity sectors. But it must be admitted that while measuring true export competitiveness, one must adjust for distortions in input prices that are often caused by tax/subsidy policies in different countries. Since this study does not go into those issues in that great detail, measuring export competitiveness through a summary measure of NPC should be treated more as indicative of the level and nature of competitiveness than reflecting an exact degree of competitiveness. An index of export competitiveness can be obtained using NPC as under:

$$[(1-NPC)/NPC]$$

NPC can be estimated under two main hypotheses, i.e., under importable hypothesis and under exportable hypothesis. Under *exportable hypothesis* the commodity in question is treated as an exportable and competes with the domestically

produced commodity at a foreign port. The relevant border or reference price under this hypothesis is obtained after deducting the transportation costs (both domestic and international), port clearance charges, marketing costs and trader's margin and processing costs necessary to make the commodity tradeable. Under exportable hypothesis, competition is assumed to take place at foreign port and therefore domestic commodity has to be extra efficient to the tune of international transportation costs at least. If the NPC coefficient under this hypothesis is less than one, then the commodity in question has competitive advantage in export, i.e., the commodity under consideration is export competitive.

(b) Double Log Regression Model (Price Elasticity)

Demand models were estimated in double log form for bananas, mangoes, grapes, sapota and pomegranates for individual importing countries to obtain country wise estimates of price elasticity of demand for exports of these fruits. Data on export price and the quantity of the fruit exported were utilized in estimating the demand models. Unit value realization, defined as the ratio of the value of exports to the quantity exported, was used as a proxy for export price. The estimated price coefficient in the model is the elasticity of demand for exports, which indicates the degree of responsiveness of exports to changes in the export price of the fruits. Thus, an elasticity of greater than one indicates that a one percent decline in the export price would result in a more than one per cent increase in the volume of exports.

(c) Revealed Comparative Advantage (RCA)

The Heckscher-Ohlin theory of factor endowment states that a country tends to export goods in which it has comparative advantage. The attempt here was to identify commodities and

markets where India has a distinct comparative advantage. In this exercise, Revealed Comparative Advantage is measured by the following index of comparative advantage:

$$RCA = (E_i/E^m)/(W^i/W),$$

where

RCA refers to the revealed comparative advantage index,

E_i is the country's export value of the perishable (fresh fruit) commodity i,

E^m is the country's total perishable (fresh fruits) export value,

W^i is the world export value of the perishable (fresh fruit) commodity i, and

W is total world perishable (fresh fruits) export value.

RCA value of greater than one reveals comparative advantage of the country in that perishable (fresh fruit) commodity.

(d) Market Attractiveness

The following ratio defined as imports of the perishable commodity as a percentage of domestic availability in the importing nations was calculated to determine which countries are the potential markets for Indian fruit exports:

[Imports / (production + imports)] x 100

A value of 100% of this ratio implies total dependence of a country on imports for the consumption of the commodity in question. This would indicate greater scope for India to penetrate this market.

Mango

Fresh mangoes are highly perishable and hence it is usually necessary to air freight them. They should arrive fully mature but firm to enable them both to ripen satisfactorily and to have as long a shelf life as possible. Most buyers prefer fruit that shows some of its mature colour, yellow or red depending on the variety, on arrival. Green mangoes, although fully mature and of excellent quality, are difficult to sell and would require some promotion to sell in these markets.

Although consumers do not distinguish between the different varieties, importers seem to prefer well-known varieties, such as Alphonso, Amelie, Apple, Haden, Kent and Ruby. The fruit is consumed essentially as dessert; it should, therefore, be free from fibrous tissue, have a good flavour when fully mature, and be free from all terpene off-flavours.

Mango Economy: World and Domestic Scenario

World Scenario

The world production of mango is estimated to be around 17 million tonnes (FAO, 1992). India is the largest producer of mango in the world, producing about 59 per cent of world mango. Other significant producers in the world are: Mexico, Pakistan and Brazil, but their contribution to world production is less than 7 per cent each.

It is important to note that less than 1 per cent (about 0.6 to 0.8 per cent) of world production is traded in fresh form. In

terms of quantity of mango exported, India contributes about 13.5 per cent to world mango exports (Buckley, 1990; APEDA, 1992). North America is the largest importer of mangoes accounting for about 50 per cent of world imports (Table 9).

Table 9: Major Mango Importing Zones Along With Quantities Imported

(Tonnes)

Importing Zone	*1977*	*1985*	*1989*	*Annual Growth (%) (1977-89)*
North America	12000 (54.5)*	32500 (47.4)*	45000 (50.0)*	11.6
Middle East	5000	18500	20000	12.2
Eur. Eco. Com.	3181	16830	22000	17.5
Others	1819	670	3000	4.3
TOTAL	*22000*	*68500*	*90000*	*12.5*

* Percentage of total.

Source: Gulati, A., et.al., *Export Competitiveness of Selected Agricultural Commodities,* NCAER, 1994; Interviews with Exporters; *Market Overviews & Country Case Studies,* USAID.

The major exporters of mango are: India, Venezuela, Pakistan, Kenya, Mexico and Brazil. The major suppliers to north America are countries from central and south America who have geographical proximity to the region. India and Pakistan are two major exporters to middle eastern region. Europe is supplied by countries in south America, Asia and Africa. Among different regions, Europe is the fastest growing market as indicated by the highest annual growth rate of 17.5 per cent over the period 1977 to 1989 (Table 9).

Domestic Scenario

Mango production in India is estimated to be around 10 million tonnes in 1992 which is about 59 per cent of world

production (FAO, 1992). Mango is widely grown in different states of India with concentration in Andhra Pradesh, Uttar Pradesh, Bihar, Karnataka, West Bengal, Tamil Nadu, Gujarat and Maharashtra.

The main varieties of mango grown in India are: Dasheri, Banganpalli, Langra, Totapari, Neelam, Alphonso, Badami and Chausa. However, the share of these well known varieties in total mango production is about 30 per cent (Patnaik, 1993).

Thus, major share of about 70 per cent is contributed by less known varieties and other local or *deshi* or non-descript varieties. The main export varieties, Alphonso and Totapari, contribute about 2 and 3.5 per cent respectively to total mango production in the country (Patnaik, 1993).

The mango season in India starts from March and goes on till July. The Alphonso variety is unique to India and is an early starter and therein lies its export advantage over mango from Pakistan, the main competitor in the Middle East.

Factor Conditions

Cost of Production

The estimation of cost of production in the case of fruits is generally much more involved, relative to annual crops, and also, perhaps, less precise due to long gestation period, usually a few years, and longer productive life, usually a few decades, for most fruit trees. Usually the economics of fruit production is presented in the form of costs and returns over time, i.e., streams of costs and returns along with yield over the life of fruit orchard in per hectare terms. Costs and returns are often converted in present value terms. Relevant interest

rates (discount factors) are used for estimation of interest costs and apportioning of orchard establishment costs over the productive life of the orchard. Given these annual costs and yield data on per hectare basis, it is possible to derive average cost of cultivation and average cost of production over the life span of fruit orchard in terms of per unit area and per unit output, respectively.

The studies that are available on economics of mango production are scarce and scattered. These, nonetheless, do provide some information about the magnitude of cost of production of mango in selected regions for selected years (Table 10).

Table 10: Cost of Production and Orchard Gate Price of Mango in Selected Regions of India

Region	*Year*	*Cost of Production* (Rs./kg)	*Orchard Gate Price* (Rs/kg)
Punjab	1984-85	1.01	3.00
U.P. (Plains)	1990	0.61	3.00
Gujarat	1992	0.80	2.00
Tamil Nadu	1992	1.61	NA

Source: Gulati, A., et.al., *Export Competitiveness of Selected Agricultural Commodities,* NCAER, 1994.

The figures in Table 10 are not comparable across states due to varying years and methods used for their estimation. Also the varieties are not specified. However, it appears that cost of production is about 20 to 40 per cent of orchard gate price indicating good margins for fruit farmers. Low cost of production of mango vis-a-vis orchard gate price also suggests the importance of post harvest matters including storage, transport, marketing margins, etc. in influencing export competitiveness of mango.

India's Exports

Though quantities and values of mango exports from India have fluctuated during 1980-81 to 1992-93, nonetheless, there is an increasing trend over time (Table 11). The f.o.b. unit value realisation in rupees appears to have increased over 1985-86 to 1992-93, but in dollar terms it has actually gone down due to depreciation of rupee against dollar over time. It is important to note, however, that the quantity of mango exports has consistently increased over the last three years.

Table 11: Mango Exports from India, 1980-81–1992-93

Year	*Quantity* (Tonnes)	*Value* (Rs. million)	*Unit Value* (Rs/kg)	*Unit value* ($/kg)
1980-81	6692	63.3	9.45	
1981-82	7483	67.3	8.99	
1982-83	13153	105.2	8.00	0.85
1983-84	11967	111.9	9.35	0.93
1984-85	11747	141.2	12.02	1.06
1985-86	16465	192.2	11.67	0.95
1986-87	16258	191.2	11.76	0.93
1987-88	20302	233.4	11.50	0.89
1988-89	16839	221.1	13.13	0.91
1989-90	12008	167.5	13.95	0.84
1990-91	19380	312.2	16.11	0.90
1991-92	23105	354.6	15.35	0.63
1992-93	25830	459.9	17.79	0.68
1993-94	22794	438.7	19.25	0.64

Source: *APEDA Export Statistics, 1993-94*.

The main destination for Indian mango export has been the middle eastern region where about 95 per cent mango

exports go (Table 12). The other minor export destinations are England, Canada, Singapore and Australia. However, the unit f.o.b. value realisation is higher from England and Singapore relative to that from middle eastern countries.

Table 12: Export Destinations and Quantities Exported of Mango from India, TE 1993-94

Region	*Export* (Tonnes)	*Export Value* (Rs. million)
Middle East	18191 (80)*	365 (83)*
Eur. Eco. Comm.	1513	40.0
Asia Pacific	908	21.0
North America	120	2.4
Others	118	2.1
TOTAL	*20850*	*431.00*

* Percentage of total.

Source: *APEDA Export Statistics, 1993-94.*

The main export varieties are Alphonso and Totapari and their share in total mango exports is more than 85 per cent (APEDA, 1992).

Export Competitiveness of Indian Mango

The export competitiveness here is assessed on the basis of wholesale price and f.o.b. values in Bombay (Table13). Wholesale price, average of monthly wholesale price April to August, the mango season, is considered as domestic reference price whereas f.o.b. unit value based on annual exports April to March, is taken as an approximation for the relevant foreign price. The f.o.b. unit values are adjusted for export packaging cost and domestic transport and handling

cost between port and market place. Thus, NPC is the ratio of wholesale price to f.o.b. unit value adjusted as described above.

NPC in Table13 is less than one in two out of four years (when official exchange rate is used) showing a mixed case of

Table 13: F.O.B. Unit Value, Wholesale Price and NPC for Mango, 1989-90 to 1992-93, Bombay

Particulars	*Year*				
	1989-90	*1990-91*	*1991-92*	*1992-93*	*1993-94*
F.O.B. unit value (Rs/kg)	13.95	6.11	15.35	17.78	19.88
Packaging, handling and transport (Rs/kg)(Approx.)	2.50	2.75	3.02	3.30	3.60
Reference Price (Rs/kg)	11.45	13.36	12.33	14.88	16.28
Reference Price* (Rs/kg)	14.24	16.58	15.40	18.04	19.54
Wholesale Price (Rs/kg)	6.78	17.86	15.37	12.42	13.28
NPC	0.59	1.34	1.25	0.86	0.82
NPC*	0.47	1.08	0.99	0.68	0.68

* Using shadow exchange rate of 1.2 times official exchange rate, i.e., assuming a premium of 20 per cent.

Source: *APEDA Export Statistics, 1993-94.*
NHB: *Horticultural Data Base.*

export competitiveness of Indian mango over time. However, NPC is greater than one in only one year if shadow exchange rate (20 per cent higher than the official exchange rate) is used. More importantly, NPC has been declining over last two

years. Wholesale price has also declined during the last two years. It must be noted, however, that four years are too small a time series to analyse any pattern over time. Also, it is important to note that variety/quality aspects are not considered due to paucity of information. Having noted all these points, on an average, over the four years reported here, NPC is less than one (0.81) suggesting moderate export competitiveness of Indian mango.

NPC may have to be adjusted for investments in cold storage, pre-cooling units; however such adjustments are not going to affect NPC computations as these would not exceed rupee one if the cold storage of 6 tonnes per hour and a cold storage unit is expected to be operated over a useful life of 15 years at the test discount rate of 20 per cent.

Revealed Comparative Advantage

NPC alone cannot determine export competitiveness of the product. For instance, NPC could be higher than one if the country is the major exporter of the commodity in the international market thus realising lower than the average f.o.b. price realised by the competitors or the domestic prices rule higher than the international prices (f.o.b.). Alternatively, NPC could be lower than one if the country is a minor exporter of the commodity and any expansion of trade could increase the NPC beyond one. In such cases the computation of revealed comparative advantage is useful. For instance Table 14 shows RCA in mangoes is the highest even though NPC indicates only moderate competitiveness, indicating the dominant position enjoyed by mangoes in the export fruits' basket of India. In contrast, in case of bananas even though NPC indicates that it is highly competitive, RCA figures reveal otherwise.

Table 14: Revealed Comparative Advantage Index (RCA)

Mango	
1992	58.8
1993	67.5
Grapes	
1992	2.2
1993	2.3
Bananas	
1992	0.05
1993	0.04
Apples	
1992	0.49
1993	0.53
Lychee	
1993	1.6
Citrus Fruits	
1992	0.21
1993	0.15
Pineapple	
1992	0.08
1993	0.08

RCA for Sapota has not been calculated for want of data on world trade in sapota. However, discussions with experts reveal that RCA would be higher than one in view of the limited world trade and India's suitable factor conditions.

Perishability

Recommended conditions for cold storage of perishable products as per *Institut International du froid,* Paris indicate the expected storage life for selected fresh fruits as shown in Table 15.

If air freight subsidy is to be used as a promotional aid then mangoes, lychees, sapota (highly perishable per experts, expected storage life not available), strawberries and bananas should qualify for it (NPC and RCA analysis reveal that mango followed by lychees and sapota should be serious contenders

Table 15: Conditions Recommended for Cold Storage of Perishable Products

Products	*Temperature*		*Relative*	*Expected*
	O F	*O C*	*Humidity (%)*	*Storage Life*
Apples	30-34	-1-4	85-95	3-8 months
Bananas Green	53-58	11.5-14.5	90-95	10-20 days
" Coloured	56-61	13-16	85-90	5-10 days
Grapes	30-32	-1-0	85-90	3 weeks-5 months
Lychees	32-35	0-1.5	85-90	5-11 weeks
Mangoes	45-50	7-10	85-90	4-7 weeks
Strawberries	32	0	85-90	1-5 days

for the subsidy). Banana, which has a high perishability and a low NPC, has not been considered in view of the very low RCA index, making it a non-serious contender for exports from India.

Market Conditions

The major importers of mangoes during 1993, the rate of market growth during the period 1986 to 1993, and the ratio of import to domestic supply are three parameters used to prioritize markets (Table 16).

Table 16: Imports of Mangoes by Selected Countries, 1993

Country	*Imports of Mangoes in 1993* (MT)	*Ratio of Import to Domestic Supply*	*Market Growth* Since 1986
France	10120	100%	64%
England	10623	100%	20%
Holland	17367	100%	290%
Japan	9000	100%	61%
Hongkong	27895	100%	NA
Singapore	10300	100%	NA
North America	90000		
Middle East	27000		

Based on this analysis, the markets of interest for mangoes would be Europe (Holland and France), Far East (Japan), in addition to the nearby Middle East market.

In order to further analyse the import markets a detailed study on income and price elasticities of the most potential market, Japan, was attempted at.

In Japan Mangoes are Replacing Bananas

In Japan, imported fruits can be classified into two categories according to their demand characteristics. One group—bananas and the three types of pineapples—are traditional tropical fruits, the demand for which is not very sensitive to either price or income changes. The other group consists of mangoes, avocados, and kiwifruit which are relatively new fruits for Japanese consumers and are characterised by large price and income elasticities.

Bananas are the most important imported fruit in volume. Bananas used to be a luxury for most Japanese but since import of bananas was liberalised in 1963, large supplies have become available at lower prices. In the late 1960s multinational fruit corporations invested in banana plantations in the Philippines, targeting Japanese markets. Now consumption of Bananas seems to have reached the satiation point, as evidence by the non-significant income elasticity in Table 10, although the demand is fairly price sensitive and highly significant.

Among the new fruits—mangoes, avocados and kiwifruit—Japan's imports of all three are growing rapidly; the price elasticity of kiwifruit and the income elasticity of mangoes are remarkably large with high statistical significance. Although kiwifruit is not produced in developing countries at this time,

the growth in kiwifruit consumption in Japan's markets has many lessons for them.

The success has been based on a remarkable price decline of 15 per cent annually in a decade. This high rate of price decline is not directly linked to recent appreciations of the Japanese yen, because New Zealand, the almost exclusive supplier of kiwifruit to Japan, offers prices in Japanese yen on

Table 17: Estimated Import Price and Income Elasticities of First-stage Demand for Japan's Imports of Selected Horticultural Commodity

Commodity	*Import Price Elasticity*	*Income Elasticity*
Cut Flowers	-2.134**	2.303**
Fruits		
Bananas	-0.557**	-0.389
Mangoes	-1.038**	3.546**
Avocados	-1.648**	0.994
Kiwifruit	-2.746**	1.765
Pineapple, Fresh	-0.669*	-0.129
Pineapple, Frozen	-0.479	-1.019
Pineapple, Canned	-0.000	1.219*

* Significant at 0.05 level.
** Significant at the 0.01 level.
Source: M. Honma, *Growth in Japan's Horticultural Trade with Developing Countries,* Research Report 1989, IFPRI.

kiwifruit trade contracts rather than in US dollars. In point, New Zealand has reduced the price of kiwifruit and assumed the risk of exchange rate changes, thus making it easy for Japanese importers to expand imports steadily. Whether this strategy could be applied in Japan for mango exports need to be examined.

The import demand for avocados has similarly been

supported by price declines.

Mangoes, another major new commodity in horticultural imports in Japan, have the highest income elasticity among the commodities listed in Table 17. Mangoes are considered an exotic and luxurious commodity, as bananas used to be in Japan. Bananas are no longer used in fruit baskets for personal gifts, but mangoes are popular. The potential demand for mangoes is expected to be very large.

Price Elasticity Analysis

Regression analysis to study the relationship between exports of mangoes from India and the unit price (Table 18) reveals that the Indian mangoes have been well accepted in Holland, Switzerland and Germany in Europe; Qatar and Bahrain in the Middle East; and Maldives, Hongkong, Singapore, and Malaysia in South Asia.

Table 18: Price Elasticity of Demand for Exports of Mangoes in Selected Countries

Country	*Price Elasticity*
Holland	-4.37
Maldives	-4.21
Malaysia	-2.83
Hongkong	-1.74
Bahrain	-1.59
Germany	-1.50
Qatar	-1.34
Singapore	-1.09

From the above analysis it is clear that Holland, followed by Maldives and Malaysia are markets highly sensitive to price

changes. Thus, freight subsidy directed to these markets would result in maximum gain.

Entry Barriers

Quarantine Regulations: Of the barriers against horticultural exports to Japan, the major concern for most developing countries is Japan's phytosanitary regulations. The main prohibited items from India, among others, include mango, lychee, sapota, fresh ripe banana, guava, papaya, fresh plum, etc. Certain citrus fruits, vegetables such as pumpkin, capsicum, cucumber, etc. because of the presence of mango fly and melon fly pests.

Japan requires that plants be brought into the country through a designated seaport or airport, with a plant inspection application form and phytosanitary certificate issued by the pant quarantine authority if the exporting country attached. These must be submitted to the plant quarantine station, and the plants inspected by a plant quarantine officer. If the plant is found free from harmful pests or diseases the certificate of inspection is issued; if any pest or disease is detected the certificate of inspection will be issued after disinfection is completed. Even the ban on plants prohibited under the Plant Quarantine Law may be lifted if predetermined conditions are met and public hearings are held.

Technical reasons for the ban will no longer exist when the following conditions are satisfied :

— *the pests in question have been exterminated in the country of origin and that fact is confirmed by Japanese experts.*

— *a technology for totally exterminating pests in the*

country of origin has been established, and that technology is confirmed to be 100 per cent effective by Japanese experts.

The countries for which the ban has been lifted and treatments accepted in respect of mangoes are listed in Table 19.

Table 19: Countries for Which the Ban Has Been Lifted and Treatment Accepted

Country	*Pest*	*Disinfection Method*
Philippines	Mango fly, Melon fly	Vapour heat treatment
Taiwan	Mango fly, Melon fly	Vapour heat treatment
Thailand	Mango fly, Melon fly	Vapour heat treatment

Source: M. Honma, *Growth in Japan's Horticultural Trade with Developing Countries,* Research Report 1989, IFPRI.

Competitors Strategy

Philippines: Philippines is the largest supplier of mangoes to both Japan (88% of import volume) and Hong Kong (79% of the import volume). Mango exports fuelled by success to these markets increased dramatically between 1985 and 1992, going from 8400 MT to 27100 MT. Available volume statistics indicate further growth to 30300 MT in 1993.

The ability to supply markets year round provides the Philippines with a seasonal advantage over potential competitors. Most important, however, is the distinctive mango variety produced in the Philippines which is the market standard in both Japan and Hong Kong.

Another important success factor with regard to the Japanese market is the adherence to that country's stringent phytosanitary conditions. *The Philippines has invested in*

several VHT facilities, a process about 10 times more expensive than traditional treatments. Built to meet Japanese specifications, located in Manila, and overseen by Japanese officials these provide the Philippines with an edge over competitors whose mangoes without VHT treatment are barred from entering Japan.

Thailand: Often accounting for as much as 60% of the retail price for fresh produce transported to European markets, 'air freight costs' is one of the biggest constraints on Thai export competitiveness. MOCAT (Ministry of Communication and Transportation) sets perishable cargo rates for state owned Thai Airways International, which allots 50% of its cargo capacity to perishables. It also provides low cost cold storage space to exporters and is expanding its refrigeration facilities.

Phytosanitary Certification: All horticultural exports are evaluated by Ministry of Agriculture and Cooperative's Department of Agriculture (Plant Quarantine Division) to determine whether they need enterability requirements in their destination markets. Also all international airports have inspection facilities.

Chile: Chile is Latin America's leading fresh fruit exporter. Association and agency initiatives, an important element of its strategy, have resulted in successful export development. These have mainly been in the following areas: trade policy and industry promotion, phytosanitary certification, pesticide regulation and technology transfer.

Technology Transfer: Fundacion Chile was established in 1976 through an agreement between the government of Chile and ITT Corp (US). Fundacion Chile is a world renowned private non-profit organisation today, which works with

individual private companies on request, and also acts as an "incubator" centre for new companies, helping with start-up growth and development. Typical of Fundacion Chile's success is the Salmon industry initiative spearheaded by the institution, then privatised, which has now placed Chile second in Salmon exports worldwide.

Air Freight Subsidy as a Strategy to Promote Exports

We have already seen that RCA in mangoes is the highest for fruits being exported from India while the NPC was more than one in two of the four years period analysed indicating that for establishing a foot-hold in new markets or in new market segments in established markets air freight subsidy would be an appropriate strategy if

1. the air freight subsidy effectively improves NPC at margin (for products which have a high RCA);

2. the perishability factor as reflected by lower storage life is high; and

3. seasonal variation in European market is high.

The NPC computations for the year 1991-92 and 1992-93 yielded results as 1.25 and 0.86 respectively; if you were to add Rs 10/kg as the freight subsidy then the NPCs would improve to 0.68 and 0.50 respectively. The perishability factor as revealed by the lower storage life (warranting pre-cooling facilities) also point out to the necessity of the need for improvement of f.o.b. realisation which could be realised with the air-freight subsidy.

The seasonality variation in the import market was analysed in the United Kingdom market. The Indian mangoes retailed at 1 pound sterling during June after reaching the peak of 2

pound sterling price during April and the Mexican variety retailed in the range of 2.25 pound sterling to 1.25 pound sterling (See appendix Table 1 Mangoes for evidence of seasonal variation). Considering that the air freight accounts for around $1.78/kg (Table 2—Appendix on Air Freight Rates) the subsidy at margin would safeguard that the realised f.o.b. value covers the domestic price of mangoes particularly if you consider that the rupee could depreciate against dollar as per NCAER model at about 5 per cent per annum. Since the air-freight to Middle East is less by $1 per, exports to Middle East would be the preferred path (least resistance path) even when the subsidy is pegged at a lower level. Thus, a concerted action is needed to promote the Premium quality Alphonsos in Europe (in other words the subsidy should be provided for Alphonso exports to Europe). The fact that mangoes are replacing bananas in Japan suggests that APEDA may have to take on an active role to install VHT facilities to promote exports to Japan. This should be viewed as a long-term investment to get a slice of the lucrative Japanese market.

APEDA Strategy

The APEDA strategy must recognise the fact that mango which has a high RCA needs air freight subsidy for, at least, the next five years to improve the NPC to promote exports on a self-sustaining basis in order to create and establish the market for mangoes in Europe It could include Alphonso for provision of subsidy if the export is directed to the European market as the European consumers do not distinguish between the different varieties and make purchases of the internationally known varieties, of which Alphonso is the only Indian variety and is also quite well known globally. Thus, subsidy should be directed to Alphonso exports to Europe while air freight subsidy for Middle East exports could be

directed to mangoes which are not readily marketable in Europe such as the fully mature green mangoes. Also there should be a distinct emphasis on exports to Europe vis-a-vis Middle East or a cap for outgo of subsidy to exports of mangoes to the Middle East.

The APEDA strategy must recognise the fact that the income elasticity of demand for mangoes in market economies is very high meaning that the institutional use of mangoes (restaurants/hotels, canteens, etc.) is an interesting outlet for contracts on long-term basis especially when the economy is in the upswing.

The APEDA strategy must recognise that the need to invest in VHT facilities (which is quite an expensive proposition) in collaboration with the Japanese Government to get a foot-hold in the Japanese market where mango is fast replacing banana, as a luxury fruit (personal gifts product-market segment) as well as to the Institutional market segment.

Since investments in these facilities will not be easily forthcoming, consideration of investments in VHT facilities on terms with Venture Capital Funds which are provided for new technology development has to be looked into. Also, involvement of Japanese quarantine officers in the programme is essential. Involvement of the Indian corporate sector, NDDB, NAFED for investments in the VHT facilities is needed the most (Indian exports are dominated by traders who are risk-averters and thus shy away from promotional efforts for developing new markets (*Source:* Delphi Technique –interviews). These organisations can enter into agreements with small farmers on identified prioritised pockets wherein the company could provide technical services, buy-back guarantee and look after post-harvest handling activities

such as cold-storage, sterilisation etc. before shipment.

The APEDA strategy must also include entering into a MOU with the Indian international carrier for reserving a section of cargo space for exports of perishables on a long-term basis as the exporters feel that timely availability of cargo space is the major incentive, if they are to avoid paying premium on cargo space through alternative routes. Till such time the exporters form a voluntary association, the reserved cargo space can be leased out to private parties (Buy and Lease-Back mechanism—Buy cargo space and lease it back.)

Lychee

Lychee Economy: World and Domestic Scenario

World Scenario

The world production of lychee is considered limited relative to other fruits studied in this report, though no exact data are available. India is ranked second to China in terms of total lychee production (APEDA, 1992). The other Lychee producing zones in the world are: Burma, South Africa, the USA (Hawaii and Florida), Israel, Mauritius and West Indies.

The major exporters of lychee are South Africa, China, Thailand, Israel, Madagascar and Mauritius. The main importers are England, France, Germany, Netherlands and countries in middle east and south east Asia.

Domestic Scenario

The area and production of lychee is about one per cent of total area under fruits and production in India. The production

of lychee in India is estimated to be about 244 thousand tonnes (*Horticultural Statistics, 1991-92*). Bihar produces about 78 per cent of total lychee in India . The other states growing lychee are Assam, Tripura, West Bengal and Uttar Pradesh. The average yield of lychee in Bihar is about 10 tonnes per ha. Average yield in other states in lower than that in Bihar.

The Indian (Bihar) average yield per tree compares well with average yield per tree in other countries (Table 20).

The season of lychee in India is short, between May and June. The main varieties of lychee in India are Shahi, Early Seedless, Rose Scented, Dehradun, Late Large Red and Calcutta.

Table 20: Average Yield Per Tree of Lychee for Selected Countries

Country	*Yield* (Kg/tree)
USA (Hawaii)	90-150
South Africa	100-125
Australia	90-135
India	80-150

Source: Gulati., A., et.al., *Export Competitiveness of Selected Agricultural Commodities,* NCAER, 1994.

Factor Conditions

Cost of Production

The cost of production and orchard gate price estimates relating to lychee production in Uttar Pradesh are Rs 0.60 and Rs 2.00 per kg respectively [NHB, 1990 (Uttar Pradesh)]. It seems that cost of production of lychee is also low as is the case for other fruits discussed earlier in the report.

India's Exports

The export of lychee from India is very limited, about one tonne per year, though no data are available over time. However, lychee is considered to be a promising fruit for export (APEDA 1992). The NAFED's experience in exporting about 6 tonnes of lychee to England during 1993 has been encouraging (Dhar, NAFED, Delhi, personal communication). 1,700 containers of lychee from West Bengal's Murshidabad district have been exported to U.K. and France by air. 1000 more containers are expected to be sent during 1994 (*Economic Times,* June 7, 1994).

Export Competitiveness of Indian Lychee

Assessment of export competitiveness in relation to lychee export is based on the NAFED's experience during 1993. The estimation of NPC is detailed in Table 21.

Table 21: Producer Price, London Price and NPC for Lychee, 1993

Particulars	*Value*
Producer price (Mujaffarpur, Bihar) (Rs/kg)	10.50
Precooling, packaging, Internal transport, storage, handling, etc., air freight (Delhi - London) and expenses in London (Rs/kg)	100.00
London Price (Rs/kg)	119.08
Reference Price (Rs/kg)	19.08
NPC	0.55

Source: Gulati., A., et.al., *Export Competitiveness of Selected Agricultural Commodities,* NCAER, 1994.

Based on one year observation of NPC, it seems that

lychee export is highly competitive. However, more information for other years would be needed to substantiate the high export competitiveness of Indian lychee.

The export competitiveness of lychees could be far higher than the typical "average" figures would suggest for the summer price of lychees in U.S.A range around USD 10 per kg vis-a-vis $2.2 during the summer. Similarly, the lychees in U.K. also sell at 5 to 7 pound sterling during the summer season vis-a-vis the winter price of 2 to 3 pound sterling.

Thus India which produces around a quarter million of lychees is in an advantageous position to market it in the international market especially during the summer season. The RCA (computed based on the current exported volume by major corporate houses) exceed one—indicates that India would be in a very competitive position should export activities become self sustaining. In fact an analysis of NPC & RCA indicate that this should be one of the important products to be included for promotion in external markets. The high perishability index indicates the need for the reservation of cargo space, provision of air freight subsidy by APEDA. The large differences in importers' selling prices during the summer and winter periods suggest that APEDA may have to restrict the subsidy during summer; also APEDA could intervene in both spot and forward markets in lychees in Europe (especially in France and U.K.) either through the large importers through an inventory financed consignment programme or through its own refrigerated storage unit in Europe.

Market Conditions

Lychee is the most popular imported Asian speciality fruit in Europe. In 1993 imports to Europe totalled some 12,000 MT. The market has been witnessing a 20% growth rate.

Although lychees are grown in Florida, the gap between demand and supply has been increasing at a rapid rate. Singapore is one of the few Asian markets which import lychees in significant quantity.

Taiwan is Asia's largest supplier, its exports being 7,000 MT. Taiwan has recently obtained phytosanitary approval from APHIS to export fresh lychees to the US market. Mexico, Israel, China, South Africa and Madagascar are the bigger suppliers and most of the supply arrives by air.

APEDA Strategy

Strategically speaking, Singapore in Asia, France in Europe and USA during the summer months, could be the markets to target attention.

APEDA would have to liaise with APHIS in USA to obtain phytosanitary approval to get a foothold during the peak summer months.

In view of the abundant availability of lychees, the Indian corporate sector has shown interest in exports of lychees; however, sufficient care must be taken to ensure that exports are either canalised or at least authorised by APEDA or some APEDA notified agency to avoid a steep fall in prices.

Also adoption of the "Buy Cargo Space (National carrier) & Lease back" or any other move to facilitate reservation of cargo space for perishables such as supporting move of voluntary associations to club exports could also form part of the APEDA strategy. Policy makers unfamiliar with horticultural exports criticise the outgo

on freight subsidy since normally the subsidy is a significant proportion of the f.o.b. realisation. However, an understanding with the National Carrier by APEDA, could help it ward off criticisms—for export of perishables in effect involves export of cargo space too.

Grapes

Grapes Economy: World and Domestic Scenario

World Scenario

The world production of grapes is about 57 million tonnes (1993). The contribution of India is about 0.7 million tonne, which is about 1.2 per cent of world production (FAO, 1993). The National Horticulture Board's estimate for grape production in India for 1991-92 is about 0.67 million tonnes (*Horticultural Statistics 1991-92*). More than 50 per cent of world production comes from Europe. Major producers of grapes are: Italy, France, Spain, the USA and Argentina.

The world export in grapes is about 1.9 million tonne and the contribution of India is about 0.5 per cent (FAO, 1993). The pattern of world trade in grapes reveals that North America and Europe are largely net importing regions whereas South America is the largest exporter region (Table 22).

Italy is the major exporter in Europe and Chile is the main exporter in South America. South Africa and Australia are other major exporters of grapes.

Table 22: World Trade in Grapes, 1993

('000 tonne)

Region	*Export*	*Import*	*Net Export*
North Central America	294	586	-292
South America	458	14	444
Europe	956	1050	-94
Asia	109	180	-71
Africa	87	3	84
Oceania	13	5.5	7.5
World	1918	1777	

Source: FAO, 1991.

Domestic Scenario

The production of grapes in India is estimated to be about 0.7 million tonnes and the production of Thompson Seedless variety, the main export variety, is about 0.1 million tonnes. The average yield in India is about 16 tonnes per hectare whereas the comparable figure in case of Israel, the highest in the world, is about 19 tonnes per hectare (FAO, 1992). The other countries where grape yield is higher than that in India are: the USA, Australia and Netherlands.

The main grape growing states in India are Maharashtra, Karnataka, Punjab, Andhra Pradesh, Tamil Nadu and Haryana. It is important to note that Maharashtra, the main grape exporting state, alone produces about 51 per cent of total grape production in India.

In terms of yield, however, Punjab and Andhra Pradesh rank higher, followed by Karnataka, Tamil Nadu, Maharashtra and Haryana. It may be useful to keep in mind the varietal difference while examining yield levels across states, e.g., Maharashtra grape is largely Thompson Seedless, which is a

high value grape variety and is exported, whereas Punjab grape is largely Perlette.

The grape season in India is from December to June, however, the peak is between December and April. The main varieties are Thompson Seedless (green and black), Bangalora Blue, Banglora Purple and Perlette. The main export variety is Thompson Seedless (green). Black Thompson Seedless is more expensive relative to green or yellow Thompson Seedless in the domestic market and has limited export demand at present.

Factor Conditions

Cost of Production

The cost of production estimates of grapes grown in Punjab and Tamil Nadu for the years 1984-85 and 1992 are presented in Table 23. These estimates, though not comparable strictly, do give an idea of low cost of production of grapes in India.

Table 23: Cost of Production and Orchard Gate Price for Grapes in Punjab and Tamil Nadu

(Rs/kg)

Region	*Year*	*Cost of Production*	*Orchard Gate Price*
Punjab	1984-85	1.02	1.75
Tamil Nadu	1992	3.05	NA

NA - not available.

Source: Gulati., A., et.al., *Export Competitiveness of Selected Agricultural Commodities,* NCAER, 1994.

India's Exports

Grapes are next to mangoes in importance in the fruit export basket of India.

Table 24: Exports of Grapes from India with Unit Values, 1980-81–1993-94

Year	*Quantity* (Tonne)	*Value* (Rs Mill.)	*Unit Value* (Rs/kg)	*Unit Value* ($/kg)
1980-81	502	3.8	7.59	
1981-82	1050	9.5	9.03	
1982-83	2188	20.4	9.31	0.98
1983-84	1728	13.8	8.01	0.79
1984-85	3210	27.9	8.70	0.77
1985-86	2658	24.5	9.22	0.75
1986-87	3159	38.2	12.11	0.96
1987-88	3297	40.6	12.31	0.95
1988-89	4738	64.0	13.51	0.93
1989-90	3729	60.8	16.30	0.98
1990-91	5348	88.1	16.47	0.92
1991-92	11147	186.2	16.70	0.68
1992-93	10801	217.9	20.17	0.77
1993-94	15931	339.3	21.30	0.68

Source: *APEDA Export Statistics, 1993-94.*

The grape exports have grown over time in quantity, value and unit value f.o.b. realisation, more so in the recent years (Table 24). However, the unit value realisation in dollar terms has declined over time.

The export destinations of Indian grapes are similar to those of mangoes (Table 25).

More than two thirds of total Indian grape exports go to middle eastern countries wherein the UAE is the major importer. Other significant importers are Saudi Arabia, Bahrain and Kuwait. United Kingdom. and Netherlands are among EEC countries importing significant quantities of grapes from India.

Table 25: Export and Export Destinations of Indian Grapes, 1993-94

Region	*Quantity* (Tonnes)	*Value* (Rs. Mill.)
Middle East	10157.2 (64)*	218.52 (6)*
Eur. Eco. Com.	2957	87
Asia Pacific	2692	30
Others	57	2.5
TOTAL	*15863.2*	*338.02*

* Percent in parenthesis.

Source: *APEDA Export Statistics, 1993-94.*

In "Others" category, important countries are Bangladesh, Mauritius and Hongkong. As such there is no clear pattern of unit value realisation across export destinations.

Export Competitiveness of Indian Grapes

Export competitiveness is assessed through NPC's under exportable hypothesis (Table 26).

The NPC estimates for the five-year period 1988-89 to 1992-93 reveal that India is highly competitive in exports of grapes. The average NPC for this period is well below unity (0.64), suggesting more investments in grapes to promote and sustain grape exports.

Revealed Comparitive Advantage

The Revealed Comparative Advantage exceeds one indicating the comparative advantage in exports of grapes. However the perishability index is not high; grapes can have

a storage lite of 3 to 5 months if the prevailing temperature is around 30 to 32° F and relative humidity is maintained at 85 to 90 per cent. In other words, while grapes would be a potential candidate for promotion, they do not warrant shipping by air.

Table 26: F.O.B. Unit Value, Wholesale Price and NPC for Grapes 1988-89 to 1993-94, Bombay

Particulars	*1988-89*	*1989-90*	*1990-91*	*1991-92*	*1992-93*	*1993-94*	*Average*
F.O.B. unit value (Rs/kg)	13.51	16.30	16.47	16.70	20.17	21.30	–
Approx. packaging, handling and transport (Rs/kg)	2.00	2.10	2.31	2.54	2.80	3.00	–
Reference Price (Rs/kg)	11.51	14.20	14.16	14.16	17.37	18.30	–
Reference Price* (Rs/kg)	14.21	17.46	17.45	17.50	21.40	21.96	–
Wholesale Price (Rs/kg)	10.32	9.00	11.45	12.22	12.58	13.07	–
NPC	0.90	0.63	0.81	0.86	0.72	0.71	0.77
NPC*	0.73	0.52	0.66	0.70	0.59	0.59	0.63

* Using shadow exchange rate of 1.2 times official exchange rate, i.e., assuming a premium of 20 per cent.

Source: *APEDA Export Statistics, 1993-94.*

Market Conditions

Table 27 shows the major importers of grapes during 1993, the rate of market growth during the period 1986 to 1993 and the ratio of import to domestic supply:

Table 27: Imports of Grapes by Countries

Country	*Imports of Grapes in 1993* (MT)	*Ratio of Import to Domestic Supply*	*Market Growth* Since 1986
Germany	336574	100%	8%
France	154316	100%	14%
England	124123	100%	32%
Holland	98610	99%	80%
Switzerland	41368	20%	10%
Japan	7000		
Hongkong	35000		
Singapore	12000		
United States	321467	5%	
Canada	154377	70%	
Saudi Arabia	30000	100%	
Oman	12636	100%	

Price Elasticity Analysis

Regression analysis to study the relationship between exports of grapes from India and the unit price (Table 28) reveals that the Indian grapes have been well accepted in France, in Europe; Oman, Bahrain, Saudi Arabia, and UAE in the Middle East; and Maldives, Malaysia, Hongkong and Bangladesh in South East Asia.

The Exports to Bahrain are most price sensitive followed by Hongkong, UAE, Oman and Saudi Arabia, indicating that promotional efforts would be successful if they are targeted at these markets. Indian flame, Indian black seedless, Indian Thomson seedless and Indian perlette varieties command a respectable place in the international markets as per ITC

databank (see Annexure Table 3 for Grapes). EU imports of Grapes is estimated at 127000 MT while the US imports is estimated at 324,000 MT. These are big markets which need to be tapped. Perhaps, efforts at intervening in forward and spot market in view of the steep price differences between seasons and the long-shelf life, overcoming entry barriers such as quarantine barriers etc would be the components of an appropriate strategy for APEDA.

Table 28: Price Elasticity of Demand for Exports of Grapes in Selected Countries

Country	*Price Elasticity*
Bahrain	-8.02
Hongkong	-5.88
UAE	-4.02
Oman	-3.07
Saudi Arabia	-3.03
Maldives	-2.90
Malaysia	-2.40
Bangladesh	-1.03

Banana

Banana Economy: World and Domestic Scenario

World Scenario

The world production of banana in 1993 is estimated to be about 50.6 million tonnes wherein the contribution of India,

the largest, is about 14.2 per cent (FAO, 1993). The other major producers are: Brazil, Philippines, Indonesia and China. It is important to note that about 98 per cent of world banana production takes place in developing countries and therefore, primary exporters of banana are these developing countries. Ecuador, Costa Rica and Colombia are the three top most exporters of banana, while US, Germany and Japan are the three top most importers (Table 29). India does not figure anywhere as big exporter despite the fact that it is the largest producer of bananas. The significant exporter of banana in Asia is the Philippines.

Table 29: Major Exporters and Importers of Banana in World, 1993

Exporter	*Quantity* ('000 tonnes)	*Importer*	*Quantity* ('000 tonnes)
Ecuador	2390	USA	3670
Costa Rica	1818	Germany	1180
Columbia	1581	Japan	913
Philippines	1153	Italy	510
Panama	688	France	614
Honduras	670	UK	649
Guatemala	442	Korea	146
Others	2841	Others	3603
WORLD	*11583*	WORLD	*11285*

Source: FAO, 1993.

Domestic Scenario

The production of Banana in India is estimated to be about 7 million tonnes in 1993 which is about 14.2 per cent of world banana production (FAO, 1993). Banana, as noted earlier, is second to mango in terms of total production of fruits in India.

The major Banana producing states in India are Maharashtra, Tamil Nadu, Gujarat, Madhya Pradesh and Andhra Pradesh

The variation in banana yield (tonnes/ha) across major banana growing states reveals that it is highest in Gujarat (40.00 tonnes/ha) whereas it is lowest in Andhra Pradesh (16.00 tonnes/ha). The yield improvements in the case of banana in Gujarat and Tamil Nadu are reported significant during the decade of 1980-81 to 1989-90 (Area and Production of Principle Crops in India, 1989-90).

Banana is available throughout the year but August to October and December to March seem to be the periods of brisk trading in India.

The main varieties of Banana are Dwarf Cavendish (Tamil Nadu and Maharashtra), Robusta (Tamil Nadu and Karnataka), Rasathali, Chakrakeli and Poovan (Andhra Pradesh).

Factor Conditions

Cost of Production

The cost of production estimates in relation to banana production are low (Table 30).

Table 30: Cost of Production of Banana in Selected Regions of India

(Rs/kg)

Region	*Year*	*Cost of Production*	*Orchard gate price*
Tamil Nadu	1992	1.04	NA
Gujarat	1992	0.56	1.15

Source: Gulati. A., et.al., Export Competitiveness of Selected Agricultural Commodities, NCAER, 1994.

As mentioned earlier in relation to mango and grapes, the cost of production estimates are not strictly comparable across states due to regional and varietal considerations not being explicit.

India's Exports

Currently very small and fluctuating quantities of banana are being exported from India (Table 31 & 31A).

The major importer of Indian banana is Netherlands. Other importers are Saudi Arabia Bahrain, Russia and Nepal. Notably, the unit value realisation is much higher from exports to Netherlands, Saudi Arabia, Bahrain relative to exports to Nepal. Roughly two thirds of exports are accounted by Netherlands (41%), Saudi Arabia (17%) and Russia (9%).

Table 31: Export of Banana (Fresh and Dried) from India, 1980-81–1993-94

Year	*Quantity* (Tonne)	*Value* (Rs. Mill.)	*Unit Value* (Rs/Kg)	*Unit Value* ($/kg)
1980-81	16	0.09	6.13	
1981-82	46	0.53	3.64	
1982-83	57	0.38	6.69	0.70
1983-84	83	0.50	6.04	0.60
1984-85	60	0.36	6.00	0.53
1985-86	122	0.74	6.05	0.50
1986-87	171	0.70	4.09	0.32
1987-88*	854	1.40	1.64	0.13
1988-89*	1369	2.17	1.59	0.12
1990-91*	290	0.63	2.10	1.18
1991-92*	656	2.70	4.12	0.17
1992-93*	1353	10.66	7.88	0.30
1993-94	1086	14.73	13.56	0.43

* including plantains.

Source: *APEDA Export Statistics, 1993-94.*

Table 31A: Exports and Export Destinations of Indian Banana

Region	*Quantity* (MT)	*Value* (Rs.million)
Middle Eastern Countries	426	5.08
Europe	509	7.34
Asia Pacific	38	0.36
Russia	98	1.73
Others	15	0.22
TOTAL	*1086*	*14.73*

Source: *APEDA Export Statistics, 1993-94.*

Table 32: Unit Value Realisation from Exports of Banana to Nepal, Saudi Arabia, Bahrain and Netherlands

Country	*1993-94*		
	Quantity (Tonne)	*Value* (Rs. mill.)	*UV* (Rs./Kg.)
Nepal	21	0.11	5.40
Sau. Arab	194	2.39	12.32
Bahrain	73	0.80	10.96
Netherlands	443	6.40	14.44
TOTAL	*1086*	*14.73*	*13.56*

Source: *APEDA Export Statistics, 1993-94.*

Export Competitiveness of Indian Banana

The NPC based on wholesale price, f.o.b. unit values at Bombay are worked out in Table 33. Wholesale price is an average of monthly wholesale price in Bombay during April to March. The f.o.b. unit value is derived from corresponding annual export figures. The NPC estimates reveal that the banana exports have been highly competitive in the last three years. It is important to note that variety/quality considerations

have not been considered due to paucity of information in this regard. Nevertheless, it appears quite certain that banana is an export competitive crop of India and accordingly relevant strategies should be chalked out to promote its exports in the Middle East, Europe and the US.

Table 33: F.O.B. Unit Value, Wholesale Price and NPC for Banana, Bombay

Particulars	*1990-91*	*1991-92*	*1992-93*	*1993-94*
f.o.b. unit value (Rs/kg)	2.10	4.10	7.88	13.56
Packaging, handling and Transport (Rs/kg) (Approx.)	0.70	0.77	0.85	1.00
Reference Price (Rs/kg)	.40	3.33	7.03	12.56
Reference Price* (Rs/kg)	1.82	4.15	8.61	15.07
Wholesale Price (Rs/kg)	1.38	2.00	2.74	2.70
NPC	0.98	0.60	0.39	0.21
NPC*	0.76	0.48	0.32	0.18

* using shadow exchange rate of 1.2 times official exchange rate.

Source: *APEDA Export Statistics, 1993-94.*

Although, the NPC shows that banana is extremely export competitive, the RCA computations (0.04) reveal that this may not be the perishable that one should target for export. Besides, the banana is being replaced by mangoes as a luxury fruit; thus to target subsidy on a product which is positioned in a declining product cycle in the international market may not be an appropriate strategy.

Market Conditions

Table 34 shows the major importers of bananas during

1993 and the ratio of import to domestic supply:

Table 34: Imports of Bananas by Countries

Country	*Imports of Bananas in 1993* (MT)	*Ratio of Import to Domestic Supply*
Germany	1179812 (11)	100%
France	613798 (5.5)	100%
England	648972 (6)	100%
Italy	509579 (4.45)	100%
Japan	913335 (9)	100%
Korea	14604 (1.3)	100%
United States	3670129 (33)	99%
Saudi Arabia	130000 (1.2)	100%

Note: Figures in brackets indicate percentage share in total world imports.

Price Elasticity Analysis

Regression analysis to study the relationship between exports of bananas from India and the unit price reveals that the Indian bananas have fared well in Germany in Europe; Bahrain, Saudi Arabia, Qatar, and Kuwait in the Middle East; and Nepal in South Asia (Table 35).

Table 35: Price Elasticity of Demand for Exports of Bananas in Selected Countries

Country	*Price Elasticity*
Germany	-9.08
Qatar	-7.34
Bahrain	-6.94
Saudi Arabia	-5.69
Kuwait	-1.93
Nepal	-1.16

The markets listed in the order in Table 35 are most sensitive to price changes and the air-freight subsidy, if to be provided at all, can be restricted to these markets for maximum gains.

Apple

Apple Economy: World and Domestic Scenario

World Scenario

The world production of apples is about 42 million tonnes of which about 65 per cent is contributed by developed countries (FAO, 1993). India produces about 1.2 million tonnes of apples which is about 2.9 per cent of world apple production. The major producers of apple are: the USA, China, France. Germany and Italy.

The major exporting and importing countries in relation to apple trade are given in Table 36.

The major exporters of apple are - France, the USA, Chile, Hungary, Italy, Argentina, Netherlands and South Africa. The major importers are Germany, the UK, Netherlands, Bel Lux, Spain, Brazil, France, Sweden, Austria, Saudi Arabia, UAE and Hongkong (Table 36).

Domestic Scenario

The production of apples in India is estimated to be around 1.2 million tonnes (FAO, 1993). The share of Jammu and Kashmir, Himachal Pradesh and Uttar Pradesh in total apple production of India is 54, 26 and 18 per cent, respectively

Table 36: Major Apple Exporting and Importing Countries in World, 1993

Exporting Country	*Quantity* (000' tonnes)	*Importing Country*	*Quantity* (000' tonnes)
France	623	Germany	713
USA	525	UK	410
Chile	361	Netherlands	256
Hungary	231	Bel. Lux.	194
Italy	422	Spain	147
Argentina	145	Brazil	80
Netherlands	366	France	91
South Africa	175	Sweden	92
		USA	114
Others	1430	Others	2113
TOTAL	*4278*	TOTAL	*4210*

Source: FAO, 1993.

(*Horticultural Statistics, 1991-92*). The yield levels in Jammu and Kashmir, Himachal Pradesh and Uttar Pradesh are 8.99, 4.51 and 4.00 tonnes/ha respectively.

The season for apple starts in August and goes on till March. First, Uttar Pradesh apples arrive followed by Himachal Pradesh apples and then arrive apples from Jammu and Kashmir. Himachal Pradesh apples fetch higher price relative to Jammu and Kashmir apples in domestic market presumably due to superior variety.

The main varieties of apple are Red, Golden and Royal Delicious.

Factor Conditions

Cost of Production

The cost of production estimates of apple production in

Jammu and Kashmir and Himachal Pradesh, the two major apple growing states, reveal that cost of production is low and is about 60 per cent of orchard gate price in both the cases (Table 37).

Table 37:Cost of Production of Apples in Jammu and Kashmir and Himachal Pradesh in India

Region	*Year* (Rs/kg)	*Cost of Production* (Rs/kg)	*Orchard Gate Price*
Jammu & Kashmir	NA	0.60	1.00
Himachal Pradesh	1983	1.37	2.22

Note: Estimates are not strictly comparable as they do not mention variety.

Source: Gulati., A., et.al., *Export Competitiveness of Selected Agricultural Commodities,* NCAER, 1994.

India's Exports

Apple exports from India (in terms of quantity and value) exhibit a gradually increasing trend between 1981 to 1989. During 1991-92, there was a dramatic increase in both quantity and value of apple exports from India; however, of late, exports of apple in quantity terms has come down while it has gone up in value terms indicating an increased unit value realisation.

Table 38 shows annual export quantities of Indian apple over 1980-81 to 1992-93 period. There is a positive trend in annual export values. The unit value realisation from apple exports seems to have increased in rupee terms but in dollar terms it has, in fact, declined as rupee has depreciated faster than the increase in rupee unit value realisation of apple exports.

Table 38 : Apple Exports of India, 1980-81–1993-94 and Unit F.O.B. Value

Year	*Quantity* (Tonnes)	*Value* (Rs million)	*Unit Value* (Rs/Kg)	*Unit value* ($/kg)
1980-81	3681	11.10	3.01	
1981-82	3620	10.08	2.78	
1982-83	3566	9.15	2.57	0.27
1983-84	4868	12.94	2.66	0.27
1984-85	6627	22.38	3.38	0.30
1985-86	4454	22.56	5.06	0.41
1986-87	6119	28.82	4.71	0.37
1987-88	4077	27.63	6.78	0.52
1988-89	4855	32.42	6.68	0.46
1990-91	3077	18.40	5.98	0.33
1991-92	10455	85.98	8.23	0.34
1992-93	8626	73.97	8.58	0.33
1993-94	5988	66.70	11.14	0.36

Source: *APEDA Export Statistics, 1993-94.*

The main export destination of Indian apple are Bangladesh (73%) & Srilanka (26%) (about 99 per cent of total exports). Small quantities are, however, also exported to the UAE, the UK, Singapore and Sri Lanka. The unit value realisation is about 60% higher from exports to Srilanka relative to that from Bangladesh. The fast growing import markets of Saudi Arabia, UAE are not importing Indian apples.

Export Competitiveness of Indian Apples

Table 39 presents wholesale price, f.o.b. unit value realisation and NPC in relation to apple exports from Calcutta. Wholesale price in Table 38 is average of monthly wholesale price in Calcutta during August to March. The unit f.o.b. value is derived from annual export figures April to March.

The estimates of NPCs measuring the degree of export competitiveness of Indian apples are not very encouraging.

Table 39: F.O.B. Unit Value, Wholesale Price and NPC for Apple, Calcutta

Particulars	*1990-91*	*1991-92*	*1992-93*	*1993-94*	*Average*
F.O.B. unit value (Rs/kg)	5.98	8.23	8.58	11.14	–
Packaging, handling and Transport (Rs/kg) (Approx.)	1.12	1.23	1.35	1.50	–
Reference Price (Rs/kg)	4.86	7.00	7.23	9.64	–
Reference Price* (Rs/kg)	6.06	8.65	8.95	11.57	–
Wholesale Price (Rs/kg)	10.27	12.71	11.88	12.67	
NPC	2.11	1.82	1.64	1.31	1.86
NPC*	1.69	1.47	1.33	1.10	1.50

* using shadow exchange rate of 1.2 times official exchange rate, i.e., a assuming a premium of 20 per cent.

***Source**: APEDA Export Statistics, 1993-94.*

Again, it is important to mention that these NPCs are based on averages without explicit consideration of variety/ quality of apple. As noted earlier, about 93 per cent of India's exports are sent to Bangladesh and Srilanka. According to some exporters, low price apples are sent to Bangladesh and Sri Lanka. If low price apples are valued at 70 per cent of domestic wholesale price, then, the resultant NPCs are close to unity (average NPC 1.05 for 1990-91 to 1992-93). However, all this suggests somewhat less export competitive nature of Indian apples, thus far.

The RCA in the case of apples is less than one; however, RCA is greater than that obtained for bananas indicating that in the future apples and not bananas are likely to be export competitive. However, the low perishability factor precludes this product from consideration of provision of air freight subsidy.

Market Conditions

The major importers of apples during 1993 and the ratio of import to domestic supply are the parameters used to prioritize markets (Table 40).

Table 40: Imports of Apples of Selected Countries, 1993

Country	*Imports of Apples in 1993* (MT)	*Ratio of Import to Domestic Supply*
Germany	4209950 (17)	100
England	409996 (10)	100
Holland	256328 (6)	33
Austria	249299 (6)	100
Benlux	193972 (5)	100
Spain	147317 (3.5)	14
Saudi Arabia	126000 (3)	100

Note: Figures in brackets indicate percentage share in total world imports.

In view of the low RCA (in value terms) and the poor NPC values, apples at the moment may not be the product to focus efforts on.

Sapota

Sapota Economy: World and Domestic Scenario

World Scenario

Sapota is also known as Chikoo or Sapodilla. Very little information on production and trade in sapota across countries is available. Based on market information provided by the Market News Service relating to horticultural products of the International Trade Centre, Geneva, it seems that sapota producing and exporting countries are Thailand, Australia and India. Importers of sapota are France, Switzerland, Bahrain and Saudi Arabia.

Domestic Scenario

Sapota is not a major fruit in terms of area and production in India but it is an important fruit for export. The major sapota growing states in India are Karnataka, Gujarat, Andhra Pradesh and Maharashtra. Karnataka alone produces about 65 per cent of sapota in India. The yield of sapota is highest in Karnataka and is lowest in Maharashtra. Thus, Karnataka is on top on both accounts, production and yield of sapota in India.

Factor Conditions

Cost of Production

It is expected, as in the case of other fruits discussed

before, that the cost of production of sapota would also be low in various production zones in India. The only information on cost of production of sapota that is available relates to Gujarat. The cost of production and orchard gate price estimates for sapota in Gujarat are Rs 0.66 and Rs 3.00 per kg respectively reflecting huge incentives for sapota cultivators (NHB, 1992 (Gujarat).

Sapota is usually available throughout the year.

India's Exports

Sapota exports from India during 1980-81 to 1992-93 have exhibited dramatic trend. While exports were almost negligible between 1981-86, they increased to about 1600

Table 41: Sapota Exports from India Along With Unit Value Realisation

Year	*Quantity* (Tonne)	*Value* (Rs. million)	*Unit Value* (Rs/kg)	*Unit Value* ($/kg)
1980-81	53	0.28	5.28	
1981-82	27	0.15	5.62	
1982-83	65	0.41	6.32	0.67
1983-84	26	0.17	6.49	0.64
1984-85	32	0.30	9.38	0.83
1985-86	30	0.24	8.11	0.72
1986-87	257	2.17	8.44	0.66
1987-88	413	3.35	8.11	0.56
1988-89	1602	10.35	6.46	0.45
1990-91	1299	10.20	7.85	0.44
1991-92	1574	13.12	8.33	0.34
1992-93	1510	13.28	8.79	0.34
1993-94	2008	21.38	10.64	0.34

Source: *APEDA Export Statistics, 1993-94.*

tonnes by 1988-89 and have hovered around that figure thereafter except in 1990-91 (Table 41). The unit value realisation in rupees has marginally increased over time, though it has experienced wide fluctuations. However, in dollar terms, the unit value realisation has declined over time due to faster depreciation of rupee against the US dollar relative to increase in rupee unit value of sapota exports.

The main export destinations of Indian sapota are: the United Arab Emirates, Bahrain Saudi Arabia and Qatar constituting about 86 per cent of India's sapota exports. The other export destinations of Indian sapota are Qatar, Oman, United Kingdom, Kuwait and Canada. One point that needs mention here is that the unit value realisation is about 50 per cent higher from North America, Canada and Germany relative to that from middle eastern countries, though small quantities of sapota are exported to these destinations.

Table 41A: Sapota – Exports and Export Destinations of India

	Qty (MT)	*Value* (Rs. million)
Middle Eastern Countries	1850	19.61
Europe	121	1.40
Asia Pacific	19	0.13
Others	18	0.24
TOTAL	*2008*	*21.38*

Source: *APEDA Export Statistics, 1993-94.*

Export Competitiveness of Indian Sapota

Assessment of export competitiveness of sapota is based on NPC for 1992-93 for which average wholesale price in Bombay (June–March) and f.o.b. unit value realisation

(April–March) are available. The other estimation of NPC for sapota is based on information provided by an exporter on domestic price and London price of sapota after adjusting for packaging, handling, internal transport costs and air freight between Delhi and London for 1992 (Table 42).

The NPCs in Table 42 are less than one suggesting high export competitiveness of sapota. It is important to note that the information is based on only single year and variety/ quality aspects are not considered due to paucity of information on these matters.

Table 42: Domestic Price, International Reference Price and NPC for Sapota, 1993-94

Particulars (A)		*Particulars (B)*	
F.O.B. unit value (Rs/kg)	10.64	London Price (Rs/kg)	67.50
Packaging, handling and transport (Rs/kg) (Approx.)	2.60	Packaging, handling, transport and air freight (Rs/kg)	54.00
Reference price (Rs/kg)	8.00	Reference Price	13.50
Reference Price*	9.60		
Wholesale Price (Rs/kg)	5.50	Delhi Price (Rs/kg)	9.00
NPC	0.68		
NPC*	0.57	NPC	0.67

* Assuming 20 per cent premium on official exchange rate.

Source: *APEDA Export Statistics, 1993-94* and *Data Base NHB.*

The *revealed comparative advantage* for sapotas has not been calculated for want of accurate data on levels of international trade. However discussions with experts reveal that the RCA for India is likely to be greater than one.

Since the perishability factor for sapota is high and since India has a competitive advantage in exports of sapota,

perhaps sapota can also be a priority product for exports.

Market Conditions

Price Elasticity Analysis

Regression analysis to study the relationship between exports of sapota from India and the unit price, reveals that the Indian sapotas have been well accepted in UK in Europe; and Bahrain, Saudi Arabia, and Kuwait in the Middle East (Table 43).

Table 43: Price Elasticity of Demand for Exports of Sapota in Selected Countries

Country	*Price Elasticity*
Saudi Arabia	-4.59
UK	-4.35
Bahrain	-4.34
Kuwait	-3.76

The markets listed in the order above are most sensitive to price changes and if the subsidy is prioritized accordingly returns would be maximised.

Unfortunately, international data on competitors, the trade volume, income elasticity of demand in importing countries could not be collected. Hence, the analysis is restricted to the computation of export price elasticities based on India's exports in the recent past. It would appear that export activities be directed to these markets, and apriori, these markets could be chosen for targeting air-freight subsidy. In view of the high perishability factor, reservation of cargo space, "Buy and lease cargo space" or support voluntary associations efforts to club shippings could be additional components of APEDA strategy.

Other Fruits

Summary Remarks

Pineapples: According to FAO Production Year Book, India was ranked third in production (6.81% of world's production). There is a considerable world trade in fresh pineapples—during 1991 through 1993 the quantity of pineapples traded was around 0.61 to 0.68 million tonnes—the trade in value terms exceeding $220 million. The largest supplier of fresh pineapples to the world are Cote Divoire ($ 38 million), Costa Rica (($36 million), Chile ($10 million), Phillipines ($23 million) and Bulgaria ($23 million).

Pineapple is similar to bananas, but canned pineapple are somewhat similar to other types of pineapples. Canned pineapple is less sensitive to price but most sensitive to income changes than fresh and frozen pineapples. The price elasticity of canned pineapple is not significant mostly because imports of canned pineapple were restricted by import quotas until April 1990 when the import quota system for canned ppineapples was abolished. Therefore, the quantity imported was bound by the quota and did not reveal the true demand which resulted in an insensitivity of imports to price changes. The high income elasticity of canned pineapples is supported by a strong demand for use in cooking, in family restaurants and take-out lunch shops.

However the computed RCA in exports of pineapples is very negligible (0.08) and India may have to develop a competitive advantage in exports of processed pineapples in view of the low unit realisation per KG in the case of fresh pineapples.

Pomegranates Fresh: The exports of pomegranates (fresh) from India in value terms is around Rs 3.7 crores (roughly 1 million dollars); However, data on international trade, competitors strategy etc are not readily available to compute factor conditions and market conditions, to chalk out an appropriate strategy. However, it would appear that RCA is likely to be higher for the export of Pomegranates in value terms account for over 3% of India's exports of fresh fruits while in the international market context, the volume of exports of pomegranates is likely to be significantly less than 3%.

Destination of 85% of pomegranate exports of India is in the Middle Eastern region with UAE, Saudi Arabia and Bahrain accounting for bulk of them: however the unit value realisation from exports to Europe is atleast 50% more indicating possible attractiveness of promotional programmes aimed at accelerating pomegranate exports to Europe (Table 43A).

Table 43A: Exports and Export Destinations of Indian Pomegranates

	Qty (MT)	*Value* (Rs. million)
Middle Eastern countries	2224	31.86
European Economic Community	14	0.30
Asia Pacific	378	4.22
Others	7	0.33
TOTAL	*2623*	*36.71*

Source: *APEDA Export Statistics, 1993-94.*

The NPC is likely to be higher than one when exported to Middle Eastern or Asia Pac.i.f.ic but likely to be less than one for exports to Europe as the domestic price of pomegranates be in the range of Rs.11.5 to 13.0 per kg.

FLORICULTURE

According to Horticulture Database (NHB), 1992-93, the area under floriculture (however, area under cut flowers is much less) in India is estimated at around 50,000 hectares and the production is estimated at 207,000 metric tons (454 Million Nos). Production increased by over 40% over the last year level. According to another estimate by Floriculture Update (BCIL), 1994 around 34,000 hectares were under flower production in the year 1989. The major flower producing states are Tamil Nadu, Karnataka, West Bengal, Andhra Pradesh, Rajasthan, Delhi, Maharashtra, Haryana, Uttar Pradesh and Gujarat. In India the accent is on commercial use of cut flowers essentially in ceremonies as well as for medicinal purposes. Use of cut flowers with long stems for decorative purposes is not in vogue in India. Export of cut flowers from India is of recent origin. It was Rs. 6.8 crores during 1991-92 which increased to Rs.8.3 crores in 1992-93 and to Rs.12 crores in 1993-94 representing a CARG of 33%.

Floriculture is one of the rapidly expanding segments in the world today. The cut flower consumption in the world is estimated at around US$ 26 billion. The major flower consuming regions of the world are as shown in Table 44.

Table 44: Flower Consumption by Regions

Region	*Flower Consumption – 1991* (US$ billion)
Western Europe	12
Eastern Europe	5
USA	6
Japan	3

The area under cut flowers for the world as a whole is estimated at around 56,000 hectares out of which 25% is under cover, either plastic or green house. Traditionally recognised floriculture centres are USA, Netherlands, Mexico and Japan. The other emerging major players in floriculture trade and production are Columbia, Israel, Zimbabwe, South Africa, Kenya, Brazil and Costa Rica.

Product Market Segmentation

The import behaviour varies not only among commodities but also among sources of supply. This leads to a presumption that consumers differentiate between horticultural commodities by place of production. The major consuming regions are Western Europe, Eastern Europe, USA and Japan. Among horticulture commodities cut flowers are a major commodity having grown rapidly in the Japanese market.

In describing the demand for cut flowers, it is useful to consider consumption of cut flowers in three ways: flowers for commercial use (10%), flowers for use in floral arrangements (20%) (Ikebana in Japan and for use by organisations elsewhere in the world), and flowers for retail sales to individuals (70%) (*see* Chart 3 for framework of analysis, Stage 1 of Chart 4 for product-market segmentation, and Chart 5 for the decision tree). Traditionally, imported flowers have mainly served commercial uses, such as banquets, weddings, funerals and other ceremonies, because their prices are low and there is no need for the flowers to last a long time. In recent years, however, the demand for flowers as personal gifts has increased rapidly, and imported flowers have become common in flower shops. There are a number of reasons why individuals are opting to give flowers as gifts. first, the desire to enjoy the affluence becomes more tangible;

Chart 3
Source of Competitiveness of Perishables – Cut Flowers

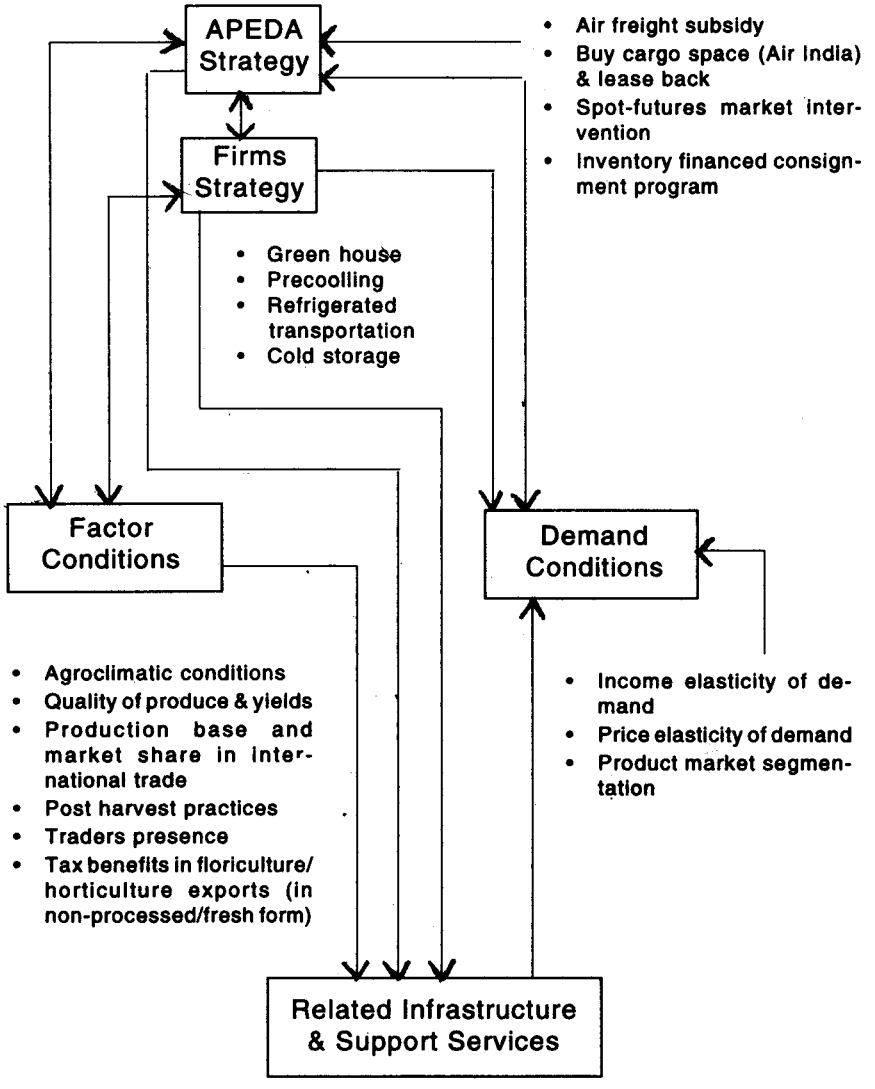


Chart 4

Product-Market Segmentation - Cut Flowers

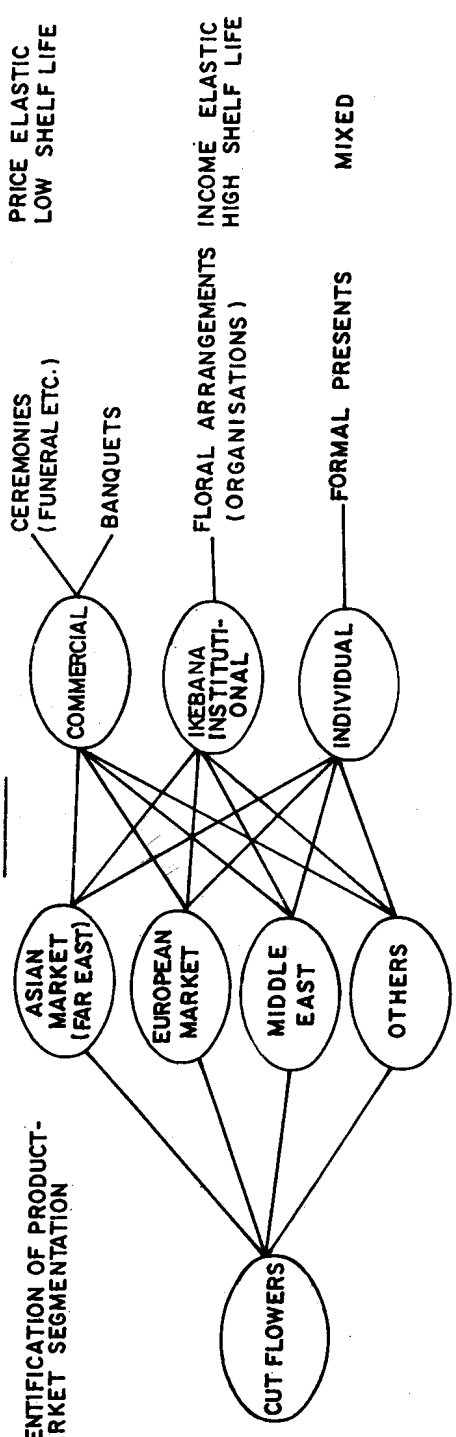
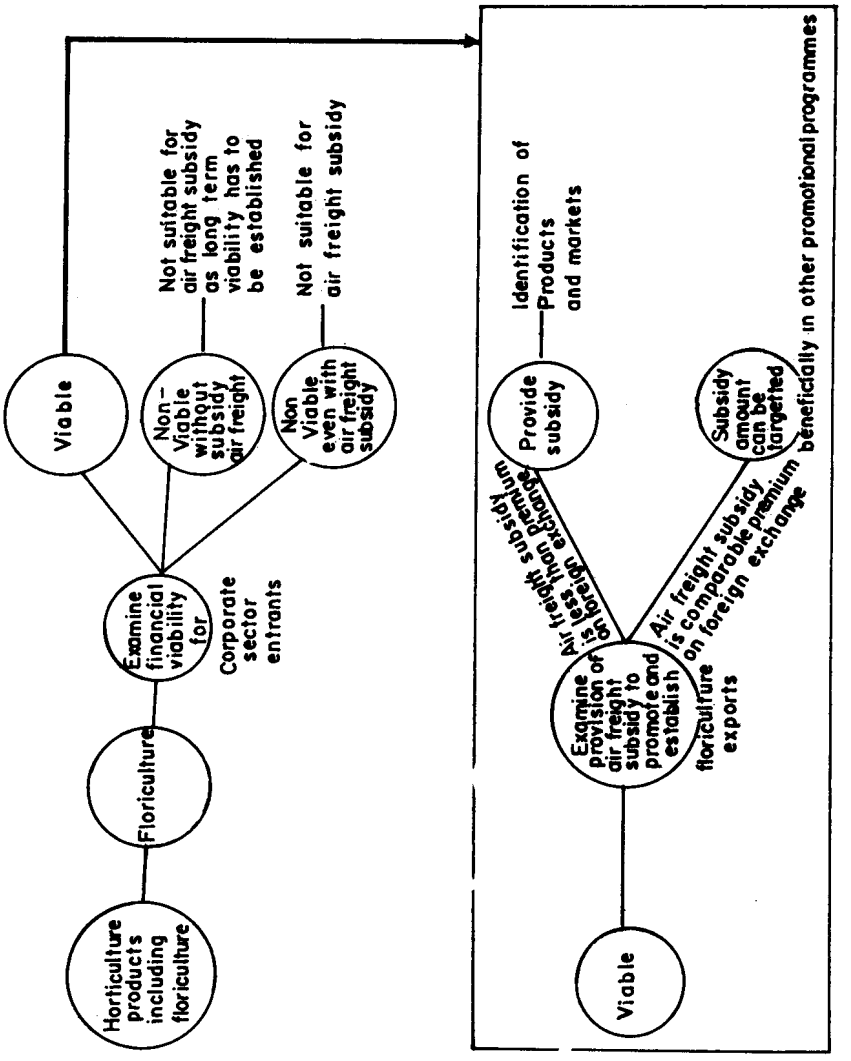


Chart 5
Decision Tree for Floriculture Exports
Economic Analysis



second, amidst the profusion of material goods, sending flowers as gift seems to express one's feelings more effectively and third, the physical distribution system has become well established with home delivery service widely available, making it possible for people to order flowers with confidence. Imported flowers which offer a wide range of choices are benefitting from this expanding market. Major suppliers of cut flowers are Thailand, Taiwan and Netherlands. The product differentiation model adopted for the study differentiates products by country of origin because each exporting country provides different kinds of cut flowers, for instance, Taiwan exports mainly Chrysanthemum; Thailand concentrates on exports of Orchids and the Netherlands supplies various kinds of cut flowers such as freesias, roses, tulips, lilies and carnations. For details on product-market segmentation and general methodology please see attached charts.

Competitor Strategy

The demand for cut flowers from Netherlands is most sensitive to price change, followed by Thailand and then Taiwan. Imports from the Netherlands are also more sensitive to income changes, followed by Taiwan and Thailand. In order to target the product-market combination, an analysis of competitors strategies becomes important to analyse strategy options for India. An analysis of Europe auctions for top ten flowers reveals that the products of importance to India could be Roses, Carnations, Chrysanthemums and Gladioli, in that order (Table 45).

The countries India would have to compete with would be mainly, Netherlands, Zimbabwe, Kenya, Israel and Columbia. Of the cut flower importers Japan offers the maximum potential

Table 45: Top Ten Cut Flowers Arranged in Terms of Auction Turnover

(Million DFL)

Crop	*1984*	*1985*	*1989*	*1990*	*1991*	*CARG*
Rose	485	499	646	704	825	9%
Chrysanthemum	381	422	492	565	598	8%
Carnation	343	250	271	276	292	-3%
Tulip	168	181	225	238	254	7%
Freesia	156	149	144	150	168	1%
Gerbera	143	143	*	126	143	0%
Lily	122	132	201	212	231	11%
Cymbidium	91	94	98	96	109	3%
Gypsophila	75	82	98	108	108	6%
Aistromeria	—	—	64	67	79	11%

* Not available.

for India. The reasons are as under:

1. The income and price elasticities are very large and are statistically significant. The income elasticity of 2.3 indicates that the cut flower imports are very sensitive to income changes; cut flowers is considered a luxury good in the sense that the demand increases faster than per capita income goes up. The cut flower imports are also very sensitive to price changes. Of the major suppliers to the Japanese market, the estimated trade coefficient for the trade flow equation for the supply of cut flowers from the Netherlands indicates that it is most sensitive to price change followed by Thailand and Taiwan (Table 46).

2. Since Thailand concentrates on exports of Orchids and Taiwan on Chrysanthemums, India could target exports of Roses and Carnations to Japan. However, Netherlands which concentrates on supply of flowers

Table 46: Cut Flowers: Own Price Elasticity and Income Elasticity for Selected Countries

Commodity/Country of Origin	*Own-Price Elasticity*	*Income Elasticity*
Cut Flowers:		
Taiwan	-1.766	3.044
Thailand	-2.128	2.377
Netherlands	-2.952	3.741

Source: M. Honma, *Growth in Japan's Horticultural Trade with Developing Countries,* Research Report 1989, IFPRI.

for commercial use has an in built competitive advantage in that they have in place a pre-shipment inspection of cut flowers so that they meet Japan's plant regulation. Pre-shipment quarantine officers of Japan were despatched to Amsterdam at the Netherlands' cost to initiate pre-shipment inspection which reduces the risk of rejection of shipments at Japan's airports. The competitive strategy of the Netherlands helped it increase its market share at the cost of Taiwan. This necessitates the role of APEDA in effecting pre-shipment inspection at Indian airports.

3. Also our computation of financial attractiveness suggests Japan as the market which would yield a high IRR (Base Case 28%).

While Rose and Carnations to Japan would be the best medium-long term promotional plan, participation in Netherlands auction, exports to Europe and the Middle East could be the immediate short term options. Also, New Zealand and Australia could be cultivated as promising markets. While expanding products to include Orchids, Gladioli, Anthurium etc. care should be taken of the intense competition and likely

lower price realisation.

For instance, Thailand is the major supplier of Orchids and Hawaii is the principal supplier of Anthurium. Exports to USA may be feasible only if air freight subsidy is increased. While auctions could be the interim route to Japan, for better price realisation one may have to sell directly to wholesalers in Europe on a fixed price basis (Basis: Secondary literature survey, Field interviews of major exporters and in-depth analysis of the Japanese market).

Now, the **vital questions** to be answered are:

(1) If product-market combinations are identified, would export of cut-flowers become a viable proposition for Indian exporters?

(2) Does a provision of air-freight subsidy, at the margin, improve the long-term goal of developing the export market?

(3) What should be the target period for provision of subsidy?

(4) What should be the supplemental role of APEDA in promotion of cut-flower exports, apart from provision of subsidy?

(5) Should India target subsidy for cut-flowers? Or how does the promotional expense to earn one unit of foreign exchange through promotion of cut-flower exports compare with the promotional expense to earn one unit through other routes?

We propose to answer these questions in the following manner: If the factor conditions are conducive to promotion of

cut flower exports and if the corporate sector is into it, questions 1 & 2 can be answered by examining the financial attractiveness of the investments in setting up green houses for export purposes and carrying out switching value analysis. Basic assumptions (based on discussions with major exporters and ICICI)are as under:

(i) The capital investment on green house, land, drip irrigation, and imported plantlets is Rs. 2.07 crores per hectare.

(ii) The operating cost of green house and transhipment expenses upto cargo is estimated at Rs. 200 per square metre

(iii) The average f.o.b. realisation per stem is assumed to lie at Rs. 5.5 to 6 for shipments to Europe, Rs. 7 to 8 for Middle East, and Rs. 8 to 9 for Far East.

(iv) The freight rates to various points in Europe, Far East and Middle East are listed in the attached cash flow statement.

(v) The air freight subsidy per kg. assumed is Rs. 6 per kg. for shipments for Middle East, Rs. 10 per kg. for shipments to Europe and Far East. It is assumed that each stem weighs 28 grams approximately. The air freight subsidy is assumed to be provided for the first five years of operations (five years is the gestation period during which subsidy would be necessary as per exporters survey).

(vi) Useful life of green house is assumed to be 15 years.

Summary results are as under:

(Per cent)

Alternative	*IRR Middle East*	*IRR Europe*	*IRR Far East*
1. Base Case	30	12	28
2. Base Case but without freight subsidy	29	11	26
3. Base Case but sales realisation less 25% to average realisation	19	-3	14
4. Same as above but without freight subsidy	18	-4	13

Inferences

- *As the price fluctuations are wide under the scenario where sales realisation is less by 25 per cent to average realisation, the freight subsidy provides the cushion as IRR equals the cost of capital to the private borrower as results 3 and 4 illustrate.*

- *The gestation period for which the freight subsidies need to be provided can be obtained as switching value in years below which IRR is lower than the cost of capital. Since IRR is not very sensitive to the period of provision of subsidy the minimum gestation period is assumed as the necessary period for effecting subsidy.*

- *The yield on investments in floriculture between 22 to 25% compares well with alternatives for private borrowers especially if you consider that exports of fresh agricultural produce yield tax benefits.*

The next vital question to be answered is whether Government can gainfully administer subsidy for promotion of

exports of other commodities or should it subsidise cut flowers and horticultural exports at all.

The policy makers use economic analysis to weigh attractiveness of policy options. In the planning commission methodology of economic analysis the premium on foreign exchange is worked as under:

1. Promotional expense to earn one unit of foreign exchange.
2. A weighted average tariff that balances the demand for and supply of foreign exchange.

The test discount rate used in the analysis is the social discount rate.

It is agreed that the scope for increasing exports mainly lie in cut flowers and fresh fruits especially from India's view point in the agricultural sector. Since air freight subsidy is the necessary promotional expense in developing viable long term export markets for cut flowers we examine the present value of subsidies against the present value of foreign exchange earnings discounting the operating cost through use of standard conversion factor which brings out that the promotional investment involved to earn foreign exchange is 7% (in other words foreign exchange can be valued at a premium of 7%). The premium involved in other programmes to earn foreign exchange is far higher indicating the higher productivity of air freight subsidy. For instance, one important scheme specifically geared to export production, is Export Promotion Capital Goods Scheme. Manufacturing firms can import capital goods at a concessional rate of 15% as against 65% general rate on condition that they export four times the c.i.f. value over the next five years. This would implicitly mean

that the Foreign exchange is valued at 16% premium in the normal scenario (IRR of the cash outflow of Re 0.50 during the initial year enabling a recurring foreign exchange inflow equivalent to 0.8 rupee during the next five years – assuming a 16% premium, it works out to a recurring inflow of rupee 0.13 for five years – would be around 18%, equivalent to the cost of capital).

Concluding Remarks

APEDA has a lead role to play in shaping the context and institutional structure surrounding firms involved in exports of perishables especially cut flowers and fresh fruits and in creating an environment that stimulates firms to gain competitive advantage. There are many instances where institutions have played a catalytic role in creating an environment for firms to gain competitive advantage such as Holland's premier research institution in cultivation, packaging and shipping of flowers, the ministry of communication and transportation of Thailand allotting 50 per cent of its air cargo capacities in the national airways to perishables or the case of the Philippines government which adopted the vapour heat treatment, a process about ten times more expensive than traditional treatments to overcome entry barriers; we foresee APEDA's role in a similar vein.

The analysis carried out so far revealed mangoes, grapes, lychees, sapota, pomegranates as products with high RCA and low NPC values by promising products to target air freight subsidy. Now it is time to look at the actual performance of fresh fruits in various markets during 1993-94 to form possible hypotheses:

(1) The proportion of fresh fruits air freighted to export markets to total exports of fresh fruits is near unity in case of products with high perishability index such as sapota, lychees etc. while it is not insignificant in the case of mangoes, grapes. Barring apples, where exports are restricted to neighbouring countries (as NPC>1), in all other cases air freight subsidy has played its catalytic role.

Table 47: Exports by Air

Fruit	*Exports by Air 1993-94*		*Total Exports 1993-94*		*Exports by air as per cent to total exports*	
	Qty. (Tonnes)	*Value* (Rs.million)	*Qty.* (Tonnes)	*Value* (Rs. million)	*Qty.*	*Value*
Banana	395.4	4.67	1086.0	14.73	36.0	32.0
Pineapples (fresh)	59.51	0.85	120.0	1.29	50.0	66.0
Guava	69.6	0.93	319.0	7.24	22.0	13.0
Mangoes	9808.0	195.04	22793.0	438.70	43.0	44.0
Grapes	1665.0	33.12	15932.0	339.30	10.4	9.8
Apples	13.2	0.19	5988.0	68.70	0.22	0.28
Pomegranates	689.5	10.55	2623.2	36.72	26.2	28.7
Sapota	1978.2	20.98	2008.0	21.38	98.5	98.1
Sitafal	1474.0	19.87	1478.0	21.38	99.7	93.0
Custard Apple	178.0	2.11	183.0	2.14	97.0	98.5

(2) The f.o.b. realisation from products exported through air shipments nearly matches the f.o.b. realisation through the conventional mode of transport (quntity exports and f.o.b. value exports roughly equal each other) thus enabling us to hypothesise that air freighted commodities command a higher c.i.f. price enabling it to realise equivalent f.o.b. prices.

(3) Air freight subsidy has been the catalyst in enabling Indian fresh fruit exporters exploring the new markets. Even in traditional markets there is a market preference for air-freighted commodities as shown in Table 48.

(4) Finally if we were to develop an index of effectiveness of air freight subsidy (f.o.b. exports-subsidy)/subsidy, the export performance of various fresh fruits in export markets can be summarised in Table 49.

Table 48: Proportion of the Market Met by Exports (Air), Destinationwise

(Per cent)

Country	*Mangoes* (Qty.)	*Grapes* (Qty.)	*Fresh Bananas* (Qty.)
Saudi Arabia	91	38	100
Kuwait	89	26	100
UK	90		100
UAE	14	61	100
Bahrain	73		100
Qatar	93		100
USA		32	
S. Africa	100		
France	100	100	
Austria	100	100	
Italy	100		
Asia Pacific			
Indonesia	100		
Malaysia	97		
Mauritius	100		
Maldives			100
Singapore		27	
Switzerland		100	
Oman			100

An analysis of effectiveness index destination-wise for mangoes reveals that the index at 7 for Switzerland and Belgium is the highest; for Middle-East region the ratio ranges between 1.1 to 1.5. In Europe, the index for UK destination is only 0.6 reflecting, probably, the severe competition from Pakistan varieties while for Germany the index is negative.

For Fresh Bananas, the index is highest for U.K. and Switzerland reflecting that the air-freighted, fully ripe, sweet fresh bananas can be an interesting variant to the conventional international market supply of unripened bananas from exporting countries. For guava, the markets of Switzerland

Table 49: Index of Effectivness of Air Freight Subsidy

Commodity	*Index (Exports-AF Subsidy) / AF Subsidy*
Bananas	0.96
Mangoes	1.24
Oranges	-0.30
Grapes	2.40
Pomegranates	1.98
Sapota	0.18
Sitafal	1.70
Custard Apple	2.10
Pineapple fresh	-0.30
Apples	-0.20
Bore	1.81
Guava	0.95

and Austria are most rewarding. For fresh grapes, the markets of UK, Germany, Bahrain and Oman exhibit fairly high indices. For pomegranates markets of Portugal, Switzerland in Europe and Saudi Arabia, Bahrain and UAE in Middle-East yield high returns on air-freight subsidy. For sapota, markets of Albania, Belgium and Switzerland in Europe are rewarding in terms of returns to subsidy while in the Middle-Eastern region, barring UAE others have responded favourably to air-freight subsidy. For bore, the indices are high in Albania, Portugal, Saudi Arabia, Bahrain, Kuwait and Malaysia.

Product	*Markets to Focus*	*Elements of Strategy*
Mango	(Price elsticity of demand for exports is high) Holland Maldives Malaysia Hong kong Bahrain	* Air freight subsidy would improve NPC at margin, making it quite attractive to export; besides a depreciation of rupee against dollar (envisaged at about 5% per annum) would ensure that

(Continued)

Product	*Markets to Focus*	*Elements of Strategy*
Mango (Contd.)	Germany Qatar Singapore ***Note :*** In Japan mangoes are replacing bananas as the luxury fruit (personal gift market). Income elasticity of mangoes is large; however quarantive regulations in Japan requiring vapour heat treatment (of disinfection) is an entry barrier to this otherwise most lucrative market in the long run.	the air freight subsidy initially, would develop a healthy export market. * Concerted action to premium quality Alphonso in Europe through air freight subsidy. * APEDA to assume active role to install VHT facilities to penetrate the Japanese market—Maybe investments in these could be treated at par with venture capital funds. * APEDA to "buy and lease back" air cargo space for perishables especially mangoes.
Lychee	Singapore France USA (summer months) *APEDA would have to liaise with APHIS in USA to obtain phytosanitary approval. Export to USA is conditional to APEDA obtaining this approval.	* Lychee is considered the most popular imported Asian speciality fruit in Europe registering a market growth rate of 20%. * Although lychees are grown in Florida the gap between demand and supply has been increasing. * Since India produces a quarter million of lychees, APEDA must ensure that exports are regulated preferably through a canalisation policy. * Buy cargo space & lease back * Involve the corporate sector in exports of lychee.
Grapes	Bahrain Hongkong UAE	* Grapes are next to mangoes in importance in the fruit export basket of India

(Continued)

Product	*Markets to Focus*	*Elements of Strategy*
Grapes (Contd.)	Oman Saudi Arabia Maldives Malaysia	* The main export variety is Thompson Seedless (green) * The perishability index is not high; Grapes can have a storage life of 3 to 5 months if the prevailing temperature is 30 to 32 degrees F; however air freighted grapes attract higher prices which compensate the high freight rates. * APEDA strategy could be to meet EU and US imports as these are mega markets (0.13 and 0.3 million ton markets respectively) by targetting air freight subsidy to these markets.
Sapota	Bahrain Saudi Arabia UK Kuwait Canada Germany	* Low NPC and an estimated RCA exceeding one suggests that this is one of the important fresh fruits, for APEDA to focus promotional efforts. * There has been a spurt in demand for exports during 1983-84 and since India is one of the leading exporters (others being Australia and Thailand) & since it has a strong foothold in Saudi Arabia & Bahrain, air freight subsidy would be the key element in promoting export of this perishable commodity.
Pomegranates Fresh	UAE Saudi Arabia Bahrain Kuwait	* Pomegranates at present is a "marginal" product in terms of attractiveness to exports as the criterion. However the NPC is

(Continued)

Product	*Markets to Focus*	*Elements of Strategy*
Pomegranates (Contd.)	UK Switzerland	likely to be higher if exported to Europe because of the price realisation in Europe vis-a-vis the Middle Eastern region. However, air freight subsidy should continue for next 5 years when the marginal depreciation of rupee vis-a-vis dollar would drive NPC lower & increase export attractiveness of pomegranates.
Pineapples Fresh		* India is a marginal player (RCA 0.08); thus provision of air freight subsidy may not aid in development of sustainable export markets.
Apples	Bangaladesh Sri Lanka	* Degree of export competitiveness of Indian apples is not high (NPC>1); hence air freight subsidy to far off locations would not be in the interest of development of viable export markets.
Banana	Germany Qatar Bahrain Saudi Arabia Kuwait	* The low NPC makes this financially attractive product for Indian farmers & traders to resort to exports; however the very low RCA suggests their attempts may not be very successful in view of the entrenched international market. The low NPC suggests that air freighting fully ripe, sweet, bananas to export markets could be an interesting proposition considering that all other exporters ripen fruits at export market centres.

Floriculture

While Rose and Carnations to Japan would be the best medium-long term promotional plan, participation in Netherlands auction, exports to Europe and the Middle East could be the immediate short term options. Also, New Zealand and Australia could be cultivated as promising markets. While expanding products to include Orchids, Gladioli, Anthurium etc. care should be taken of the intense competition and likely lower price realisation. For instance, Thailand is the major supplier of Orchids and Hawaii is the principal supplier of Anthurium. Exports to USA may be feasible only if air freight subsidy is increased. While auctions could be the interim route to Japan, for better price realisation one may have to sell directly to wholesalers in Europe on a fixed price basis (Basis: Secondary literature survey, Field interviews of major exporters and in-depth analysis of the Japanese market).

It is agreed that the scope for increasing exports mainly lie in cut flowers and fresh fruits especially from India's view point in the agricultural sector. Since air freight subsidy is the necessary promotional expense in developing viable long term export markets for cut flowers we examine the present value of subsidies against the present value of foreign exchange earnings discounting the operating cost through use of standard conversion factor which brings out that the promotional investment involved to earn foreign exchange is 7% (in other words foreign exchange can be valued at a premium of 7%). The premium involved in other programmes to earn foreign exchange is far higher indicating the higher productivity of air freight subsidy. For instance, one important scheme spec.i.f.ically geared to export production, is Export Promotion Capital Goods Scheme. Manufacturing firms can import capital goods at a concessional rate of 15% as against

65% general rate on condition that they export four times the c.i.f. value over the next five years. This would implicitly mean that the Foreign exchange is valued at 16% premium in the normal scenario (IRR of the cashoutflow of Re 0.50 during the initial year enabling a recurring foreign exchange inflow equivalent to 1 rupee during the next five years (assuming a 16% premium, it works out to a recurring inflow of Re 0.16 for five years) would be around 18% (equivalent to the cost of capital).

To sum up the role of APEDA and the desired strategy mix could be as under:

- Provide air freight subsidy for at least five years and prioritise product-market combinations as listed above (analyses).
- Buy air cargo space and lease back to exporters for perishables (Delphi).
- Quality certification for speedier exports based on past track record (Delphi).
- Create sterilisation facilities in India and lease the facility for ex. VHT for mangoes (competitor strategies).
- Cater to institutional demand where the income elasticity of demand for perishables is high.
- Support joint initiatives like clubbing shipments by air (ex. South Indian Floriculture Association).
- Support initiatives to categorise investments in precooling, sterilisation facilities etc as investments in development of new technology akin to venture capital funds.

Annexure

Table A. 1: BASE CASE: Air Freight Subsidy Rs.6/kg for Middle East & Rs.10/kg for Europe and Far East

(Rs.Cr./Hectare)

	Capital	Operating	Air Freight			Air Freight Subsidy			Avg. fob realisation			Net Cash Realisation		
Year	Cost	Cost	Middle East	Europe	Far East	Middle East	Europe	Far East	Middle East	Europe	Far East	Middle East	Europe	Far East
1	2.07											-2.07	-2.07	-2.07
2		0.20	0.08	0.17	0.19	0.01	0.02	0.02	0.56	0.44	0.64	0.30	0.09	0.27
3		0.20	0.11	0.25	0.28	0.02	0.04	0.04	0.84	0.65	0.96	0.55	0.24	0.51
4		0.20	0.15	0.33	0.38	0.03	0.05	0.05	1.13	0.87	1.28	0.80	0.39	0.75
5		0.20	0.15	0.33	0.38	0.03	0.05	0.05	1.13	0.87	1.28	0.80	0.39	0.75
6		0.20	0.15	0.33	0.38	0.03	0.05	0.05	1.13	0.87	1.28	0.80	0.39	0.75
7		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
8		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
9		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
10		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
11		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
12		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
13		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
14		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
15		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
											IRR	30%	12%	28%

Table A. 2: CASE II: No Air Freight Subsidy

(Rs.Cr./Hectare)

Year	Capital Cost	Operating Cost	Air Freight			Air Freight Subsidy			Avg. fob realisation			Net Cash Realisation		
			Middle East	Europe	Far East	Middle East	Europe	Far East	Middle East	Europe	Far East	Middle East	Europe	Far East
1	2.07											-2.07	-2.07	-2.07
2		0.20	0.08	0.17	0.19	0.00	0.00	0.00	0.56	0.44	0.64	0.29	0.07	0.25
3		0.20	0.11	0.25	0.28	0.00	0.00	0.00	0.84	0.65	0.96	0.53	0.21	0.47
4		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
5		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
6		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
7		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
8		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
9		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
10		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
11		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
12		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
13		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
14		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
15		0.20	0.15	0.33	0.38	0.00	0.00	0.00	1.13	0.87	1.28	0.78	0.34	0.70
											IRR	29%	11%	26%

Table A. 3: CASE III: Base Case But Sales Realisation Reduced by 25 Per cent

(Rs.Cr./Hectare)

Year	Capital Cost	Operating Cost	Air Freight			Air Freight Subsidy			Avg. fob realisation			Net Cash Realisation		
			Middle East	Europe	Far East	Middle East	Europe	Far East	Middle East	Europe	Far East	Middle East	Europe	Far East
1	2.07											-2.07	-2.07	-2.07
2		0.20	0.08	0.17	0.19	0.01	0.02	0.02	0.42	0.33	0.48	0.16	-0.01	0.12
3		0.20	0.11	0.25	0.28	0.02	0.04	0.04	0.63	0.49	0.72	0.34	0.08	0.27
4		0.20	0.15	0.33	0.38	0.03	0.05	0.05	0.84	0.65	0.96	0.52	0.17	0.43
5		0.20	0.15	0.33	0.38	0.03	0.05	0.05	0.84	0.65	0.96	0.52	0.17	0.43
6		0.20	0.15	0.33	0.38	0.03	0.05	0.05	0.84	0.65	0.96	0.52	0.17	0.43
7		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
8		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
9		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
10		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
11		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
12		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
13		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
14		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
15		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
											IRR	19%	-3%	14%

Table A. 4: CASE IV: Base Case But Sales Realisation Reduced by 25 Per cent Without Freight Subsidy

(Rs.Cr./Hectare)

	Capital	Operating	Air Freight			Air Freight Subsidy			Avg. fob realisation			Net Cash Realisation		
Year	Cost	Cost	Middle East	Europe	Far East	Middle East	Europe	Far East	Middle East	Europe	Far East	Middle East	Europe	Far East
1	2.07											-2.07	-2.07	-2.07
2		0.20	0.08	0.17	0.19	0.00	0.00	0.00	0.42	0.33	0.48	0.15	-0.04	0.09
3		0.20	0.11	0.25	0.28	0.00	0.00	0.00	0.63	0.49	0.72	0.32	0.04	0.24
4		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
5		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
6		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
7		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
8		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
9		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
10		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
11		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
12		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
13		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
14		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
15		0.20	0.15	0.33	0.38	0.00	0.00	0.00	0.84	0.65	0.96	0.49	0.12	0.38
											IRR	18%	-4%	13%

Table 1: UK Importer Selling Prices For Fresh Mangoes

(Prices In Pounds Sterling Per Kilo)

	Exporter:	Brazil Atk	Brazil Sea	Quat Sea	Honduras	India	Israel	Jamaica Sea	Kenya Ngo	Mexico Air	Mexico Sea	Pakistan	South Afr Sea	Venezuela Air
1993	Jul 28			1.90				1.25					1.40	
	Aug 4									2.25	1.85			
	Aug 11						1.75							
	Aug 19													
	Aug 26						1.40	1.30				1.65		
	Sep 2						1.75							
	Sep 9						1.65							
	Sep 16						1.50							
	Sep 23	2.50					1.50							
	Sep 30	2.50					1.25				1.50			
	Oct 7	2.25					1.45							
	Oct 14	1.90								2.50	1.50			
	Oct 21	1.75					1.25			2.50				
	Oct 28	2.50												
	Nov 4													
	Nov 11		1.50											
	Nov 18													
	Nov 25		1.00											
	Dec 2	1.60	1.00											
	Dec 9		1.00											
	Dec 16		1.00											

(Continued)

Table 1 : (Contd.)

	Exporter:	Brazil Atk	Brazil Sea	Quat Sea	Honduras	India	Israel	Jamaica Sea	Kenya Ngo	Mexico Air	Mexico Sea	Pakistan	South Afr Sea	Venezuela Air
1993	Dec 23		1.10											
	Dec 30													
1994	Jan 6													
	Jan 13													
	Jan 20	1.75							2.00					
	Jan 27	1.60							1.75					
	Feb 3	1.60												
	Feb 10	1.50							1.50				1.50	
	Feb 17		1.50								1.30		1.20	
	Feb 24													
	Mar 3													
	Mar 10	1.40								1.60			1.20	
	Mar 17												1.25	
	Mar 23													
	Mar 31								1.50					2.25
	Apr 7													
	Apr 14													2.00
	Apr 21	1.75		1.50					1.35					1.50
	Apr 28	1.75				2.00							1.30	2.25
	May 5													
	May 13	1.75			1.80									2.25

(Continued)

Table 1: (Contd.)

	Exporter:	Brazil Atk	Brazil Sea	Quat Sea	Honduras	India	Israel	Jamaica Sea	Kenya Ngo	Mexico Air	Mexico Sea	Pakistan	South Afr Sea	Venezuela Air
1994	May 19					1.50				1.75				1.75
	May 25				1.50	1.50				1.50				2.00
	Jun 1		1.50											2.25
	Jun 9		1.60	1.40	1.50	1.40		1.10			1.25			2.00
	Jun 15				1.50	1.65			1.00		1.25			2.00
	Jun 22			1.60		1.00						1.50		
	Jun 29													
	Jul 6				1.25			1.00						1.80
	Jul 14				1.25			1.00						1.80
	Jul 21													
	Jul 28													
	Aug 3						2.00			1.50				
	Aug 10									1.55	1.25			1.50
	Aug 17						1.70			1.75				
	Aug 24						1.10			1.25				

Source: ITC/MNS, Geneva.

ABBR

ame=ameli
atk=tommy
had=haden
irw=irwin
kei=keitt
ken=kent
ngo=n'gow
sen=sensat

Table 2: European Importer Selling Prices for Fresh Lychees

	Importer:	*France* (FF/kg)							*Germany* (DM/kg)						
	Exporter:	*Australia*	*China*	*Israel*	*Med*	*Reunion*	*South Air*	*Thai-land*	*Australia*	*China*	*Israel*	*Med*	*Mauritius*	*South Air*	*Thai-land*
1993	Jul 28			90.00				80.00			12.25				
	Aug 4			38.00											
	Aug 11			37.00							11.50				
	Aug 19			38.00							11.00				
	Aug 26			36.00						11.25	11.00				
	Sep 2		23.00	43.00							11.75				
	Sep 9		24.00	40.00				36.00			14.00				
	Sep 16			41.00											
	Sep 23														
	Sep 30											4.25			
	Oct 7														
	Oct 14														
	Oct 21														
	Oct 28														
	Nov 4														
	Nov 11														
	Nov 18														
	Nov 25	67.00							17.60						

(Continued)

Table 2 : (Contd.)

	Importer:	France (FF/kg)							Germany (DM/kg)						
	Exporter:	Australia	China	Israel	Med	Reunion	South Air	Thai-land	Australia	China	Israel	Med	Mauritius	South Air	Thai-land
1993	Dec 2				36.50								10.50	10.50	10.00
	Dec 9														
	Dec 16														
	Dec 23														
	Dec 30														
1994	Jan 6														
	Jan 13				7.00	21.00							2.50		2.75
	Jan 20				6.50	20.00							2.50		2.50
	Jan 27				9.00		11.00						3.25		
	Feb 3				10.00		12.50						3.75		
	Feb 10				17.00		19.00								5.50
	Feb 17				19.00		19.00								5.00
	Feb 24														
	Mar 3														
	Mar 10				16.00										5.50
	Mar 17				17.00										5.00
	Mar 23														
	Mar 31						27.00								

(Continued)

Table 2 : (Contd.)

	Importer:	*France* (FF/kg)							*Germany* (DM/kg)						
	Exporter:	*Australia*	*China*	*Israel*	*Med*	*Raunion*	*South Air*	*Thai-land*	*Australia*	*China*	*Israel*	*Med*	*Mauritius*	*South Air*	*Thai-land*
1994	Apr 7														
	Apr 14														
	Apr 21														
	Apr 28							62.50							
	May 5														
	May 13							62.00							19.00
	May 19							62.00							
	May 25							62.00							12.50
	Jun 1														
	Jun 9							58.00							
	Jun 15														
	Jun 22							52.00							
	Jun 29														
	Jul 6							48.00			13.00				
	Jul 14							48.00			13.00				
	Jul 21														
	Jul 28			40.00						11.75					

(Continued)

Table 2: (Contd.)

	Importer:	*Holland* (Hfl/kg)				*UK* (£/kg)						
	Exporter:	*Israel*	*Med*	*South Afr*	*Thai*	*China*	*Israel*	*Med*	*South Afr*	*Taiwan*	*Thai*	*Zambia*
1993	Jul 28	13.00					5.00				5.50	
	Aug 4	12.25									5.50	
	Aug 11	12.25					3.75			3.75		3.75
	Aug 19	12.25					4.00				4.50	
	Aug 26	13.50					3.50					
	Sep 2	11.75				4.50	4.50					
	Sep 9	14.50				4.00			4.50		4.50	
	Sep 16											
	Sep 23	15.00					5.00					
	Sep 30											
	Oct 7											
	Oct 14											
	Oct 21											
	Oct 28											
	Nov 4											
	Nov 11											
	Nov 18											
	Nov 25						4.75					
	Dec 2			10.25					3.50			
	Dec 9											

(Continued)

Table 2: (Contd.)

	Importer:	*Holland* (Hfl/kg)				*UK* (£/kg)						
	Exporter:	*Israel*	*Med*	*South Afr*	*Thai*	*China*	*Israel*	*Med*	*South Afr*	*Taiwan*	*Thai*	*Zambia*
1993	Dec 16											
	Dec 23											
	Dec 30											
1994	Jan 6											
	Jan 13		3.60	4.00			1.75	2.00				
	Jan 20		3.60	3.75				1.50				
	Jan 27		4.00	3.75				1.60				
	Feb 3		4.50	4.00				1.50				
	Feb 10		5.50	5.50				1.60	1.70			
	Feb 17		7.00	7.00				1.50				
	Feb 24											
	Mar 3											
	Mar 10		6.75	5.00			2.60	2.40	2.25			
	Mar 17		7.25	7.25					2.50			
	Mar 23											
	Mar 31			7.25					4.00			
	Apr 7											
	Apr 14				20.00				4.00			
	Apr 21				17.00						7.50	
	Apr 28				18.25						7.00	

(Continued)

Table 2: (Contd.)

	Importer:	*Holland* (Hfl/kg)				*UK* (£/kg)						
	Exporter:	*Israel*	*Med*	*South Afr*	*Thai*	*China*	*Israel*	*Med*	*South Afr*	*Taiwan*	*Thai*	*Zambia*
1994	May 5											
	May 13				17.50						7.00	
	May 19				17.50						6.50	
	May 25				17.75						7.50	
	Jun 1				16.50						6.25	
	Jun 9				16.00		7.00				5.75	
	Jun 15				15.50				6.50		5.75	
	Jun 22				16.00	6.60					6.00	
	Jun 29											
	Jul 6				15.50	7.00						
	Jul 14				15.50							
	Jul 21											
	Jul 28	13.75					5.50					

Note: All prices in importer country currency, per kilogram.

Source : ITC/MNS, Geneva.

Table 3: UK Importer Selling Prices for Fresh Grapes

	Importer:	*UK*									
	Exporter:	*Chile fla*	*Chile per*	*Chile rib*	*Chile thom*	*Egypt fla*	*Egypt thom*	*India fla*	*India blk sdl*	*India thom*	*India per*
1993	Dec 2										
	Dec 9										
	Dec 16									3.40	
	Dec 23		3.00		3.10			2.20	2.10	1.30	
	Dec 30										
1994	Jan 6										
	Jan 13	2.80									
	Jan 20		1.60		1.85						
	Jan 27	1.80	1.60								
	Feb 3	1.40	1.60		1.60						
	Feb 10	1.45	1.60		1.60						
	Feb 17	1.35			1.70						
	Feb 24										
	Mar 3										
	Mar 10	1.15			1.20						
	Mar 17	1.15			1.40						
	Mar 23										
	Mar 31	1.00			1.40					1.40	

(Continued)

Table 3: (Contd.)

	Importer:	UK									
	Exporter:	Chile fla	Chile per	Chile rib	Chile thom	Egypt fla	Egypt thom	India fla	India blk sdl	India thom	India per
1994	Apr 7										
	Apr 14										
	Apr 21	1.12		1.20	1.40					0.80	1.45
	Apr 28										
	May 5	1.25		1.15	1.30					1.40	
	May 13	1.25		1.25	1.40					1.50	
	May 19			1.25	1.50					1.60	
	May 25			1.20						1.35	3.05
	Jun 1	1.30									
	Jun 9	1.35		1.15	1.30					1.10	
	Jun 15	1.25		1.15		1.20	2.00			1.35	1.45
	Jun 22			0.95	1.20		1.90			1.00	
	Jun 29										
	Jul 6			1.00			1.75			1.75	
	Jul 14			1.00			1.75			1.75	
	Jul 21										
	Jul 28			1.05							

(Continured)

Table 3: (Contd.)
UK Importer Selling Prices for Fresh Grapes (Part II)

	Importer:	*UK*									
	Exporter:	*Mexico thom air*	*Namibia thom*	*South Afr bar*	*South Afr dau*	*South Afr alm*	*South Afr fla*	*South Afr thom*	*South Afr sult*	*South Afr ben*	*South Afr alph*
1993	Dec 2										
	Dec 9							4.4 (air)	4.2 (air)		
	Dec 16						4.40 (air)	4.4 (air)	4.4 (air)		
	Dec 23		3.20								
	Dec 30										
1994	Jan 6										
	Jan 13								2.00		
	Jan 20							2.10	2.00		
	Jan 27							2.30	2.10		
	Feb 3							2.20	2.00		
	Feb 10						2.20	1.80	1.80	1.35	1.40
	Feb 17							1.90		1.75	
	Feb 24										
	Mar 3										
	Mar 10								1.60	1.10	1.20
	Mar 17								1.45		
	Mar 23										
	Mar 31			1.20							
	Apr 7										
	Apr 14										
	Apr 21			1.10	1.55			1.45			
	Apr 28										

(Continued)

Table 3: (Contd.)

	Importer:	UK									
	Exporter:	Mexico thom air	Namibia thom	South Afr bar	South Afr dau	South Afr alm	South Afr fla	South Afr thom	South Afr sult	South Afr ben	South Afr alph
1994	May 5			1.20	1.50	1.35					
	May 13			1.25	1.85						
	May 19	3.75		1.30	1.70						
	May 25			1.30	1.70	1.60					
	Jun 1			1.35	1.95	1.80					
	Jun 9			1.35	1.80	1.70					
	Jun 15			1.27	1.85	1.85					
	Jun 22										
	Jun 29										
	Jul 6										
	Jul 14										
	Jul 21										
	Jul 28										

Source: ITC/MNS, Geneva

ABBR

White Grapes
aim=almeira
dau=dauphine
ita=italia
mus=muscat
newx=new cross
per=periette
sult=sultana
sup=superior
thom=thompson seedless
vict=victoria
walt=waltham cross

Other Grapes
alph=alphonse
bar=barinka
ben=ben hannah
blk sdl=black seedless
car=cardinal
fla=flame
rglo=red globe
rib=ribier
roy=royal
rub=ruby

Table 4: New Convent Garden (London) Wholesale Market Prices for Strawberries

(In Pence, by Punnet Unless Otherwise Noted)

		Israel	*Colombia*	*USA*	*Egypt*	*Spain*	*Belgium*	*France*	*Holland*	*Italy*	*Kenya*	*Zimbabwe*	*New Zealand*
Jan	7	100											
	11	120	80	170									
	18			180									
	25	120	120	170/12 oz									
Feb	1	100		160	70	80							
	18												
	22	60		140	50	50							
March	1	70		120		52							
	8			150		60							
	15	50		120		40							
	22					40							
	29					42							
April	5			160		28							
	12					25				30			
	22			120		35				35			
	26			130		48							
May	3			150		40	75	110	70				
	10					25		100		30			
	17					28/250g	120	50/250g pun		35/250g pun			

(Continued)

Table 4: (Contd.)

(In Pence, by Punnet Unless Otherwise Noted)

		Israel	*Colombia*	*USA*	*Egypt*	*Spain*	*Belgium*	*France*	*Holland*	*Italy*	*Kenya*	*Zimbabwe*	*New Zealand*
May	24					22	130/500g	100		32			
	31						160/500g	100/500g		45			
June	7			130/12 oz		18/250g	120/500g	120					
	17			140		50/250g	125/500g						
	24												
July	1			140			80/500g						
	8			120/16			130/500g						
	15						95/500g						
Aug.	7												
	14												
	21												
	26			150/14 oz									
Sept.	9			130/12 oz			120/500g						
	16			130/12 oz									
	23			120/12 oz									
	30						150/500g						

(Continued)

Table 4: (Contd.)

(In Pence, by Punnet Unless Otherwise Noted)

		Israel	*Colombia*	*USA*	*Egypt*	*Spain*	*Belgium*	*France*	*Holland*	*Italy*	*Kenya*	*Zimbabwe*	*New Zealand*
Oct.	7			120/12 oz			90/500g						
	14			130/12 oz			85/500g						
	21			150/12 oz			115/500g						
	28			150/12 oz			95/500g						
Nov.	4						95/500g					100/250g	
	11			175/12 oz			90						
	18			120/12 oz			70		100				180
	25							1	175/500g				
Dec.	9			250/12 oz			280/500g				100		
	16	150/250g					140/500g		175				

Source : Fresh Produce Journal.