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Export Potential of Fruits, Vegetables and Flowers From India

M. DATTATREYULU

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PART I

EXPORT POTENTIAL OF FRUITS AND VEGETABLES FROM INDIA

CONTENTS

EXPORT POTENTIAL OF FRUITS AND VEGETABLES FROM INDIA

I. INTRODUCTION

Horticultural crops provide a better alternative for diversification of Indian agriculture in view of higher returns available from them. Horticulture sector helps in improving productivity of land, generating employment, improving economic conditions of the farmers and entrepreneurs, enhancing exports and foreign exchange earnings and above all providing nutritional security to the people.

Realising the importance and the role of horticultural crops have to play, plan allocation in the Eighth Five Year Plan has been raised to Rs. 1000 crore as against Rs. 24 crore in the Seventh Five Year Plan.

Horticultural products have a high income elasticity of demand. As income goes up, demand rises rapidly, especially in the middle- and high-income groups in developing and developed countries. In developed countries, the growing concern for health and nutrition has caused consumer preferences to shift from high-fat, high-cholesterol foods, such as meat and livestock products, to low-fat, low-cholesterol foods, such as fish, fruits and vegetables. Also, there is an increasing tendency in developed countries to diversify the diet by consuming a wide variety of fruits and vegetables, a change partly stimulated by the increase in international travel and communications. This, in turn, has led to and is facilitated by increasing imports of new and non-traditional horticultural products, especially from the tropical developing countries.

Conditions for increasing production of horticultural crops are very favourable in the country. This is partly because production of horticultural crops in general is labour-intensive. India endowed with abundant labour in relation to capital has competitive advantage in production and exports. Horticultural products not only have good potential for generating employment in cultivation but also in processing, marketing, and distribution. And they are frequently produced on small farms, thus providing an important source of additional income for poor farmers in developing countries. There are many horticultural products, especially fruits, that fetch high prices in world trade.

Thus the efficient production of high-value horticultural products on small farms can help alleviate rural poverty.

The growing interest in horticultural exports in the country also reflects the search for diversified non-traditional agricultural exports in order to expand foreign exchange earnings so that the country can meet rising import requirements for accelerated economic growth and mounting debt service payments.

This paper seeks to assess India's export potential of fruits and vegetables in fresh form.

II. GLOBAL SCENARIO

A. WORLD PRODUCTION

A variety of fruits and vegetables are grown in all the regions of the world - Africa, North & Central America, South America, Asia, Europe and Oceania - there are, however, wide variations in the quantities and varieties produced in different countries.

Global production of fresh fruits and vegetables comprises the following:

Fresh Fruits

Bananas and Plantains

Citrus Fruits

Oranges
Tangerines and mandarins
Lemons and limes
Grape fruit and pomelo

Tropical Fruits

Mangoes
Avocados
Pineapples
Dates
Persimmons
Papayas

Miscellaneous Fruits

Apples
Pears
Quinces
Apricots
Sour Cherries
Peaches and nectarines
Plums
Stone Fruit
Strawberries
Raspberries
Gooseberries
Currants
Blueberries
Cranberries
Grapes
Watermelons
Cantaloupes and other melons
Figs

Treenuts

Brazil nuts
cashew nuts
chestnuts
Almonds
Walnuts
Pistachios
Kolanuts
Hazelnuts (Filberts)
Arecanuts (Betel)
Coconuts
Olives
Melonseed

Fresh Vegetables

Roots & tubers
Potatoes
Sweet Potatoes
Yantia
Taro

Yams
Hops

Miscellaneous Vegetables

Sugarcane
Sugarbeets
Cabbages
Artichokes
Lettuce
Spinach
Tomatoes
Cauliflower
Pumpkins, squash, gourds
Cucumbers and gherkins
Eggplants
Chillies and peppers, green
Onions and shallots, green
Onions, dry
Garlic
Beans, green
Peas, green
Broad beans, green
String beans
Carrots
Okra
Green corn (maize)
Mushrooms
Chicory roots
Vegetable products, fresh or dried
Carobs

Fruits

World production of fruits was estimated at 387.9 million tonnes in 1994 which increased marginally over the previous years. The Annexure I indicates world production of fruits by major producing countries.

Table 1
WORLD PRODUCTION OF FRUITS* - BY MAJOR PRODUCING COUNTRIES

Qty : '000 MT

Country	1992	1993	1994
China	26,588	32,559	37,298
India	31,194	32,450	33,235
Brazil	32,738	31,951	32,515
USA	26,869	28,940	28,854
Italy	20,701	18,995	17,972
Spain	15,159	13,003	11,648
France	12,033	9,960	10,649
Turkey	9,431	9,645	9,700
Mexico	9,987	10,000	9,547
Uganda	8,411	8,845	9,239
Iran	8,509	8,851	9,021
World Total	**3,80,668**	**3,84,334**	**3,87,939**

* Fruits excluding Melons
Source: Production Year Book, FAO, Rome, 1994
India's Share in World Production : 8.57%
India's Rank in World Production : 2

China is the largest producer of fruits in the world followed by India, Brazil and USA in that order. In 1994, they accounted for 9.6%, 8.6%, 8.4% and 7.4% respectively of world production. These four countries with a combined production of 131902000 tonnes accounted for 34% of world production in 1994.

USA besides being a major producer is also an important importer as well as an exporter of fruits.

India ranked second and accounted for 8.6% of world production of fruits in 1994.

Many categories of fruits are produced on a global basis. Some of the fruits which are important from trade angle and from India's point of view are given in the following table:

Table 2
WORLD PRODUCTION OF FRUITS - BY MAJOR CATEGORIES

Qty.: '000 MT

Fruits	1992	1993	1994
Oranges	57961	59394	58731
Grapes	62424	56989	56391
Bananas	51309	52242	52584
Apples	44600	47453	48890
Mangoes	17479	18337	18450
Pineapples	11125	11546	11832
Total of 6 Categories	244898	245961	246879
Grand Total (All Fruits incl. others)	**380668**	**384334**	**387939**
% Share of 6 Categories in Grand Total	64.3	64.0	63.6

Source: Production Year Book, FAO, Rome, Italy, 1994.

Share of each category in the world production of fruits in 1994 was as follows:

Category	% Share
Oranges	15.1
Grapes	4.5
Bananas	13.6
Apples	12.6
Mangoes	4.8
Pineapple	3.1

Details regarding countrywise production of major categories of fruits are given in Annexures I.

In 1994, India's position in global production of fruits was as follows:

Category	India's Share in	India's Rank in
Oranges	3.6	6
Grapes	1.3	17
Bananas	15.0	1
Apples	2.5	10
Mangoes	54.2	1
Pineapples	6.9	5

Vegetables

World production of vegetables was estimated at 485.6 million tonnes in 1994. Production showed an increasing trend. The following table provides world production of vegetables by major producing countries:

Table 3
WORLD PRODUCTION OF VEGETABLES BY MAJOR PRODUCING COUNTRIES

Qty: '000 MT

Country	1992	1993	1994
China	1,23,094	1,25,513	1,28,811
India	64,209	63,800	65,137
USA	33,449	33,173	36,443
Turkey	19,189	18,468	19,354
Japan	14,350	13,669	13,870
Italy	14,537	14,054	13,629
Spain	10,477	10,231	10,680
Korea Rep.	10,081	10,276	10,503
Russian Fed.	10,661	10,450	10,190
Iran	8,894	8,798	10,050
World Total	**4,70,174**	**4,73,970**	**4,85,550**

Note : Total includes Vegetables + Melons
Source : Production Year Book, FAO, Rome, 1994

India's Share in World Production : 13.42%
India's Rank in World Production : 2

China is the number one producer followed very distantly by India and the USA.

India ranked number two in world production of vegetables and it accounted for only 13.42% in 1994.

Many categories of vegetables are produced in the world. Important vegetables from trade angle and from India's stand point are shown in the following table:

Table 4
WORLD PRODUCTION OF VEGETABLES BY MAJOR CATEGORIES

Qty.: '000 MT

Category	1992	1993	1994
Potatoes	277208	291460	265436
Tomatoes	73896	74357	77540
Cabbages	41031	40878	40250
Onions, dry	29776	30278	32546
Cucumbers and Gherkins	18268	18726	19261
Cauliflower	10080	10505	10888
Peas, Green	4541	4012	346
Total of 7 Categories	454800	467216	450267
Grand Total (All Vegetables incl. others)	470174	473970	485550
% Share of 7 categories in Grand total	96.7	98.6	92.7

Source: Production Year Book, FAO, Rome, Italy, 1994.

Share of each category in the world production of vegetables in 1994 was as follows:

Category	% Share
Potatoes	54.7
Tomatoes	16.0
Cabbages	8.3
Onions, dry	6.7
Cucumbers & Gherkins	4.0
Cauliflower	2.2
Peas, Green	0.9

Details regarding countrywise production of major categories of vegetables are given in Annexure II.

In 1994, India's position in global production of vegetables was as follows:

Category	India's Share in World Production (Percentage)	India's Rank in World Production
Potatoes	5.7	6
Tomatoes	6.5	5
Cabbages	8.2	3
Onions, dry	13.2	2
Cucumbers and Gherkins	N.A.	N.A.
Cauliflower	44.1	1
Peas, green	6.2	3

Tree Nuts

In global production of fruits, tree nuts constitute a very small percentage. In 1994, the share of tree nuts in global production was only 1.2 per cent.

Production of tree nuts declined to 4665000 M.T. in 1994 from previous years. The following table gives details of production by major producing countries:

Table 5
WORLD PRODUCTION OF TREE NUTS BY MAJOR PRODUCING COUNTRIES

Qty.: '000 M.T.

Country	1992	1993	1994
Turkey	803	600	724
China	365	382	397
Iran	348	436	349
Spain	345	327	292
Italy	301	274	280
Brazil	141	146	231
India	374	170	170
Greece	103	101	102
Korea Rep.	114	95	100
World Total	**4985**	**4731**	**4665**

Source: Production Year Book, FAO, Rome, Italy, 1994.

India's Share in World Production : 3.64%
India's Rank in World Production : 7

B. WORLD EXPORTS

Fruits. World exports of fresh fruits are on the increase. There are complementarities in the supply and marketing of fresh and processed fruits. With modern packaging and fruit treatment technologies there is considerable value added attached to the exportation of fresh fruits.

Tropical or semi-tropical fruits play a substantial role in international trade. Bananas and oranges are very important from export point of view. The only other tropical fruit of considerable significance from export point of view is pineapple in fresh form. Exports of apples and grapes are also increasing but on a lower growth rate.

In world exports of fruits, India's share is insignificant as could be seen from Table 6.

Table 6
WORLD EXPORTS OF FRUITS & VEGETABLES

Qty.: '000 MT
Val.: '000 US$

Item	1992		1993		1994	
	Qty.	Val.	Qty.	Val.	Qty.	Val.
FRUITS						
Oranges						
— World	5876	3069963	6399	2926410	6909	3257065
— India	8.19	1564	6.00	1153	9.30	1779
% Share of India	0.139	0.051	0.094	0.039	0.135	0.055
Bananas						
— World	10784	3334167	11602	3485592	12071	410748
— India	1.35	405	1.09	471	1.00	470
% Share of India	0.013	0.012	0.009	0.014	0.008	0.011
Apples						
— World	3910	2455949	4453	2051818	4539	2567529
— India	8.63	2811	5.97	2134	6.63	2184
% Share of India	0.221	0.114	0.134	0.104	0.146	0.085
Grapes						
— World	1771	1608363	1926	1649796	2009	1846686
— India	10.77	8229	15.93	10848	17.34	12781
% Share of India	0.608	0.512	0.827	0.658	0.863	0.692
Pineapple, Fresh						
— World	605	182709	680	221989	724	262914
— India	0.07	35	0.12	41	0.15	80
% Share of India	0.011	0.019	0.018	0.018	0.021	0.030

VEGETABLES						
Potato						
— World	7563	1571393	7102	1290355	7590	1745594
— India	5.67	461	7.45	753	5.00	430
% Share of India	0.075	0.029	0.105	0.058	0.066	0.025
Tomatoes						
— World	2348	1965711	2815	2128699	3080	2483560
— India	0.33	69	0.19	20	0.20	40
% Share of India	0.014	0.004	0.007	—	0.006	0.002
Onions						
— World	2578	712790	2672	752621	3136	1016885
— India	272	45443	357	58458	305	62976
% Share of India	10.551	6.375	13.361	7.767	9.726	6.193

Source: Trade Year Book, Food and Agriculture Organisation, Rome, Italy, 1994

Tropical fruit other than bananas and citrus that enter international trade whose value is significant is the pineapple. The volume of fresh pineapple imports is over 4 million tonnes, a sizeable portion of which is used for processing purposes.

There is a wide range of tropical fruits of a more exotic nature which has attracted increasing attention in the past few years. The market for exotic fruits, in fresh or processed form, is as yet limited but the potential is there. Among the most promising ones are mangoes, guavas, papayas, and pasion fruits. But there are scores of non exotic fruits which could qualify as well, although with more limited applications and among them, mention may be made of tamarinds, sour sops, cashew apples, acerola cherries, jack fruits, anonas, as well as the lychees, longans, and mangosteens of Far Eastern reputation.

Developing countries are expected to have a comparative advantage in tropical fruits and, therefore, to perform well in export markets. But tropical fruits constituted a small per cent of total world trade in fresh fruits. This indicates that the demand for tropical fruits in industrialised countries has been limited. However, familiarity with tropical fruits is growing in developed countries as the result of, first, an increase in international travel; second, an increase in immigrants from tropical developing countries, who have created a demand for tropical foods; and third, rising affluence in developed countries, which has fostered a desire for diversification of food consumption patterns and thus a trend towards the more exotic fruits.

Vegetables

Of the various vegetables that enter into world exports in fresh form, three are important namely tomatoes, potatoes and onions.

India's share in world exports of potatoes and tomatoes is insignificant. In the case of onions, however, India has a significant share of over six per cent.

Among fresh vegetables the miscellaneous vegetable categories had the largest share in the value of world exports - 75 per cent - followed by roots and tubers at 20 per cent. More than 90 per cent of roots and tubers were potatoes. At 28 per cent tomatoes were the most important single item in the miscellaneous vegetables category. Another 31 per cent was distributed as follows:

> Lettuce (8 per cent), cucumbers (8 per cent), chillies and pepper (6 per cent), cabbages (3 per cent), cauliflowers (3 per cent) and carrots (3 per cent).

C. WORLD IMPORTS

Of the various fruits imported, bananas, citrus, apples and grapes are very important, but only next to raisins. Most of the fruits imported in fresh forms are both for consumption and processing.

Among the vegetables imported potatoes, tomatoes and onions are very significant. Table 7 gives world imports of fruits and vegetables while major exporting and importing countries in respect of fruits and vegetables are shown in Annexure III.

Table 7
WORLD IMPORTS OF FRUITS & VEGETABLES

Qty.: '000 MT
Val.: '000 US$

Item	1992		1993		1994	
	Qty.	Val.	Qty.	Val.	Qty.	Val.
FRUITS						
Oranges	5886	3478788	5984	3266195	6589	3668136
Lemons & Limes	1017	602569	1054	610599	1198	745639
Bananas	10885	5323123	11406	5181853	12394	6157666
Apples	3947	3062657	4243	2194414	4188	2628091
Grapes	1761	2015697	1775	1868494	1920	2109606
Raisins	505	708783	538	691254	575	7177150
Pears	1134	1007740	1096	783505	1291	925683
Peaches	898	980662	762	749873	980	905695
Pineapple	632	379415	662	369861	688	381179
Dates	283	277526	249	258908	290	268750
Pimento	224	382510	194	290580	188	271742
VEGETABLES						
Potato	7674	1857460	6866	1376506	7365	1828695
Tomatoes	2389	2166171	2768	2278892	2816	2464224
Onions	2587	778874	2586	800779	3091	1124168

Source: Trade Year Book, Food and Agriculture Organisation, Rome, Italy, 1994

III. INDIA'S SCENARIO

A. PRODUCTION

Production of fruits and vegetables is on the increase recording a level of 104.6 million tonnes in 1993-94. The following table indicates area under and production of fruits and vegetables in the country.

Tables 8
PRODUCTION OF FRUITS AND VEGETABLES IN INDIA

Area : Lakh
Prod : Lakh MT

Items	1991-92		1992-93		1993-94	
	Area	Prod.	Area	Prod.	Area	Prod.
Fruits	28.74	286.32	32.06	329.55	36.26	394.79
Vegetables	51.37	585.32	50.45	638.06	48.30	650.95
Total	**8011.1**	**871.64**	**82.50**	**967.61**	**84.56**	**1045.74**

Source : Departments of Horticulture/Agriculture of States/Union Territories
- In the total production of fruits and vegetable in 1993-94, fruits constituted only 37.75% of the total;
- Vegetables constituted 62.25% of the total production.

Fruits

Production of fruits is spread over many States in the country but six states are the major ones as shown in the following table.

Table 9
PRODUCTION OF FRUITS IN INDIA - BY MAJOR STATES
(1993-94)

Area : 000 Hectares
Production: 000 M.T.

State	Area	Production
Andhra Pradesh	539.9	6006.0
Bihar	295.6	3711.6
Karnataka	242.2	4196.9
Maharashtra	372.6	577.6
Tamil Nadu	179.6	3620.6
U.P. (Plain)	304.8	3010.5
Total Six States	**1934.7**	**26322.0**
Total (incl. others)	**3626. 2**	**39478.6**

Percentage Share of Six States in All India 53.35% 66.67%
- Andhra Pradesh (15.2%), Maharashtra (14.6%), Karnataka (10.6%), Bihar (9.4%), Tamil Nadu (9.2%) and U.P. Plains - (7.6%) in that order are important producers.

Of the various fruits produced in the country, Banana, Mango, Citrus, Apple, Guava, Papaya, Pineapple, Litchi, Grapes and Sapota are very important as they together accounted for over 80% of production of all fruits in the country. The following table gives a profile of production of selected fruits in the country.

Table 10
PRODUCTION OF SELECTED FRUITS IN THE COUNTRY

Area : Hectares
Production : M.T.

	Item	Area	Production
1.	Bananas	431685	11900824
2.	Mango	1217362	10118505
3.	Citrus	433828	3911830
4.	Apples	204996	1298326
5.	Guava	118015	1278883
6.	Papaya	55907	1266185
7	Pineapples	62225	1006669
8.	Litchi	55493	813388
9.	Grapes	38841	70256
10.	Sapota	34832	481142
	Total of above items	**2653184**	**32778218**
	Total (incl. others)	**3626184**	**39478593**

Source : Departments of Horticulture/ Agriculture of States/Union Territories
Production of fruits in the country is given in Annexure III.

Vegetables

Production of vegetables is spread over the whole country. Bihar, Orissa, UP (Plains) and West Bengal are the major States engaged in the production of vegetables. In addition, Andhra Pradesh, Assam, Karnataka, Kerala, Madhya Pradesh and Maharashtra are also important.

Production of vegetables in the country is given in Annexure IV.

B. YIELD LEVELS

Yield levels play a significant role in enhancing production and cutting down costs of production. Particularly in the case of vegetables, assessment of yields and comparison with other countries is possible. The following table gives yield levels in selected fruits and vegetables.

Table 11
YIELD LEVELS IN FRUITS AND VEGETABLES
(1994)

Item	World	India	Major Producing Countries		
FRUITS					
Grapes	7147	20548	1. India	:	20548
			2. Italy	:	9964
			3. France	:	7746
			4. U S A	:	17332
			5. Turkey	:	6228
			6. Spain	:	2639
VEGETABLES					
Potatoes	14591	15000	1. Russian Fed.	:	9935
			2. China	:	12505
			3. Poland	:	13585
			4. U.S.A.	:	37394
			5. Ukraine	:	10545
			6. India	:	15000
Tomatoes	27184	15672	1. U.S.A.	:	63661
			2. China	:	25959
			3. Turkey	:	39375
			4. Italy	:	48052
			5. India	:	15672
			6. Egypt	:	31081

Cauliflower	17956	17778	1.	India	:	17778
			2.	China	:	25709
			3.	France	:	12640
			4.	Italy	:	19655
			5.	UK	:	15674
			6.	U.S.A	:	13616
Onions, Dry	16087	11026	1.	China	:	17407
			2.	India	:	11026
			3.	U.S.A.	:	44142
			4.	Turkey	:	20000
			5.	Iran	:	36607
Cucumbers and Gherkins	15855	NA	1.	China	:	17199
			2.	Iran	:	15729
			3.	Turkey	:	27500
			4.	USA	:	14025
			5.	Japan	:	47059
Peas, Green	5859	2714	1.	U.S.A.	:	9486
			2.	China	:	7827
			3.	France	:	14341
			4.	India	:	2714
			5.	U.K.	:	5392
			6.	Russian Fed	:	20000
Cabbages	23496	16500	1.	China	:	23520
			2.	Russian Fed.	:	26000
			3.	India	:	16500
			4.	Japan	:	40000
			5.	Korea Rep.	:	54968
			6.	Poland	:	29256

Source: Production Year Book, FAO, Rome, Italy, 1994.

— In grapes, India attained the highest yield level in the world at 20,548 Kg. per hectare. India ranked seventeenth in production and her share in global production was only 1.33% in 1994.

— In potatoes, yield level's in India at 15,000 kg. per hectare is good and equals that of world average. In U.S.A., yield rate was the highest at 37,394 Kg. per hectare in 1994. India ranked sixth in world production and her share in world production was only 5.7% in 1994.

— In tomatoes, yield per hectare is very low compared to any major producing country. Yield in U.S.A. was 63661 kg. per hectare.

— India is the largest producer of cauliflower in the world. Yield at 17778 Kg per hectare compares well with the world average of 17956 Kg. per hectare. In China yield was 25709 kg. per hecate in 1994.

— In India, yield rate of onion was low at 11026 kg. per hectare. In China it was 17407 Kg., in U.S.A. 44142 Kg., in Turkey 20000 kg. and in Iran 36607 kg. per hectare.

— Yields in peas and cabbages are very low in India compared with any major producing country.

C. GOVERNMENT OF INDIA'S EFFORTS

There is a vast potential for growing a larger variety of horticultural crops like fruits, vegetables, flowers, spices, cashewnut, coconut, arecanut, root and tuber crops, medicinal and aromatic plants etc. The diversity of physiographic, climatic and soil characteristics makes it possible to grow horticultural crops almost throughout the year.

Major Development Programmes in Central Sector

Fruits. The Central Sector Scheme on Integrated Development of Tropical, Arid and Temperate Zone Fruits was launched during VIII Five Year Plan with an outlay of Rs. 74 crore.

The Programmes envisaged under this scheme include: (a) establishment of big nurseries under public sector; (b) establishment of small district level nurseries under private sector, (c) setting up of tissue culture units under public and private sectors; (d) training of farmers, (e) establishment of oil extraction plants; (f) area expansion; (g) improving productivity; and (g) demonstration plots.

Between 1992 and 1995, 13 big nurseries, 188 small nurseries, 21 tissue culture units were established. 758 demonstration plots have been established and an area of 11,747 hactare under area expansion and 330,321 hactare under rejuvenation respectively were covered.

Vegetables. The production of vegetables, including potato, during 1993-94 was 650.90 lakh tonnes, covering an area of about 48.20 lakh ha. The production in the country is expected to increase significantly due to popularisation of hybrid seeds of various vegetables.

The Central Sector Scheme on Production and Supply of Vegetable Seeds is being implemented with VIII Plan outlay of Rs. 15 crore. The Scheme envisages distribution of vegetable seed mini-kits including seeds of hybrid varieties, production of foundation seed and setting up of hybrid seed production units in private sector.

Root and Tuber Crops. Root and tuber crops including potato have been identified as most important group of staple food in the tropical countries of the world. The production of potato alone during 1993-94 was 180.03 lakh tonnes. For promoting cultivation of root and tuber crops, a Central Sector Scheme is being implemented with VIII Plan outlay of Rs. 2.5 crore. The Scheme envisages setting up of Main/Sub Bio-centres, distribution of tuber seed mini-kits and laying out of demonstration plots in the States.

Mushroom. The Central Sector Scheme on Mushroom cultivation standard in VIII Five Year Plan with an outlay of Rs. 10 crore, aims primarily at creating the infrastructure and for spawn and pasteurised compost production and providing training to farmers for mushroom cultivation. Work is under progress for establishment of a total of 20 units each of spawn production and pastuerised compost and training of 800 farmers in 21 States/UTs.

Use of Plastics. The National Committee on use of Plastics in Agriculture (NCPA) was set up in 1981 for promoting use of plastic in agriculture. Its mandate is to provide research and training support to the State Governments through its Plasticulture Development Centers (PDCs), overseeing the implementation of the schemes on plasticulture and helping in transfer of technology. The NCPA has presently 11 PDCs mostly located in State Agricultural Universities. Six more new PDCs are being set up to cover the major States.

Total outlay of Rs. 250 crore has been made during VIII Five Year Plan for taking up various programmes for popularising use of plastics including drip irrigation, greenhouse, mulching etc. in horticultural crops.

Drip Irrigation. This is a method of irrigation in which the network of plastic pipes distribute required quantity of water directly to the root zone of the plants. It provides benefits in saving of water, reduction in weeds and increase in yield. A subsidy of 50 per cent subject to a maximum of Rs. 15,000 per farmer is offered on the

actual cost of the system. Additional 25 per cent financial help will be available to Government farms to enable them to demonstrate the working systems. It is expected to cover 30,743 hectares of land under drip irrigation installation and 4,782 hectares under the drip demonstration during 1995-96.

Greenhouse. There is a device to control micro environment for crop production. This helps in faster germination, raising of season crops, high value crops for exports, crops in harsh weather conditions, etc. It is proposed to set up polygreen houses over an area of 49.8 hectares with an outlay of Rs. 4.15 crore during 1995-96 with each beneficiary getting one unit of 500 sq. mts.

Mulching

A thin plastic film (20 to 200 microns) is spread around the plants to prevent the weed growth, conserve moisture, maintain soil texture and control soil borne diseases. A sum of Rs. 3.05 crore is being spent in 1995-96 to bring in an area of 6,100 hectares under mulching.

Schemes of the National Horticulture Board

The National Horticulture Board (NHB) is laying special emphasis on strengthening of post-harvest and marketing infrastructure. During the Eighth Five Year Plan, NHB has adopted a three-pronged strategy as follows:

i) to strengthen post-harvest infrastructure for minimising losses;

ii) to provide support services in establishment of national grid for marketing; and

iii) to induce advance technological input for increasing productivity and quality of horticulture produce, especially through high-tech projects for better economic returns to the farmers in domestic and export markets.

NHB has made efforts, through literature and campaigns, to create awareness about the schemes specially in the States where horticulture has potential but infrastructural facilities for post-harvest management and marketing are lacking. Special attention is being

given to the North East Hill Region and horticulturally non-traditional/ tribal areas of the country.

(a) **Integrated Project on Management of Post-Harvest Infrastructure of Horticultural Crops.** The project laid special emphasis on reducing the post-harvest losses. Under the project, assistance is provided for creation of post-harvest infrastructure such as grading/ packing facilities in the producing areas, increased use of plastic crates for handling the produce, transport facilities with particular emphasis on developing chain including establishment of cold storages, retail outlets etc., for direct marketing, and on other aspects where harvest losses could be minimised. Soft loan having service charge of 4 per cent is provided to the cooperative/corporate sector, registered/voluntary organisations, agro/horticulture corporations for creation of such post-harvest infrastructure facilities to a maximum extent of Rs. one crore. During 1995-96, 31 projects have been sanctioned for an amount of Rs. 12.68 crore for the establishment of 28 cold storages, 31 pre-cooling units, 33 refrigerated vans, 24 specialised transport vehicles and 11 grading/packing centres. 1,40,000 plastic crates have also been sanctioned.

(b) **Development of Market Infrastructure through Soft Loan.** The scheme focuses on creating integrated network for marketing of fruits, vegetables and flowers and promote exports of value-added products. Under the Scheme, soft loan upto 40 per cent of the loan portion limited to Rs. one crore per project for integrated project focusing on linkages between producers, processors and marketers is provided for introduction of high value addition, export enhancement, introduction of new processes technologies and strengthening of infrastructural facilities. During 1995-96, assistance has been sanctioned for 25 projects for an amount of Rs. 21.27 crore and 95 proposals amounting to Rs. 64.27 crore as NHB share are under consideration.

(c) **Introduction of New Technologies and Concepts in Horticulture.** Various research institutions/universities are developing technologies which have been tested at laboratory scale and they are found to be advantageous in increasing productivity and enhancing quality and shelf-life. In order to test these technologies and concepts on commercial scale, the scheme is being implemented from 1993-94. The scheme also envisages to popularise use of improved tools and equipments for better production and marketing. The

scheme also envisages creation of awareness through audio-visual aids, films, distribution of literature etc. During 1995-96, an amount of Rs. 3 crore is likely to be utilized.

(d) **Market Information Service Scheme for Horticultural Produce.** NHB makes available latest market price and trends of important horticulture commodities being traded in different wholesale markets of the country. Information is collected from 22 Market Information Centres and 11 Sub-Centres sourcing the information from wholesale/terminal fruits and vegetable markets. The information is disseminated on daily basis through mass media viz., Newspapers, All-India Radio and Doordarshan Kendras to a wide spectrum of beneficiaries. NHB also publishes monthly bulletin, Commodity Bulletins and market profiles for the benefit of user organisations.

(e) **Establishment of Nutritional Gardens in Rural Areas.** In order to increase production and consumption of fruits in rural areas, NHB provides each household upto 10 fruits plants suitable for growing in the respective areas near the dwelling unit/dugwell. During 1995-96, 52 lakh fruit plants are being distributed entailing an expenditure of Rs. 2.6 crore.

(f) **Transfer of Technology through Training and Visits to Research Stations/Progressive Farmers.** NHB provides financial assistance to State Governments for conducting visits to various research stations of progressive farmers in different areas.

D. EXIM POLICY

Units engaged in production in agriculture, aquaculture, animal husbandry, floriculture, horticulture, pisciculture, viticulture, poultry and sericulture and set up under the Export Oriented Units (EOUs) Scheme and Export Processing Zones (EPZ) Scheme are entitled to various benefits if the units undertake to export their entire production as per the Exim-Policy (1997-2002) of the country. Some of the benefits include.

— Duty free imports of all types of goods including capital goods required for manufacture, production or processing provided they are not prohibited items in the Negative List of imports.

— Units engaged in agriculture, horticulture and agro-related activities may sell upto 50% of the production in value terms in the DTA subject to positive net foreign exchange earning.

— Agriculture and export produce continue to be exempted from the income-tax.

— Airport and sea ports are being equipped with specialised cargo handling facilities for perishables and their capacity upgraded and modernised.

— APEDA is setting up a State-of-the-art cargo handling facilities for perishables at Delhi and similar facility is being set up in Mumbai.

— Walk-in-cold rooms have been installed at Calcutta, Madras, Bangalore and Trivandrum airports. Similar facilities are being provided at Ahmedabad, Hyderabad and Pune airports.

— APEDA provides technical and financial facilities.

— The Exim policy 1997-2002 provides incentive by granting Special Import Licence (SIL) to the exporters of fruits and vegetables from the North-Eastern region. The SIL helps the exporters to import goods which are denied in the normal course. These include principally the consumer goods for which there is considerable demand in the country.

— The Exim Policy 1997-2002 has granted an additional SIL entitlement for perishables like vegetables and fruits and floriculture projects. Double weightage will be given for agri-exports in calculating the eligibility of recognised exporters. The SIL entitlement will increase by one percent of the FOB value exports if perishables constitute more than 10 percent of the exports made by a company.

— As per the Exim policy, for the first time, the floor limit for zero duty import of capital goods under the EPCG Scheme has been lowered to Rs five crore for agriculture and allied sectors. Processing units would be major beneficiaries of the concession. Items like tractors, green house equipment and machinery for grading and sorting of agricultural commodities could also be imported duty free under the new facility. Earlier, the farm sector was not able to access the concessional window since the projects were not large enough to account for imports with Rs 20 crore.

— APEDA, under the Scheme for Post-Harvest Handling assists exporters including producers, growers, cooperative organisations and Federations, to set up facilities like sorting, grading, packaging, pre-cooling and storages. Financial assistance to the extent of 50 percent of the total capital cost subject to a ceiling of Rs 5 lakhs per beneficiary, is available as grant-in-aid under the scheme.

— APEDA assists in procuring specialised transport units like refrigerated vans necessary for perishables. The scale of assistance under the scheme is 25 percent subject to a ceiling of Rs 1.5 lakhs per unit.

1. To introduce better packaging, APEDA had developed standard specification for cardboard cartons to be used in packaging fruits, vegetables and flowers through the expert assistance of the Indian Institute of Packaging. To induce exporters to use such improved packaging material carrying the "Produce of India" label, APEDA assists in meeting a part of the cost of packaging development as well as a subsidy of 30 percent on the packaging cost upto an amount of Rs 1 lakh per beneficiary.

2. Quality is very important in exports and in order to introduce quality consciousness amongst the exporters, APEDA has scheme to promote quality control. Under these schemes, APEDA assists producers to set up/strengthen quality control laboratories as well as to avail of expert services for installing ISO-9000 and other recognised international Quality Control systems. So far none of the producers/ exporters in the field of horticulture or processed foods have got registration the ISO-9000 which would be mandatory in future for exporting to developed countries. It is hoped that the position would improve soon.

3. Exporters of fresh horticulture produce have since long complained of the high burden of airfreight which renders their products incompetitive in the international market. To enable our products to compete more effectively, APEDA has introduced an Airfreight Subsidy Scheme since September, 1993 through which it is reimbursing a part of the airfreight paid. However, due to financial constraints the scheme is applicable only to some selected fruits and cut flowers including tissue culture propagated plant material. The scale of subsidy given is 25% of the IATA rate subject to a maximum of Rs ten

per kg. for Europe and North America and Rs six per kg for West and South East Asia.

4. Finally, APEDA has worked out the comprehensive pre-harvest and post harvest protocols for various fruits and similarly manuals for pack-house practices has been developed. The premium quality exporters scheme under which the exporter having the facilities for scientific post harvest management and adopt good processing practices as detailed out in the pack house manuals are granted premium quality exporters status. Under this scheme, "Produce of India" logo will be given to these exporters and the logo will be aggressively promoted in the importing countries as a symbol of quality agro produce from India.

E. WHOLESALE AND RETAIL RATES—A COMPARISON

The retail rates are always more as compared to wholesale rates. The substantial difference in these prices is due to certain factors i.e. a substantial margin of international market functionaries, perishability of horticulture produce, distance between wholesale and retail markets, sale potential and several other allied factors. Even the retail rates vary significantly in various parts of the consuming areas due to large distance from wholesale/sub-wholesale markets, standard of living of residents in that locality, quality of produce etc. Retail rates of following five metropolitan cities have been compared empirically with wholesale prices prevailing in respective fruit and vegetable wholesale market of that city.

Delhi	National Dairy Development Board, Fruit & Vegetable Project, Booth No.1537, Shalimar Bagh, Delhi.
Bombay	Apna Bazar.
Bangalore	Horticultural Producers Cooperative Marketing and Processing Society.
Calcutta	Sealdah Market.
Madras	Corporation Fruit Market, Narayanappa Road, for fruits and Tanner Thurai Vegetable Market, No. 91, R.H. Road, Mylapore for vegetables.

The retail rates of selected fruit & vegetables in the five Metropolitan cities have been given as under :

Table 12
WHOLESALE & RETAIL RATES IN METROPOLITAN CITIES IN INDIA, APRIL 1996

Market Centres		1st WK.	2nd WK.	3rd WK.	4th WK.	Average Whole Sale Rates	Average Retail Rates
	W = Wholesale Rate per Quintal R = Retail Rate per Quintal						
1. APPLE							
Bangalore	W =	2,765	2,762	2,752	3,067	2,836	4,017
	R =	4,000	4,000	4,000	4,067		
Bombay	W =	2,200	2,281	2,250	2,281	2,253	4,000
	R =	4,000	4,000	4,000	4,000		
Calcutta	W =	2,168	2,478	2,115	2,672	2,358	3,129
	R =	2,731	3,179	2,886	3,720		
Delhi	W =	1,770	1,786	1,812	1,781	1,787	3,233
	R =	3,200	3,200	3,200	3,333		
Madras	W =	3,896	3,690	3,821	4,000	3,852	4,272
	R =	3,913	3,913	3,913	4,565	4,696	
2. BANANA							
Bangalore	W =	438	507	550	537	508	621
	R =	600	600	600	683		
Bombay	W =	330	340	370	390	358	920
	R =	880	880	960	960		
Calcutta	W =	626	587	636	730	645	1,221
	R =	1,200	1,094	1,209	1,380		
Delhi	W =	650	654	682	738	681	1,302
	R =	1,146	1,200	1,211	1,254		
Madras	W =	293	313	316	358	320	470
	R =	463	444	470	503		
3. GRAPES							
Bangalore	W =	1,655	1,877	2,371	—	1,971	2,925
	R =	2,625	3,150	3,000	—		
Bombay	W =	1,400	1,520	1,650	1,725	1,574	2,825
	R =	2,500	2,800	3,000	3,000		
Calcutta	W =	2,039	2,629	1,954	2,705	2,332	3,254
	R =	2,712	3,464	2,779	4,060		
Delhi	W =	2,562	2,750	2,571	2,688	2,643	2,994
	R =	2,600	3,085	2,857	3,433		
Madras	W =	1,875	2,143	2,219	—	2,079	3,333
	R =	3,000	3,400	3,600	—		

4.	LEMON							
	Bangalore	W =	1,380	1,386	1,433	1,500	1,425	3,478
		R =	3,500	3,557	3,457	3,400		
	Calcutta	W =	1,457	1,358	1,280	1,308	1,351	2,024
		R =	2,257	1,932	1,814	2,095		
	Delhi	W =	2,435	2,257	1,942	1,646	2,070	3,846
		R =	3,667	3,600	3,543	3,133		
	Madras	W =	2,083	2,083	1,728	1,833	1,932	3,332
		R =	3,000	3,000	3,328	4,000		
5.	MANDARIN							
	Bangalore	W =	709	787	804	947	812	1,886
		R =	1,600	1,657	1,786	2,500		
	Calcutta	W =	726	824	712	720	746	1,204
		R =	1,144	1,245	1,196	1,230		
	Delhi	W =	1,067	1,067	1,611	1,736	1,370	1,591
		R =	1,354	1,546	1,643	1,821		
6.	MOSAMBI							
	Bangalore	W =	1,225	1,335	1,532	1,450	1,386	2,236
		R =	1,750	2,229	2,400	2,567		
	Bombay	W =	730	750	730	800	752	2,200
		R =	2,000	2,000	2,400	2,400		
	Calcutta	W =	945	988	1,221	1,187	1,085	1,680
		R =	1,500	1,523	1,854	1,845		
	Delhi	W =	1,000	1,257	1,314	1,188	1,190	2,016
		R =	1,842	2,028	2,200	1,992		
	Madras	W =	1,172	1,546	1,600	1,750	1,517	1,858
		R =	1,640	1,800	1,834	2,160		
7.	POMEGRANATE							
	Bangalore	W =	600	678	742	1,100	780	1,285
		R =	1,200	1,300	1,300	1,340		
	Bombay	W =	1,228	1,200	1,285	1,250	1,241	1,950
		R =	1,800	2,000	2,000	2,000		
	Calcutta	W =	1,579	1,589	1,630	2,430	1,807	2,265
		R =	2,025	1,964	1,950	3,120		
	Delhi	W =	1,225	1,429	1,743	1,775	1,543	1,867
		R =	1,667	1,800	2,000	2,000		
8.	PAPAYA							
	Bangalore	W =	155	162	164	150	159	120
		R =	200	200	200	200		
	Calcutta	W =	404	439	412	467	430	
		R =	532	571	551	586		
	Delhi	W =	600	614	650	625	622	
		R =	1,000	1,000	1,000	1,000		

9.	SAPOTA							
	Bangalore	W =	938	871	895	955		
		R =	1,100	1,143	1,200	1,200		
	Bombay	W =	600	550	620	588	590	1,500
		R =	1,500	1,500	1,500	1,500		
	Calcutta	W =	825	946	1,016	1,097	974	1,524
		R =	1,081	1,471	1,689	1,855		
	Delhi	W =	647	721	730	757	714	1,428
		R =	1,200	1,436	1,528	1,550		
10.	POTATO							
	Bangalore	W =	448	492	448	677	516	680
		R =	660	660	666	733		
	Bombay	W =	390	460	500	540	472	725
		R =	600	700	800	800		
	Calcutta	W =	267	337	359	363	332	338
		R =	397	44	464	449		
	Delhi	W =	320	377	360	353	352	517
		R =	454	471	564	579		
	Madras	W =	492	500	541	622	539	925
		R =	900	900	900	1,000		
11.	ONION							
	Bangalore	W =	278	279	230	305	273	528
		R =	560	529	514	507		
	Bombay	W =	270	240	260	290	265	538
		R =	550	500	550	550		
	Calcutta	W =	385	429	442	416	418	669
		R =	686	676	637	678		
	Delhi	W =	400	433	400	361	398	576
		R =	600	575	582	546		
	Madras	W =	350	340	357	358	351	600
		R =	600	600	600	600		
12.	TOMATO							
	Bangalore	W =	169	173	150	192	171	269
		R =	235	260	251	330		
	Bombay	W =	530	460	475	450	479	1,100
		R =	1,200	1,000	1,000	1,200		
	Calcutta	W =	254	287	299	372	303	466
		R =	402	392	526	543		
	Delhi	W =	595	720	448	285	512	789
		R =	900	1,207	682	367		
	Madras	W =	197	209	187	200	198	475
		R =	500	450	450	500		

13.	OKRA							
	Bangalore	W =	775	831	678	756	760	946
		R =	1,020	1,023	906	833		
	Bombay	W =	1,100	1,150	1,170	1,120	1,135	2,200
		R =	2,200	2,200	2,400	2,000		
	Calcutta	W =	582	481	320	364	437	695
		R =	769	790	541	680		
	Delhi	W =	1,525	1,171	1,250	1,025	1,243	1,649
		R =	2,000	1,646	1,614	1,317		
	Madras	W =	350	350	352	341	348	778
		R =	700	814	700	900		
14.	BRINJAL							
	Bangalore	W =	220	275	252	220	242	426
		R =	480	300	466	460		
	Bombay	W =	300	330	370	340	335	900
		R =	1,000	1,000	800			
	Calcutta	W =	1,014	825	750	637	806	1,057
		R =	1,219	1,007	1,075	927		
	Delhi	W =	425	312	203	215	289	619
		R =	708	607	564	596		
	Madras	W =	94	187	233	187	525	
		R =	500	500	600	500		
15.	BITTERGOURD							
	Bangalore	W =	753	822	782	756	778	1,226
		R =	1,100	1,171	1,300	1,333		
	Calcutta	W =	696	611	491	421	555	828
		R =	919	849	795	747		
	Delhi	W =	662	1,051	988	850	888	1,651
		R =	1,633	1,914	1,657	1,400		
	Madras	W =	750	798	796	800	786	1,300
		R =	1,100	1,300	1,300	1,500		
16.	GINGER							
	Bangalore	W =	1,138	1,164	1,242	1,225	1,192	1,564
		R =	1,400	1,457	1,700	1,700		
	Bombay	W =	1,150	1,100	1,150	1,220	1,155	2,850
		R =	2,800	2,800	2,800	3,000		
	Calcutta	W =	871	918	1,030	1,012	958	2,203
		R =	1,850	2,118	2,646	2,380		
	Delhi	W =	1,116	1,019	909	754	950	2,649
		R =	2,767	2,628	2,600	2,600		
	Madras	W =	1,071	1,098	1,165	1,216	1,138	1,875
		R =	3,100	2,814	2,700	2,700		

17.	GARLIC							
	Bangalore	W =	700	817	771	850	784	1,800
		R =	1,800	1,800	1,800	1,800		
	Bombay	W =	760	830	850	880	830	2,600
		R =	2,000	2,400	3,000	3,000		
	Calcutta	W =	603	695	863	829	748	1,974
		R =	2,025	1,879	2,000	1,990		
	Delhi	W =	631	603	528	587	587	2,284
		R =	2,367	2,400	2,200	1,990		
	Madras	W =	1,430	1,300	1,323	1,350	1,351	2,828
		R =	3,100	2,814	2,700	2,700		
18.	CABBAGE							
	Bangalore	W =	254	273	316	388	308	594
		R =	520	529	629	700		
	Bombay	W =	370	320	400	340	358	1,100
		R =	1,200	1,000	1,200	1,000		
	Calcutta	W =	229	264	333	351	294	450
		R =	347	406	534	514		
	Delhi	W =	157	157	185	212	178	381
		R =	329	382	400	412		
	Madras	W =	183	225	276	279	241	650
		R =	500	700	700	700		
19.	CAULIFLOWER							
	Bangalore	W =	750	745	738	981	804	949
		R =	900	900	929	1,067		
	Bombay	W =	380	360	400	420	390	1,500
		R =	1,600	1,200	1,600	1,600		
	Delhi	W =	600	582	814	950	736	1,192
		R =	833	1,200	1,544	—		
20.	PEAS							
	Bangalore	W =	1,925	1,942	2,150	2,400	2,104	3,016
		R =	2,450	3,000	3,114	3,500		
	Delhi	W =	1,025	1,046	957	1,000	1,007	1,281
		R =	1,358	1,307	1,200	1,258		

F. EXPORTS

Exports of Fruits

The varied climatic and soil conditions in the country are facilitating production of a large variety of fruits viz., i) Temperate fruits, ii) Sub-tropical fruits and iii) Tropical fruits.

Temperate fruits include Apple, Pear, Peach, Plum, Apricot, Cherries, Almond, Prunes, Walnut, Strawberry. Sub-tropical fruits are oranges, grape fruit, Lime, Lemon, Litchi, Phalsa, Date, Fig, Grape, Guava, Avocado and pomegranate. The tropical fruits are Papaya, Cashew, Mango, Pineapple, Sapota, Mangosteen, Jackfruit and Bread fruit.

India is not only growing a large variety of fruits very successfully and substantially (India emerged as the largest producer of fruits in the world) but is also exporting to global markets. Relative to the huge production of fruits which is estimated at 394.7 lakh tonnes, exports at over one lakh tonnes constituted only 0.253 per cent in 1995-96. Broadly this points out to the huge potential India has in the export of fruits to global markets. India's share in World exports of vegetables and fruits was only 1.7 percent in 1994.

About 40 kinds of fruits are exported from the country. There is an impressive growth in the exports of fresh fruits from Rs 184.53 crore in 1994-95 to Rs 229.96 crore in 1995-96. Exports of fruits registered a spectacular growth at 24.6% in 1995-96 over 1994-95. Percentage growth was only 2.8 in 1994-95 over 1993-94. While exports of fresh fruits from India are shown in Annexure V, the following table shows exports of major fruits from the country.

Table 13
EXPORTS OF MAJOR FRESH FRUITS FROM INDIA

Qty: Tonnes
Val: Rs. lakhs

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Walnuts	6326.1	6717.9	6459.0	6063.9	6925.7	8240.4
Grapes, fresh	15928.7	3390.0	16813.4	4049.0	22150.9	5357.0
Mangoes	22793.9	4387.3	25414.4	4502.3	22269.2	3851.9
Oranges, fresh	5986.9	359.5	11764.7	665.5	17767.6	1365.7
Apples	5987.7	666.9	6507.6	678.0	9271.0	976.5
Pomegranates	2623.2	367.2	4144.5	559.4	4255.2	653.1
Tamarind, fresh	3926.9	253.4	2422.2	190.5	5929.8	499.3
Water melons	8624.5	409.5	7959.4	463.5	7040.0	351.9
Sapota	2007.9	213.8	2600.4	268.5	2328.2	255.8
Banana, fresh	1081.1	147.3	966.1	89.6	1744.0	222.1
Sultanas and other dried grapes	2.2	1.7	58.2	28.9	234.0	104.5
Total of Major Fruits	**75294.1**	**16914.5**	**85109.9**	**17559.1**	**99915.6**	**21878.2**
Total of All Fruits	**84832.9**	**17944.1**	**94713.0**	**18452.6**	**109704.2**	**22996.2**

Source : DGCI&S, Calcutta

Percentage growth in exports of major fruits is shown in the following table.

Table 14
PERCENTAGE GROWTH IN EXPORTS OF FRUIT
(IN VALUE TERMS)

	In Percentage growth/ decline over previous year	
	1994-95	**1995-96**
Walnuts	-7.4	35.9
Grapes, fresh	19.4	32.3
Mangoes	2.6	14.5
Oranges, fresh	85.1	105.2
Apples	1.7	44.0
Pomegranates	52.3	16.8
Tamarind, fresh	- 24.9	162.1
Water melons	13.2	- 24.1
Sapota	25.5	- 4.8
Banana, fresh	- 39.2	47.9
Sultanas & other dried grapes	1600.0	261.6

— Growth in exports is clearly evident in respect of Fresh Grapes, Fresh Oranges, Apples, Pomegranates and Sultanas & other dried grapes.

— In the case of Walnuts, Mangoes, Fresh Tamarind, Water Melons, Sapota and Fresh Bananas there is instability in markets.

Market

The following table indicates major fresh fruits from the export point of view and the major markets.

Table 15
EXPORTS OF MAJOR FRESH FRUITS AND MAJOR MARKETS

Walnuts	:	Spain, France, Germany, Netherlands, Greece, UK, Egypt, Italy, USA and Switzerland
Grapes, fresh	:	U.K., U.A.E., Netherlands, Bangladesh, Belgium and Saudi Arabia
Mangoes	:	U.A.E., Saudi Arabia, Kuwait, U.K., Singapore, Netherlands, Bangladesh
Oranges, fresh	:	Bangladesh, U.K. and Mauritius
Apples	:	Bangladesh, Sri Lanka and Nepal
Pomegranates	:	U.A.E., Bangladesh, Saudi Arabia, U.K., Bahrain, Kuwait and Netherlands
Tamarind, fresh	:	Pakistan, Sri Lanka, Germany, Switzerland, Yemen Arab Republic and Saudi Arabia
Water Melons	:	U.A.E., Maldives, Pakistan and Italy
Sapota	:	Saudi Arabia, U.A.E., Bahrain, Kuwait, U.K and Qatar
Bananas, fresh	:	Netherlands, Russia, U.S.A., Qatar, Pakistan and U.A.E.
Sultanas & Other dried grapes	:	U.K., Germany, Saudi Arabia, Netherlands, Bangladesh and Sri Lanka

Walnuts

Exports of walnuts fluctuated during the period 1993-94 to 1995-96. In 1995-96, however, exports recorded a level of Rs 82.40 crore, the highest in the whole category of fruits. The following table indicates exports of Walnuts to major markets.

Table 16
EXPORTS OF WALNUTS FROM INDIA - BY MAJOR MARKETS

Qty : Tonnes
Val : Rs Crore

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Spain	952.9	10.77	654.0	7.00	1029.8	14.26
France	783.4	7.96	791.0	6.66	1071.9	12.77
Germany	756.2	9.01	1017.2	10.94	892.7	10.81
Netherlands	451.2	5.64	604.2	5.76	740.2	9.96
Greece	621.1	6.79	673.1	6.30	709.5	8.02

U.K	1217.0	10.05	967.3	6.91	922.2	7.37
Egypt	226.6	2.96	300.0	3.56	270.0	3.83
Italy	134.0	1.54	341.4	2.41	271.0	3.19
U.S.A	316.7	3.56	62.8	0.63	167.0	2.11
Switzerland	30.0	0.36	27.0	0.26	107.5	1.60
Denmark	192.8	1.94	183.8	1.63	144.1	1.59
Portugal	49.9	0.58	98.7	1.12	99.4	1.45
Jordan	83.0	0.81	177.5	1.53	94.8	1.10
Total (incl. others)	**6326.1**	**67.18**	**6459.1**	**60.64**	**6925.7**	**82.40**

Note : Walnuts are exported from the country both in 'Kernals' and in Shell froms. About 95% of exports of however, are in Kernals form. This table provides combined total of walnuts in shell and walnuts kernals.

Source : DGCI&S, Calcutta

Walnuts are exported to about 30 countries. Developed countries are the major market. Spain, France, Germany, Netherlands, U.K. are principal markets.

Average Unit value Realisation on exports of Walnuts was Rs 119 per kg in 1995-96. The following table indicates Unit Value Realisation in selected markets.

Table 17
UNIT VALUE REALISATION ON EXPORTS OF WALNUTS
(1995-96)

(Rs. per kg.)

Spain	:	138.48
France	:	119.16
Germany	:	121.14
Netherlands	:	134.49
Greece	:	113.49
U.K	:	79.94
Egypt	:	142.01
Italy	:	117.59
U.S.A	:	126.16
Switzerland	:	149.29

Grapes, fresh

India is exporting fresh grapes to a large number of countries. Exports have grown to reach a level of Rs 54.76 crore in 1995-96 from Rs 33.93 crore in 1993-94 and Rs 40.85 crore in 1994-95.

The ratio of growth in exports of fresh grapes was very impressive. It was 20.3 per cent in 1994-95 over the previous year and 34.1 per cent in 1995-96 over 1994-95. The following table indicates exports of fresh grapes to major markets.

Table 18
EXPORTS OF FRESH GRAPES FROM INDIA - BY MAJOR MARKETS

Qty : Tonnes
Val : Rs. crore

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
UK	2694.1	7.90	7063.6	19.90	7766.1	23.00
U.A.E	6749.4	14.89	4398.8	10.88	4852.1	14.06
Netherlands	184.4	0.57	532.3	1.50	2037.2	5.64
Bangladesh	2558.4	2.70	2399.1	2.50	4582.3	4.51
Belgium	33.6	0.14	31.2	0.05	849.7	2.31
Saudi Arabia	2499.1	4.96	962.7	2.19	938.7	1.65
Total (incl. others)	**15931.6**	**33.93**	**16877.0**	**40.85**	**22414.0**	**54.76**

Major export markets for grapes include UK, UAE, Netherlands, Bangladesh, Belgium and Saudi Arabia. These six countries together accounted for 93.4 per cent of total exports in 1995-96.

Average Unit Value Realisation on exports of fresh grapes was Rs 24.4 per kg. in 1995-96. The following table indicates Unit Value Realisation in selected markets.

Table 19
UNIT VALUE REALISATION ON EXPORTS OF FRESH GRAPES (1995-96)

(Rs. per kg.)

UK	:	29.62
U.A.E	:	28.98
Netherlands	:	27.71
Bangladesh	:	9.85
Belgium	:	27.12
Saudi Arabia	:	17.60
Germany	:	25.36
South Africa	:	25.33
France	:	47.30

Other markets to which fresh grapes were exported from the country included Kuwait, Sri Lanka, Bahrain, Germany, South Africa, Qatar, Hong Kong, France, Pakistan, Kenya, USA, Oman, Malaysia, Switzerland, Mauritius, Canada, Nepal, Seychelles, Singapore, Sweden, Norway, Maldives and Mali.

Mangoes Fresh

Fresh mango exports are fluctuating. Exports declined to Rs 38.52 crore in 1995-96 from Rs 45.03 crore in 1995-96 and Rs 43.87 crore in 1993-94. The decline in 1995-96 was both in terms of quantity and value. The following table shows exports of fresh mangoes from the country to major markets.

Table 20
EXPORTS OF FRESH MANGOES FROM INDIA-
BY MAJOR MARKETS

Qty : Tonnes
Val : Rs Crore

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
UAE	10172.5	20.23	10004.4	21.09	10899.1	19.13
Saudi Arabia	4260.8	8.48	4961.1	9.36	4631.1	6.56
Kuwait	1691.6	4.25	1053.6	1.97	1427.0	2.80
U.K	1032.2	2.68	1218.2	2.16	1269.1	2.62
Singapore	149.2	0.47	328.1	0.76	349.9	1.38
Netherlands	353.2	0.97	293.5	0.74	322.2	1.24
Bangladesh	1667.8	1.14	4907.0	3.85	1443.0	1.09
Total (incl. others)	**22793.9**	**43.87**	**25414.4**	**45.03**	**22269.2**	**38.52**

Source: DGCI&S, Calcutta

India is exporting fresh mangoes to more than 50 countries. Over 90 percent of exports are directed to seven countries viz. UAE, Saudi Arabia, Kuwait, UK, Singapore, Netherlands and Bangladesh.

The average unit value realistion on export of fresh mangoes was Rs 17.3 per kg in 1995-96. The unit value realisation in selected markets in 1995-96 is shown in the following table.

Table 21
UNIT VALUE REALISATION ON EXPORT OF FRESH MANGOES (1995-96)

(Rs. per kg.)

U.A.E	:	17.55
Saudi Arabia	:	14.18
Kuwait	:	19.65
U.K	:	20.64
Singapore	:	39.56
Netherlands	:	38.49
Bangladesh	:	7.58
Bahrain	:	13.39
Malaysia	:	26.93
Qatar	:	11.64
U.S.A	:	23.69
South Africa	:	30.45

Other countries to which fresh mangoes were exported from the country included Bahrain, Malaysia, Qatar, U.S.A., South Africa, Switzerland, Germany, France, Oman, Hong Kong, Australia, Canada, Indonesia, Belgium, Netherlands Antillas, Mauritius, Maldives, Brunei, Argentina, Seychelles, Kenya, Sweden, Bhutan, Nepal, Portugal, Burundi, Ukraine, Austria, Japan, Yemen, Arab Republic, Sri Lanka, Thailand, Italy, Slovenia and Syrian Arab Republic.

Oranges, fresh Exports of oranges in fresh form are on the increase. Exports reached a level of Rs 13.65 crore in 1995-96 registering 105% growth over the previous year. The following table shows exports of oranges in fresh form from the country to major markets.

Table 22
EXPORTS OF FRESH ORANGES FROM INDIA - BY MAJOR MARKETS

Qty : Tonnes
Val : Rs. Crore

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Bangladesh	5834.9	335.44	11202.4	620.58	16899.1	1256.93
U.K	—	—	3.1	1.16	340.8	46.33
Mauritius	49.4	7.07	107.8	12.02	76.8	21.07
Sri Lanka	17.5	2.32	33.2	3.07	111.3	11.37
Saudi Arabia	38.5	8.47	40.8	4.21	60.0	.28
Bhutan	—	—	10.0	0.83	83.1	5.89
Total (incl. others)	**5986.9**	**359.53**	**11764.7**	**665.5**	**17767.6**	**1365.72**

Source: DGCI&S, Calcutta

Bangladesh is the major market as it alone accounted for 92 percent of India's total exports of oranges in fresh form in 1995-96. Other markets in the neighbourhood included Sri Lanka, Bhutan and Nepal. Exports are also directed to Saudi Arabia, U.A.E., Kuwait, Oman, Qatar and Bahrain in the Middle East.

Average Unit Value Realisation on export of fresh oranges was Rs 7.69 per kg. in 1995-96. The Unit Value Realisation in selected markets is shown in the following table.

Table 23
UNIT VALUE REALISATION ON EXPORT OF FRESH ORANGES (1995-96)

(Rs. per kg.)

Bangladesh	:	7.40
U.K	:	13.56
Mauritius	:	27.43
Sri Lanka	:	10.21
Saudi Arabia	:	13.80
Bhutan	:	7.09
Hong Kong	:	32.42
U.A.E	:	11.35

Apples

Exports of apples increased from Rs 6.78 crore in 1994-95 to Rs 9.77 crore in 1995-96, registering 44.1% growth over the previous year. The following table shows exports of apples from the country to major markets.

Table 24
EXPORTS OF APPLES FROM INDIA - BY MAJOR MARKETS

Qty : Tonnes
Val : Rs Lakhs

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Bangladesh	4369.3	421.52	5394.1	527.84	8512.6	875.42
Sri Lanka	1564.7	239.67	1070.6	144.97	657.1	86.92
Nepal	31.5	2.51	3.0	0.42	48.9	7.09
Total (incl. others)	**5987.7**	**666.88**	**6507.6**	**678.04**	**9271.0**	**976.53**

Source : DGCI&S, Calcutta

Bangladesh is the major market as it alone accounted for 89. percent of total exports of apples from the country in 1995-96. There are also exports to Sri Lanka, Nepal, U.A.E., Oman, Saudi Arabia, Kuwait and Qatar and some of the European countries but these markets together constituted about 10 per cent of total exports.

Average unit value Realisation on export of apples is Rs 10.53 per kg. Unit value Realisation in selected markets is shown in the following table.

Table 25
Unit Value Realisation on Export of Apples (1995-96)

(Rs. per kg.)

Bangladesh	:	10.28
Sri Lanka	:	13.22
Nepal	:	14.50
St. Kitts Nevish	:	10.38
U.A.E.	:	10.07
U.K.	:	24.67
Oman	:	27.95
Saudi Arabia	:	14.44

Pomegranates

India is exporting pomegranates to a large number of countries. Exports are valued at Rs. 6.54 crore in 1995-96. The following table indicates exports of Pomegranates from the country to major markets.

Table 26
EXPORTS OF POMEGRANATES FROM INDIA - BY MAJOR MARKETS

Qty : Tonnes
Val : Rs Lakhs

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
U.A.E	1300.7	179.24	1737.9	265.44	1553.7	287.08
Bangladesh	337.2	35.40	1019.6	89.76	1438.8	134.04
Saudi Arabia	586.0	88.49	834.4	118.48	635.1	90.46
U.K.	9.1	1.97	76.9	13.81	185.5	56.32
Total (incl. others)	**2623.2**	**367.16**	**4144.5**	**559.4**	**4255.2**	**653.12**

Source : DGCI & S, Calcutta.

U.A.E., Bangladesh and Saudi Arabia together accounted for 87% of total exports of pomegranates.

Average unit value Realisation on exports of Pomegranates was Rs. 15.35 per kg. in 1995-96. Unit value Realisation in respect of selected markets is given in table below.

Table 27
UNIT VALUE REALISATION OF EXPORT OF POMEGRANATES (1995-96)

(Rs. per kg.)

U.A.E.	18.49
Bangladesh	9.32
Saudi Arabia	14.24
U.K.	30.36
Bahrain	20.86
Kuwait	15.45
Netherlands	34.15

Tamarind, Fresh

Fresh tamarind is exported from the country to a large number of markets both in Asia and Europe. Exports increased significantly to reach a level of Rs 4.99 crore in 1995-96 from Rs. 1.9 crore in 1994-95.

The following table indicates exports of Tamarind in fresh form from India.

Table 28
EXPORTS OF FRESH TAMARIND FROM INDIA - BY MAJOR MARKETS

Qty: Tonnes
Val: Rs Lakhs

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Pakistan	3261.5	178.31	1577.0	102.89	4686.2	384.66
Sri Lanka	—	—	44.0	4.45	751.3	53.09
Germany	38.0	447.54	93.2	12.55	83.3	12.06
Switzerland	—	—	40.0	3.44	76.0	8.84
Yemen Arab Rep.	110.0	14.42	30.0	3.72	50.0	6.60
Saudi Arabia	138.4	10.46	19.1	2.40	42.4	6.07
Total (incl. others)	**3926.9**	**253.41**	**2422.2**	**190.46**	**5929.8**	**499.33**

Source : DGCI &S., Calcutta.

Pakistan has been the largest market for tamarind in fresh form from India. It alone accounted for 77 per cent of total exports of tamarind in fresh form in 1995-96 from the country. Sri Lanka and Germany are the two other important markets. These three markets together accounted for 90% of exports of tamarind from the country.

Unit Value Realisation on exports of tamarind in fresh form was Rs 8.42 per kg. in 1995-96. The following table provides unit value Realisation on exports of tamarind from the country.

Table 29
UNIT VALUE REALISATION ON EXPORTS OF TAMARIND IN FRESH FROM THE COUNTRY (1995-96)

(Rs. per Kg.)

Pakistan	:	8.21
Sri Lanka	:	7.07
Germany	:	14.48
Switzerland	:	11.63
Yemen Arab Republic	:	15.20

Water Melons

Water Melons are exported from the country largely to countries in the region. Exports are, however, around Rs 4 crores and in 1995-96, exports actually declined to Rs 3.5 crore from Rs 4.6 crore in 1994-95. The following table indicates the position.

Table 30
EXPORTS OF WATER MELONS FROM THE COUNTRY - BY MAJOR MARKETS

Qty: Tonnes
Val: Rs Lakhs

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty.	Val
U. A.E.	8304.1	389.93	7308.3	404.45	6444.6	311.62
Maldives	66.9	4.24	231.5	19.94	252.1	12.94
Pakistan	12.0	1.62	60.4	5.30	80.8	7.76
Total (incl. others)	**8624.5**	**407.46**	**7959.4**	**463.53**	**7040.0**	**351.88**

Source : DGCI &S, Calcutta.

U.A.E., is the only major market which accounted for 88.6 per cent of the total exports of water Melons from the country in 1995-96. Maldives, Pakistan, Bahrain, Iran and Nepal are important markets in the region. Italy, Netherlands and UK are important market in Europe.

Average Unit Value Realisation on exports of water Melons was Rs 4.99 per kg. in 1995-96. Unit value Realisation from U.A.E. was Rs 4.83 per kg in 1995-96.

Sapota

Sapotas are exported largely to countries in the Asian region. Total exports are around Rs 2.5 crore per annum. Following table shows exports of sapotas from the country by major markets.

Table 33
EXPORTS OF SAPOTAS FROM THE COUNTRY - BY MAJOR MARKETS

Qty: Tonnes
Val: Rs Lakhs

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Saudi Arabia	263.2	28.92	332.2	33.95	637.2	90.86
U.A.E.	804.1	82.71	1005.2	111.03	719.0	63.20
Bahrain	448.5	46.51	501.6	55.22	443.3	44.56
Kuwait	67.7	8.48	158.6	14.55	196.0	23.19
U.K.	116.5	13.48	170.8	15.98	109.9	11.33
Qatar	209.3	23.16	218.1	17.18	125.5	10.42
Total (incl. others)	**2007.9**	**213.78**	**2600.4**	**268.50**	**2328.2**	**255.84**

Source : DGCI & S, Calcutta.

More than 90 per cent of exports of Sapotas are directed to Saudi Arabia, U.A.E., Bahrain, Kuwait and Qater.

Average Unit Value Realisation on exports of Sapotas from the country was Rs 10.99 per kg. in 1995-96. Unit Value Realisation in selected markets is as follows.

Table 32
UNIT VALUE REALISATION ON EXPORT OF SAPOTAS (1995-96)

(Rs. per kg.)

Saudi Arabia	:	14.26
U.A.E.	:	8.79
Bahrain	:	10.05
Kuwait	:	11.83
Qatar	:	8.30

Bananas, Fresh

Exports of bananas relative to production and variety are very limited from the country. Obviously bananas from India are not popular. Exports are directed mainly to Europe and Middle East countries. The following table indicates exports of Bananas in fresh form by major markets.

Table 33
EXPORTS OF BANANAS FROM THE COUNTRY - By MAJOR MARKETS

Qty : Tonnes
Val : Rs Lakhs

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Netherlands	442.7	63.60	133.8	19.52	716.7	110.76
Russia	96.7	17.30	95.5	21.74	143.3	31.78
U.S.A.	0.2	2.00	5.0	1.34	78.4	20.89
Qatar	30.5	3.23	131.9	10.88	98.7	8.68
Pakistan	—	—	—	—	129.3	7.79
Total (incl. others	**1086.1**	**147.31**	**966.1**	**89.56**	**1744.0**	**222.09**

Source : DGCI & S, Calcutta.

While Netherlands and Russia are important markets, exports are directed in small quantities to West Asian markets including Qatar, UAE, Saudi Arabia, Bahrain, Jordan, Kuwait and Oman. There was significant increase in exports to USA in 1995-96. Equally significant was the export to Pakistan, South Africa and France.

Average Unit Value Realisation on exports of bananas was Rs 12.73 per kg. in 1995-96. Unit value Realisation in Selected Markets is shown in the following table.

Table 34
UNIT VALUE REALISATION ON EXPORT OF FRESH BANANAS (1995-96)

(Rs. per kg.)

Netherlands	:	15.46
Russia	:	22.17
U.S.A.	:	26.65
Qatar	:	8.79
Pakistan	:	6.02
U.A.E	:	11.09
South Africa	:	19.27
Germany	:	15.65

Sultanas & other Dried Grapes

Apart from fresh grapes, India has Sultanas & other dried grapes and Raisins which are value-added products. While the Average Unit Value Realisation on the export of fresh grapes was only Rs 24.4 per kg., the UVR was Rs 44.6 per kg. on export of sultanas and other dried grapes and Rs 49.6 per kg. on Raisins.

From a modest export of Rs 1.66 lakhs in 1993-94, exports increased to Rs 28.94 lakhs in 1994-95 and zoomed to Rs 1.04 crore in 1995-96. The following table indicates exports of Sultanas & other dried grapes from the country.

Table 35
EXPORTS OF SULTANAS & OTHER DRIED GRAPES FROM INDIA - BY MAJOR SELECTED MARKETS

Qty : Tonnes
Val : Rs Lakhs

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
UK	—	—	—	—	187.2	84.26
Germany	—	—	—	—	15.5	5.16
Saudi Arabia	—	—	—	—	12.4	5.05
Netherlands	—	—	—	—	14.5	4.84
Bangladesh	—	—	—	—	3.4	3.40
Srilanka	—	—	—	—	0.8	1.08
U.A.E.	0.8	0.78	30.0	11.21	0.2	0.47
Oman	0.5	0.31	2.2	2.97	neg.	0.20
Kuwait	—	—	13.3	5.94	—	—
Hong Kong	—	—	10.2	5.06	—	—
Bahrain	—	—	2.5	3.76	—	—
Total (incl. others)	**2.2**	**1.66**	**58.2**	**28.94**	**233.97**	**104.46**

Source : DGCI & S., Calcutta.

UK emerged as the major market for Sultanas & other dreid grapes from India in 1995-96. Germany and Netherlands also imported but in small quantities. Middle-East countries are also important markets.

Average Unit Value Realisation was Rs 44.65 per kg. in 1995-96 on export of Sultanas. Unit Value Realisation from selected market is as follows:

Table 36
UNIT VALUE REALISATION ON EXPORT OF SULTANAS
(1995-96)

(Rs. per kg.)

UK	:	45.00
Germany	:	33.39
Saudi Arabia	:	40.71
Netherlands	:	33.71
Bagladesh	:	101.28
Sri Lanka	:	137.97
U.A.E.	:	237.15
Oman	:	651.67

Export of Vegetables

A large variety of vegetables are exported from the country mainly in fresh form and partly in frozen form. Onions, potatoes, cucumbers/gherkins, mushrooms, garlic, peas and mixed vegetables are the major items. In addition, exports of potatoes and mixed vegetables in frozen form are significant.

Exports of vegetables from the country are growing every year. Exports reached a record level of Rs. 301 crore in 1995-96 as against Rs. 294 crore in 1994-95 and Rs. 206 crore in 1993-94. The growth rate in exports is 21 per cent per annum.

Exports of frozen vegetables too are growing but their rate of export growth is lower 13 to 15 per cent as against 21 per cent in the case of fresh vegetables.

The following table shows exports of major fresh and frozen vegetables from the country. Details of all vegetables exported from the country are shown in Annexure VI. Exports of major fresh and frozen vegetables from India are shown in the following table:

Table 37
EXPORTS OF FROZEN MIXED VEGETABLES FROM INDIA - BY MAJOR MARKETS

Qty : Tonnes
Val: Rs. Crore

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Onions, fresh	357.10	182.7	401.30	204.6	351.00	230.7
Potatoes, fresh	7.09	2.1	15.76	6.7	34.49	18.9
Cucumbers & gherkins, fresh	0.18	0.2	1.10	1.8	5.01	6.5
Mushrooms, fresh	0.04	0.2	0.29	1.7	2.56	6.4
Garlic	2.09	1.6	0.42	0.4	3.52	3.3
Peas	Neg.	Neg.	0.32	0.7	0.56	1.2
Mixed vegetables	6.73	5.5	8.59	7.5	14.28	12.1
Potatoes, frozen	1.98	1.1	5.68	4.4	3.88	2.9
Other vegetables, fresh/chilled	4.04	2.7	6.13	4.8	7.18	5.6
Mixed vegetables, frozen	10.02	8.7	7.69	7.3	9.90	10.4
Total	**389.27**	**204.8**	**447.28**	**239.9**	**431.38**	**298.0**
Total (incl. others)	**390.50**	**206.0**	**459.83**	**248.7**	**434.40**	**301.2**

Source: DGCI&S, Calcutta

— 93% of exports of vegetables are in fresh form in 1995-96

— 70% of exports of vegetables are in frozen form in 1995-96.

— Fresh onions alone accounted for a share of 76.6% in the total exports of vegetables from the country in 1995-96.

— Next only to onions are potatoes as they accounted for a share of 6.3 per cent in total export of vegetables.

In the following pages, commoditywise export and their direction are discussed.

Onions, fresh

Fresh onions are exported to nearly 30 countries. Exports are increasing year after year particularly in value terms. Exports in 1995-96 amounted to Rs. 231 crore registering a growth of 12 per cent over the 1994-95. The following table shows exports of fresh onions from the country to major markets.

Table 38
EXPORTS OF FRESH ONIONS FROM INDIA

Qty : Tonnes
Val : Rs. Crore

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Malaysia	51.1	33.0	89.9	50.7	89.3	63.7
UAE	105.59	43.3	151.2	65.8	101.9	56.6
Singapore	36.18	26.8	42.4	29.6	41.6	42.3
Sri Lanka	37.7	23.6	54.9	26.8	63.6	37.6
Bangladesh	82.0	35.7	12.1	5.8	31.2	17.8
Saudi Arabia	22.8	10.9	20.1	8.9	8.4	3.8
Mauritius	5.6	3.1	5.2	2.4	6.1	3.5
Bahrain	4.5	2.2	5.6	2.6	2.4	1.5
Kuwait	4.0	1.8	1.5	0.7	2.1	1.1
Total (incl. others)	**357.1**	**182.7**	**401.3**	**204.6**	**351.00**	**230.7**

Source: DGCI&S, Calcutta.

Malaysia, UAE, Singapore, Sri Lanka and Bangdladesh are the major markets as these five countries together imported fresh onions valued at Rs. 218 crore in 1995-96 and accounted for 94 per cent of India's total exports of fresh onions.

While the average unit value realisation on export of fresh onions was Rs. 6.58 per kg., there were different value realisations from different markets. The Unit Value Realisation in respect of selected markets in 1995-96 is shown in the following table:

Table 39
UNIT VALUE REALISASTION ON EXPORTS OF FROZEN MIXED VEGETABLES (1995-96)

(Rs. per kg)

Malaysia	:	7.13
UAE	:	5.55
Singapore	:	10.17
Sri Lanka	:	5.91
Bangladesh	:	5.70
UK	:	7.09
Netherlands	:	5.33

Other countries to which fresh onions were exported from the country included Malaysia, Burundi, Seychelles, Reunion, Netherlands, Russia, UK, Nepal, Qatar, Germany, Trinidad and Tobago, Indonesia, Ethiopia, USA, France, South Africa, Australia, Japan, Canada, Pakistan, Oman, Kenya, Hong Kong, Israel, Malawi, Switzerland and Mozambique.

Potatoes, Fresh

There has been a significant jump in the export of potatoes, in fresh form, from the country. Exports reached a record level of Rs. 18.89 crore in 1995-96, an increase of over 280% over exports at Rs. 6.69 crore in 1994-95. The following table indicates exports of fresh potatoes from the country.

TABLE 40
EXPORTS OF FRESH POTATOES FROM INDIA - BY MAJOR MARKETS

Qty : Tonnes
Val : Rs. Crore

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Sri Lanka	—	—	2605.4	1.39	7224.7	4.94
Russia	—	—	—	—	7000.0	4.25
UAE	1359.2	0.68	2644.0	1.18	4634.0	2.55
Turkey	—	—	—	—	3701.0	2.14
Mauritius	150.0	0.09	2995.0	1.58	3222.5	1.89
Nepal	2398.0	0.56	5054.5	1.16	6230.4	1.54
Total (incl. others)	**7092.8**	**2.13**	**15755.4**	**6.69**	**34490.5**	**18.89**

Source : DGCI&S, Calcutta

Sri Lanka, Russia, UAE, Turkey, Mauritius and Nepal are the major markets for fresh potatoes from India. These six markets together accounted for about 92 per cent of India's total exports of potatoes in 1995-96. In respect of markets such as Russia and Turkey there was no regularity in the offtake.

Average Unit Value Realisation on exports of fresh potatoes was Rs. 5.48 per kg in 1995-96. The following table indicates Unit Value Realisation in respect of selected markets.

TABLE 41
UNIT VALUE REALISATION ON EXPORTS OF FRESH POTATOES (1995-96)

(Rs. per kg)

Sri Lanka	6.82
Russia	6.07
UAE	5.50
Turkey	5.78
Mauritius	5.87
Nepal	2.47
Pakistan	3.86
Singapore	6.04

Other markets for fresh potatoes included Pakistan, Singapore, Maldives, Seychelles, Malaysia, UK, Bangladesh, Saudi Arabia, Indonesia and Bahrain.

Mushrooms Fresh

There has been a spurt in the export of mushrooms from the country. Exports increased phenomenally from Rs. 19 lakhs in 1993-94 to Rs. 174 lakhs in 1994-95 to Rs. 640 lakhs in 1995-96. The rate of growth in exports in 1995-96 was 220 per cent over the previous year. The following table indicates exports of mushrooms in fresh form to major markets from India.

Table 42
EXPORTS OF FRESH MUSHROOMS FROM INDIA - BY MAJOR MARKETS

Qty : Tonnes
Val : Rs. Crore

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
USA	19.0	5.9	90.4	48.9	816.7	346.1
Netherlands	—	—	111.0	50.34	09.5	160.8
Israel	—	—	—	—	156.0	57.2
Canada	—	—	—	—	96.0	3.2
Russia	—	—	11.5	18.8	15.0	9.1
Italy	—	—	—	—	12.0	8.3
Kuwait	—	—	19.0	6.4	20.0	7.5
Philippines	—	—	—	—	18.5	7.3
Oman	—	—	—	—	1.2	1.5
Total (incl. others)	**41.5**	**19.0**	**289.7**	**173.7**	**1559.6**	**639.9**

Source: DGCI&S, Calcutta

USA, Netherlands and Israel together accounted for over 88 per cent of India's total exports in 1995-96. USA alone accounted for 54 per cent.

The Average Unit Value Realisation on exports of Mushrooms in 1995-96 was Rs. 41 per kg. The following table indicates Unit Value Realisation in respect of selected markets:

Table 43
UNIT VALUE REALISASTION ON EXPORTS OF MUSHROOMS (1995-96)

(Rs. per kg)

USA	42.43
Netherlands	39.28
Israel	36.64
Canada	33.20
Russia	60.79
Italy	68.94
Kuwait	37.74
Philippines	39.12
Oman	123.98
France	117.19
UAE	72.80

In previous years, India exported aiso to Germany, Switzerland, Sweden, Saudi Arabia and Bahrain. In 1995-96, there were, however, no exports to these markets.

Cucumbers & Gherkins, Fresh

There has been a spectacular increase in the export of cucumbers & gherkins in fresh form from the country during the last three years. Exports spurted from a modest Rs. 17.62 lakhs in 1993-94 to Rs. 178.05 lakhs in 1994-95, over 1,000 per cent increase. Again exports escalated to Rs. 645.5 lakhs in 1995-96, registering a growth of 362%. The following table indicates exports of fresh cucumbers & gherkins to major markets.

Table 44
EXPORTS OF FRESH CUCUMBERS & GHERKINS FROM INDIA - BY MAJOR MARKETS

Qty : Tonnes
Val : Rs. Crore

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Belgium	18.5	2.84	201.9	35.040	735.3	139.85
Spain	62.0	6.85	289.6	6.57	952.9	126.46
Australia	58.4	5.25	42.1	5.99	680.2	73.24
USA	—	—	74.6	12.90	421.1	58.74
UK	40.8	2.68	118.9	13.68	664.4	52.34
Sri Lanka	—	—	45.0	5.56	243.6	34.09
France	—	—	168.6	22.40	192.7	30.04
Netherlands	—	—	26.0	4.21	223.3	25.92
Canada	—	—	53.0	7.40	135.8	21.78
Philippines	—	—	—	—	154.0	14.30
US Virgin Island	—	—	—	—	89.0	12.27
UAE	—	—	—	—	216.2	11.29
Total (incl. others)	**179.7**	**17.62**	**1101.4**	**178.05**	**5014.7**	**645.55**

Source: DGCI&S, Calcutta

Although exports are directed to many markets 12 markets are the principal ones accounting for over 93 per cent of the total. Belgium and Spain emerged as the major markets accounting for over 40 per cent of the total in 1995-96.

Average Unit Value Realisation on exports of fresh cucumbers and gherkins was Rs. 12.87 per kg in 1995-96. Unit Value Realisation on exports to principal markets is shown in the following table:

Table 45
UNIT VALUE REALISASTION ON EXPORTS OF FRESH CUCUMBERS/GHERKINS (1995-96)

(Rs. per kg)

Belgium	19.02
Spain	13.27
Australia	10.77
USA	13.95
Sri Lanka	7.88
France	15.56
Netherlands	11.61
Canada	16.04
Philippines	9.28
US Virgin Island	13.78
UAE	5.22

Apart from the principal markets, exports are directed to Brazil, Russia, Italy, Switzerland, South Africa, Qatar, Venezuela, Japan, Germany and Singapore.

The country is also exporting preserved cucumbers and gherkins and their export amounted to 11,949 tonnes valued at over Rs. 20 crores.

Mixed Vegetables, Frozen

India's exports of frozen mixed vegetables amounted to Rs. 10.35 crore in 1995-96. Exports growth in 1995-96 was nearly 42 per cent over the previous year. Export growth, however, is fluctuating. Ten markets, viz., Saudi Arabia, Kuwait, UAE, Bahrain, UK, Russia, Qatar, Canada, Oman and Germany accounted for over 90 per cent of exports. Of these the first four countries together accounted for over 65 per cent in 1995-96. The following table shows exports of frozen mixed vegetables from India - by major markets.

Table 46
EXPORTS OF FROZEN MIXED VEGETABLES FROM INDIA - BY MAJOR MARKETS

Qty : Tonnes
Val : Rs. Crore

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Saudi Arabia	3858.5	299.65	25580.3	234.17	3135.4	283.47
Kuwait	1112.5	91.44	1116.3	103.99	1336.3	136.76
UAE	984.3	67.78	979.1	86.64	1401.5	127.38
Bahrain	1328.4	106.30	936.1	71.94	1203.0	111.64
UK	580.0	71.05	413.8	52.26	476.7	70.64
Russia	—	—	—	—	192.8	57.06
Qatar	947.9	74.16	557.9	41.76	563.7	40.14
Canada	251.7	33.65	190.5	20.57	325.3	36.46
Oman	236.0	19.25	234.8	19.81	262.0	30.08
Germany	198.7	34.37	209.3	29.26	100.8	29.34
Total (incl. others)	**10025.8**	**72.67**	**7694.9**	**728.70**	**9899.9**	**1035.30**

Source: DGCI&S, Calcutta

Average Unit Value Realisation on exports of frozen mixed vegetables was Rs. 10.46 per kg in 1995-96. Unit Value Realisation on exports to principal markets is shown in the following table:

Table 47
UNIT VALUE REALISASTION ON EXPORTS OF FROZEN MIXED VEGETABLES (1995-96)

(Rs. per kg)

Saudi Arabia	9.04
Kuwait	10.23
UAE	9.09
Bahrain	9.28
UK	14.82
Russia	29.59
Qatar	7.12
Canada	11.21
Oman	11.48
Germany	29.10

G. PACKAGING AND QUALITY STANDARDS

The main purpose of packaging is to provide the produce with the attributes necessary to survive a number of different hazards which can be expected during storage, transport and distribution. Therefore foresight and comprehension is required with respect to the distribution pattern.

The first step in selection of a package for a specific product and particular target market or markets is to form a clear picture of the distribution pattern which the product must follow. To do this, a distribution model should be drawn up. The distribution model is a representation of the system through which the produce is transferred, in qualitative as well as quantitative terms. The best foundation for drawing up such a distribution model is direct study of all the operations involved. Practice, however, seldom allows for such detailed investigations. In most cases the distribution model will have to be based on second hand and general information. Although such information may be imperfect, the model is valuable as a structure for establishing the requirements, selecting the package, and planning future changes.

The extent to which such models may be used depends upon the characteristics of the produce and the complexity of the market.

In all cases the sequential character of distribution must be taken into consideration. The package chosen should be acceptable in all links of the distribution chain.

The protection required by fresh fruits and vegetables

Horticultural crops are living tissues, high in water content and diverse in terms of morphology, composition and physiology. The successful development of a package is based on the requirements of the product within the framework of the handling and marketing system.

The main causes of deterioration are metabolic change, mechanical injury and attack by pests and diseases.

Environmental factors can affect the rate of decline of product quality; these include temperature, vapour pressure deficit, relative humidity, atmospheric composition and exposure to light. The package into which the product is placed can also influence the environment.

Temperature management is one of the most critical factors, and good temperature management depends on achieving good contact between the product and the external environment.

A package may have to facilitate both the rapid cooling of the contents from high field temperatures, for example under conditions of forced air cooling, and the maintenance of low storage or transit temperatures. It must allow removal of metabolic heat during storage and transport, and may have to contain the product, throughout the ripening process, if it is a climacteric or ripening fruit. For effective ripening the product requires exposure to increased temperature in a uniform manner, and to ethylene gas. Such packages must therefore have adequate ventilation capability, for effective warming and gassing.

Some commodities have a high sensitivity to ethylene gas, and hence the need to avoid gas build up in transit, require packages which allow for effective external air ventilation (e.g. avocado).

A package may also protect the produce from moisture loss. Polyethylene liners, usually with perforations to allow gaseous exchange, are used for some commodities.

Certain commodities have special treatments which must be taken into account when designing the package, for example sulphur diox-

ide treatment of grapes, and in-package use of ethylene absorbants.

Packages must assist in protection of the commodity against damage; there exists a number of different types of bruises which can occur and the appropriate design of the package and its fittings, can reduce the chance of bruising.

Impact bruises result from dropping the commodity individually or in the package onto a hard surface. This can be reduced by the adoption of careful handling procedures, by the use of in-package cushion pads, and by unitization and improved package fillers.

Compression bruises result from incorrect packing, overfilling, and inadequate package performance. With overfilling and inadequate package performance, the commodity may have to absorb much of the stacking weight. Whilst different commodities may have differing degrees of resistance, the extent to which the commodity bears this weight should be minimized.

Vibration and abrasion bruises are generally a result of product movement within the package. Whilst the damage may be superficial, it can adversely affect the value of the commodity in the market. This type of damage can be minimized through correct package sizing and fill density. International packaging materials, such as warps, paddings, trays, may also be beneficial. Bulging of the package can reduce the benefits of a tight fill.

In attempting to maintain optimal environmental conditions for the commodity, the package may be exposed to high relative humidities (i.e. 85-95 per cent RH). Fluctuations in environmental temperature and relative humidity can arise, for example, by removal from cold store, and under such conditions water may condense on the product and package. The package must therefore be able to perform under all the temperature and humidity conditions that are likely to be encountered.

Packing house operations

1. Produce preparation

Fruits and vegetables for export are usually brought to packing houses soon after their harvest for preparation and packing.

Before being packed, produce is normally prepared or treated in various ways, depending upon its characteristics. Such preparation may include degreening, washing, drying, waxing, fungicide application, sizing and labelling.

During this preparation, and normally after washing and drying, the produce is sorted to remove rejects or produce unfit for the fresh market.

Elimination of diseased produce is essential. Such produce deteriorates rapidly during storage and transportation and causes increased sorting during later stages of the distribution process. The deteriorating produce may also:

— Cause spreading of any disease to the rest of the contents of the package

— Increase the evaporation of water to the air in the package which may accelerate deterioration of the rest of the contents (this is relevant particularly to commodities which require a lower relative humidity in storage, e.g. onions);

— Produce high levels of ethylene;

— Attract insects.

It is no less important to eliminate produce which is:

— Injured, as such produce behaves more or less in the same manner as diseased produce and moreover is extremely vulnerable to attack by disease;

— Overripe, as it is liable to arrive at the market in unsaleable condition and to cause deterioration of the rest of the contents of the package;

— Too immature to ripen normally;

— Otherwise unable to satisfy the market's requirements with respect to size, shape, colour, taste, visual defects, etc.

Produce in conditions such as those stated increases the risks to the rest of the produce, adds to the packaging and transportation costs, causes intensified sorting and control, and increases the waste

quantities in later stages of the distribution chain, without contributing to the ultimate income from its sale.

Depending on its type, the produce is normally sorted for quality and size at the same stage as it is sorted for rejects. It is necessary to:

— Grade the produce according to the quality criteria of the market;

— Size the produce to obtain a uniform product in each package.

Proper sorting is of utmost importance in order to preserve the quality, upgrade the consumer appeal, and maximize the efficiency of the distribution process, in particular for high volume trade.

Observance of international quality standards

International quality standards are issued by:

— The United Nations, Economic Commission for Europe (UN/ECE).

— The Organisation for Economic Co-operation and Development (OECD).

— The European Economic Community (EEC)

These standards cover a range of common types of fruits and vegetables grown in Western Europe. They are identical in principle, but differ slightly in respect to classification and selection of produce.

The UN/ECE and OECD standards contain provisions for:

— Identification of quality, including:

— Minimum requirements;

— Criteria for classification into 3 classes: "Extra", "Class I" and Class II". A few products have 2 classes only;

— Sizing, specific for each type of produce;

— Quality and size tolerances;

— Presentation, including uniformity and packaging;

— Marking, including, the identification of :

— Packer and/or dispatcher

— Nature of produce

— Origin of produce

— Commercial specifications

— Control mark.

Reference to specific marking and other provisions are stated for each product in Annexure IV.

The UN/ECE and OECD standards are recommendations without direct legal power; however, EEC has based its regulatory system on these quality standards, with minor alternations. The EEC regulations are mandatory for internal trade within the Community, and for imports from third countries in Europe and non-European Mediterranean countries.

The regulations also apply to imports from other countries, if the packages are marked according to the quality marking regulation. If other markings or no markings are stated, it is presumed that they conform with class I. If not they should at least qualify for Class II in order to obtain import permission. In this case, each package should be marked "Class II".

Other European countries have adopted the UN/ECE and OECD standards on a similar basis. Even where not statutory, the standards are used for guidance.

Commercial requirements

One of the main aims of selecting for quality and size is to obtain uniform produce which can be transferred in unbroken transport units from the packing house in the producing country to the retail trade and/or the retail prepacking house in the consuming country.

Another important aim is to adapt the produce for retail sale in the consuming country. By sorting the produce into categories, which in respect of size, colour and shape are indistinguishable to the consumers, the retail trade is able to prepack and to sell in uniform packages or by the piece at standard prices. Weighing and other kinds of individual classification are becoming less acceptable to retail traders because of the increased product preparation costs prior to sale.

Sorting to fulfil the commercial requirements for uniformity may differ from that required to meet international quality standards. The commercial requirements normally remain within the framework of international quality standards, though they are often more demanding.

Management of empty package supplies

A good package starts with an appropriate design, suitable materials and correct manufacture. However, even the best package may fail, if handling of the empty package and its preparation for filling are carried out carelessly and without regard to specific package properties and requirements.

Empty packages are often transported to the packing station unprotected, or are stored there exposed to the weather and to sunlight. Alternatively they may be covered by a tarpaulin or stored indoors, but even then the conditions may be unsuitable, for example, very humid or extremely dry. Such conditions are detrimental to most types of packaging. Transport and, even more importantly, storage should be under cover in a moderately dry atmosphere, the optimum being a relative humidity of 45 to 65 per cent. Empty packages should be stacked and raised from the ground by means of pallets or racks to protect the packaging from moisture below and to ensure good ventilation. Storage for empty packages should always avoid:

— Direct sun, which will degrade plastic materials, fade and discolour printing inks and materials, and dry out fibre based materials causing a reduction in strength;

— Exposure to rain, snow and dew, which will reduce the strength of fibre based materials, rust staples and other iron-based components, decompose many types of glue and cause an accumulation of water in cavities.

Erecting, filling and closing

At the packing house the final operations involve erecting, filling and closing the package. These processes may be carried out with automatic machines, but most erection and closure, even in industrialized countries, is done manually and with simple equipment, such as tape dispensers, staplers and strapping tools.

Most equipment of this kind is quite sturdy, but this does not imply that no inspection and maintenance is required.

A regular maintenance programme established with the advice of the suppliers of the equipment will help to avoid problems such as:

— Malfunction of the equipment which results in improper package assembling;

— Rapid wear of the equipment;

— Sudden breakdown causing stoppage of packing operations.

When selecting tools for these processes, it should be kept in mind that most equipment is very specialized and will only perform a specific task with specific packaging materials. Local availability of such materials should be checked before investment.

Three basic methods are available for assembling and closing corrugated and solid fibreboard boxes, as follows:

(a) Taping

Taping is appropriate for certain styles of box. It requires that the flaps to be taped meet and that the material used for the outer liner:

— Has a cohesive surface. Short fibre materials with weak surfaces are not appropriate;

— When intended for use with gummed paper tape, should not absorb moisture from the tape too quickly. Highly absorbant surfaces are not appropriate;

— When intended for use with gummed paper tape, should not be polyethylene coated;

— Is not coated with paraffin wax;

Taping can be performed manually, using a dispenser/applicator, or can be fully mechanized.

(b) Stapling

Stapling offers the advantage that the total composition of the packaging material is effectively secured in the assembling. Surface properties are unimportant, but a good resistance to tearing when exposed to probable increased relative humidity during transport is required. Short fibre materials are generally less appropriate for stapling. Care should be taken to prevent the staples from coming into direct contact with the surfaces of the produce. Stapling is usually performed by operatives with foot-pedal machines; pneumatic power assistance can be used. Wire stitching machines may be preferred for high outputs.

(c) Gluing

Gluing is an assembling method requiring good cohesion of the surfaces and of the paper material in depth, including cohesion between the liners and the fluting in corrugated fibreboard. The method can be carried out completely by hand or with machines of any degree of sophistication. In all cases, utmost care must be taken in order to achieve the appropriate open and closing time specific for each glue/material combination.

Before investing in any assembling method, the potential machine supplier should be asked to carry out practical tests with the packaging and assembling materials to be used on the equipment.

(d) Filling

Filling the package requires considerable care. When the produce is arranged in layers without additional internal packing such as dividers and/or trays, size grading must be precise in order to secure dense packing and level layers. With some types of additional packaging greater size tolerance may be acceptable.

Irrespective of the packing method, produce should be arranged in layers or jumble-packed to fill the package in such a manner as to reduce movement of the produce. This should reduce bruising or abrasion of the produce by vibration in transport and handling. It is, however, equally important that the package not be overfilled.

Cooling

Cooling of the produce may be carried out before or after packing. Where produce is cooled after packing, the package should be adapted to the cooling facilities that are used. If cooling is simply by circulation of cold air, the packages should be constructed to give the air easy access to the produce. Ventilation holes will normally be required on all sides and frequently in the top and bottom as well. The circulation of air is generally a slow method of cooling; from 12 hours to several days may be required. Ventilation holes on the sides and the horizontal edges accelerate the cooling, but only if space is left between the packages for circulation of the cold air. When closed packages are used, it should be expected that most of the cooling will be by conduction rather than convection.

With forced air cooling the air is forced through a block of filled packages. To obtain effective forced air cooling, the package is generally constructed with ventilation holes in one direction only and so situated that the air can pass unimpeded from one box to the next throughout the entire block. In order to reduce the number of transfers the ventilation holes should preferably be located on the short sides of the package. Ventilation holes should normally be 4 to 6 per cent of the short side surface. It is essential for good functioning of forced air cooling that the package be closed in all directions other than the air stream direction.

Forced air cooling normally requires only few hours for the product to reach storage temperature.

Hydrocooling involving the use of cold water to rapidly cool produce, is generally used on produce in bins or in bulk before packing. Its use for packed commodities is limited and requires the package to be water tolerant.

Package-icing is used for the cooling and temperature management of some products. The package containing the product is filled with a predetermined quantity of ice. The use of crushed ice, flake ice or ice and water slurry in the package generally requires that the package be water tolerant. However, in many cases, ice is placed in a watertight container inside the package.

Vacuum cooling is a rapid cooling technique used primarily for leafy vegetables. The packages are before placing in a vacuum

cooler. other than pallet size compatibility, there are no specific package design factors which need to be taken into account. Where water is applied to the product before or during the vacuum cooling process, the package is required to be water tolerant.

D. Transportation and Storage

1. Distribution patterns

The method of transportation is one of the most important factors to be taken into consideration in the choice of packaging to be utilized.

Transport costs are considerable in the international fruit and vegetable trade, and consequently packaging should be chosen to minimize these costs.

The principal modes of transportation - air, sea, road, and rail- generally consist of the following typical sequences of operations.

H. CONSTRAINTS

i) Horticulture Development

1. Large tracts of unproductive/senile orchards and plantations.
2. Inadequate availability of planting materials of high-yielding varieties.
3. Several chronic production problems such as mango malformation, guava wilt, citrus decline etc
4. Acute shortage of infrastructure for post-harvest processing, transport etc.
5. Unorganised marketing
6. Inadequate research, extension and development support

ii) Production and Export of Fruits and Vegetables

A number of constraints would have to be overcome in developing production and exports. These are:

— Lack of infrastructure (storage, transport, cargo space, facilitiers at air/sea ports, fruit chilling and vapour heat treatment)

— Institutional support (credit arrangement, promotion of Indian fruits & vegetables abroad)

— Research and development efforts for high quality and yields comparable to those in other producing and exporting countries.

IV. STRATEGY FOR TAPPING EXPORT POTENTIAL

The horticulture sector in the country has the highest potential for export because of various favourable factors including the soil and climatic conditions. India is endowed with production of a wide variety of tropical, sub-tropical and temperate fruits and vegetables. As per world production data of FAO in 1994, India ranked second in the overall production of fruits and vegetables (China ranked first).

In fruits, India stood frist in the global production of Bananas and Mangoes, fourth in Guava, fifth in pineapples, sixth in organges, tenth in apples and seventeenth in grapes.

In vegetables, India ranked first in cauliflower, second in onions, third in cabbages and green peas and fifth in tomatoes and potatoes.

In world production of fruit and vegetables, India's share was 8.6% and 13.4% respectively in 1994. India's share in world exports of fruits and vegetables was only 1.7% in 1994.

Despite having a second position in World production of fruits and vegetables, India's exports remained meagre at only Rs.531.16 crore in 1995-96. The growth rate of 22.6 per cent in 1995-96 over 1994-95, however, showed the export growth potential of the sector.

Conceding that there is high growth potential, the task is how to tap the potential. Why did it remain sluggish so far. What are the strengths and weaknesses. What measures are needed to sustain the tempo of export growth over the years.

Apart from the natural factors of soil and climate, India is located geographically close to important world markets for fruits and vegetables.

Global imports are increasing and this should encourage India to strengthen her efforts to supply to global markets by removing various constraints in production and exports.

Infrastructural constraints need to be removed so that post-harvest losses are reduced and incomes are increased. Pre-harvest practices are to be followed by the farmers so as to improve the quality of the produce to make it acceptable in import markets.

Air cargo space needs to be augmented to facilitate exports in fresh form. Air-freight rates and sea-freight rates are to be examined regularly to ensure that India's exports remain competitive.

Land ceiling laws are to be reviewed and modified so as to facilitate export production.

Exporters need to organise themselves unitedly to face global competition instead of each exporter trying to export in small quantities in the most unorganised manner. Indian exporters need to recognise the professional management approach of deriving synergy to build competitiveness to emerge as dependable suppliers on a sustained basis.

India's export basket has to undergo a revolutionary change in order to establish India as a competitive and reliable supplier. Presently India's share in the value of world exports in many fruits and vegetables, save onions, is ridiculously low at much less than one per cent. In onions, however, the share is over 6 per cent. Exports need to be jacked up through a deliberate and planned change in the basket of exports in line with the global demand pattern. A paradigm shift in exports is absolutely necessary. Similarly enlargement of export markets is necessary. Over 90% of India's exports of fruits and vegetables are presently directed to West Asian and East European markets.

India has to take advantage of the low cost of production of horticultural products. Developed countries where the costs of production are escalating are likely to shift their production bases to countries like India. In order to encourage this, India has to attract foreign direct investments through appropriate policy modifications including changes in land laws and taxation laws.

Export Target

There is sizeable potential for export of fruits and vegetables from the country. Fruits that have export potential include mangoes, grapes, citrus, apple, banana and lychee. In addition, export potential exists in the case of Sapota, custard apple, ber, strawberry and pineapple. In vegetables, export potential exists in onion, tomato, potato, seasonal vegetables and high value vegetables. Beans, peas, green chillies, broccoli, asparagus, mushrooms, capsicum, and lettuce in the high value vegetable category are important.

In order to tap the full potential of exports of fruits and vegetables it is necessary to impart export orientation to production through marketing to achieve competitiveness in supplying to global markets. Therefore, the development paradigm has to focus on the following:

i) improving productivity and quality of produce from the existing plantations;

ii) developing infrastructure for post-harvest handling and marketing;

iii) product diversification and improving consumption;

iv) increasing availability of quality seed/planting material;

v) area expansion;

vi) transfer of technology;

vii) export enhancement;

viii) human resource development, and

ix) improving infrastructure and data base for fruits and vegetables.

Exports of fruits and vegetables constitute an insignificant per cent of total production and do not in any way clash with domestic consumption needs.

North-Eastern and Hilly States have unutilised potential in horticulture which could be harnessed. These States have the potential

to produce surplus fruits and vegetables for exports. Production would also increase because of the incentives being provided under the various centrally sponsored schemes like the integrated development of tropical, temperate and arid zone fruits, production and supply of vegetable seeds and development of root and tuber crops and the conversion of land under subsistence farming into high value horticulture crops.

Vegetables such as beans, okra, chillies and other seasonal vegetables are required to be cultivated exclusively to cater to the export markets.

Since production is meant for consumption either in the domestic market or in export markets, dynamic infrastructure need to be developed around each major production zone, adopting the concept of "Packing Houses", with each such unit linked to the wholesale market. There is also the need for developing appropriate combination of post-harvest infrastructure facilities at the level of primary cooperative socieities, intermediary levels and terminal markets.

Specialised facilities like irradiation for onion and potato, X-ray detection of spongy tissue in Alphanso mango, vapour heat treatment, crop specific curing, ripening chambers etc. are required to be set up to cater to the sophisticated markets abroad and in domestic metropolitan cities.

More airports should be converted into international airports for handling perishable commodities with each airport having independent and efficient transit and storage system.

Private sector should come forward to provide transport and storage facilities by new investments.

Diversification of Exports

Taking advantage of diversified production in fruits and vegetables, India has to aim for a larger share of global export markets. The off-seasonal advantages available in catering to European and American markets coupled with large production surpluses provide an edge to diversify export markets.

Currently India's exports of fruits and vegetables are largely directed to West Asian markets and only small quantities are marketed in Europe and USA. The region where India has cost advantage in transport is East Asia. Therefore, East Asian region (Singapore, Korea, Hong Kong, Japan, etc.) should be explored for possible markets in near future.

Onion exports should be made free and brought under OGL. In order to meet the needs of European markets, less pungent and white and yellow varieties of onions should be cultivated.

Market promotion efforts need to be intensified in the existing markets of South East Asia, SAARC countries and the Middle East for onions.

Efforts need to be intensified to promote fruits like mango and grapes in South East Asian markets. Along with, other fruits such as strawberry, apple and oranges have good export prospects in these markets.

An item like Sapota is export competitive but is less known outside India. Market promotion efforts are necessary for tapping European market for Sapota and lychee.

Pakistan market offers scope for export of fruits and vegetables during selective periods.

Vapour Heat Treatment protocols are to be completed to export various fruits to Japanese market.

Protocols are to be developed for shipment of assorted vegetables in large volume to the markets of Middle East and South East Asia.

Production of fruits and vegetables without using inorganic chemicals mainly to cater to developed markets has to be encouraged.

Technologies need to be developed to reduce the effects of residues in fresh fruits and vegetables.

Exports of horticultural products in Ninth Plan in quantitative terms is given in Annexure VII. APEDA envisages that exports of fruits & vegetables from India would reach a level of about Rs. 1,200 crore by 2001-2002 and Rs. 1,500 crore by 2005-2006.

LIST OF ANNEXURES

ANNEXURE I
WORLD PRODUCTION OF FRUITS* - BY MAJOR PRODUCING COUNTRIES

Qty : '000 M.T

	1992	1993	1994
China	26,588	32,559	37,298
India	31,194	32,450	33,235
Brazil	32,738	31,951	32,515
USA	26,869	28,940	28,854
Italy	20,701	18,995	17,972
Spain	15,159	13,003	11,648
France	12,033	9,960	10,649
Turkey	9,431	9,645	9,700
Mexico	9,987	10,000	9,547
Uganda	8,411	8,845	9,239
Iran	8,509	8,851	9,021
World Total	**3,80,668**	**3,84,334**	**3,87,939**

* Fruits excluding Melons
Source: Production Year Book, FAO, Rome, 1994
India's Share in World Production : 8.57%
India's Rank in World Production : 2

ANNEXURE I (i)
WORLD PRODUCTION OF APPLES - BY MAJOR PRODUCING COUNTRIES

Qty : '000 M.T.

	1992	1993	1994
China	6568	9078	12007
USA	4798	4861	4948
France	2344	2079	2157
Italy	2394	2144	2103
Turkey	2100	2080	2080
Russian Fed.	1830	1700	1700
Iran	1463	1624	1690
Romania	541	1097	1451
Poland	1570	1842	1441
India	1110	1200	1238
World Total	**44600**	**47453**	**48890**

Source : Production Year Book, FAO, Rome, Italy.
India's Share in World Production : 2.53%
India's Rank in World Production : 10

ANNEXURE I (ii)
WORLD PRODUCTION OF GRAPES - BY MAJOR PRODUCING COUNTRIES

Qty : '000 M.T.

	1992	1993	1994
Italy	10625	9757	9372
France	7995	6656	6933
USA	5490	5467	5377
Turkey	3450	3700	3550
Spain	5757	4568	3167
Argentina	2953	1945	2900
Iran	1508	1835	1875
China	1255	1517	1690
Germany	1806	1312	1482
South Africa	1673	1490	1480
Greece	1350	1400	1400
Romania	905	1339	1349
Chile	1141	1300	1200
Australia	987	791	987
Azerbaijan	1126	900	860
Brazil	800	786	801
India	700	730	750
World Total	**62424**	**56989**	**56392**

Source : Production Year Book, FAO, Rome, Italy.
India's Share in world production : 1.33%
India's Rank in world production : 17

ANNEXURE I (iii)
WORLD PRODUCTION OF ORANGES - BY MAJOR PRODUCING COUNTRIES

Qty : '000 M.T.

	1992	1993	1994
Brazil	19682	18771	18604
USA	8082	9972	9515
China	4820	6074	6175
Spain	2926	2510	2597
Mexico	2541	2852	2570
India	1900	2000	2100
Italy	2112	2109	1610
Iran	1819	1440	1485
Egypt	1771	1324	1300
Pakistan	1160	1180	1200
World Total	**57961**	**59394**	**58731**

Source : Production Year Book, FAO, Rome, Italy.
India's shre in World production : 3.58%
India's Rank in World Production : 6

ANNEXURE I (iv)
WORLD PRODUTION OF MANGOES - BY MAJOR PRODUCING COUNTRIES

Qty : '000 M.T.

	1992	1993	1994
India	9500	10,000	10,000
China	974	1117	1180
Mexico	1076	1158	1090
Pakistan	787	794	800
Indonesia	700	750	779
Thailand	615	620	630
Nigeria	500	500	500
Brazil	394	400	400
Philippines	330	334	360
Haiti	230	230	230
Zaire	212	212	214
Madagascar	200	205	200
Tanzania	185	186	187
Dominican Rep.	191	180	185
Bangladesh	183	184	184
Egypt	179	197	180
Sudan	135	135	135
Srilanka	69	123	133
World Total	**17479**	**18337**	**18450**

India's Share in World Production : 54.20%
India's Rank in World Production : 1

ANNEXURE I (v)
WORLD PRODUCTION OF PINEAPPLES - BY MAJOR PRODUCING COUNTRIES

Qty : '000 M.T.

	1992	1993	1994
Thailand	2180	2589	2686
Philippines	1135	1254	1190
Brazil	826	818	999
China	668	777	860
India	769	800	820
Nigeria	800	800	800
Indonesia	380	383	383
Colombia	347	381	378
USA	499	336	331
Vietnam	500	300	315
World Total	**11125**	**11546**	**11632**

Source : Production Year Book, FAO, Rome, 1994.
India's Share in World production : 5.96%
India's Rank in World Production : 5

ANNEXURE I (vi)
WORLD PRODUCTION OF BANANAS - BY MAJOR PRODUCING COUNTRIES

Qty : '000 M.T.

	1992	1993	1994
India	7778	7800	7900
Brazil	5624	5587	6022
Ecuador	3995	4422	4715
Philippines	3005	3069	3250
Indonesia	2400	2300	2300
Colombia	1900	2150	2000
Costa Rica	1667	1827	1932
Mexico	2095	2344	1700
Thailand	1630	1650	1658
Papua New Guine	1250	1280	1329
Vietnam	1265	1300	1321
Burundi	1645	1585	1269
Nigeria	1050	1050	1050
Honduras	1023	1013	980
Panama	1093	819	900
World Total	**51309**	**52242**	**5258**

Source : Production Year Book, FAO, Rome, 1994.
India's share in World Production : 15.02%
India's Rank in World Production : 1

ANNEXURE II
WORLD PRODUCTION OF VEGETABLES- BY MAJOR PRODUCING COUNTRIES

Qty : '000 M.T

	1992	1993	1994
China	1,23,094	1,25,513	1,28,811
India	64,209	63,800	65,137
USA	33,449	33,173	36,443
Turkey	19,189	18,468	19,354
Japan	14,350	13,669	13,870
Italy	14,537	14,054	13,629
Spain	10,477	10,231	10,680
Korea Rep.	10,081	10,276	10,503
Russian Fed.	10,661	10,450	10,190
Iran	8,894	8,798	10,050
World Total	**4,70,174**	**4,73,970**	**4,85,550**

Note : Total includes Vegetables + Melons
Source: Production Year Book, FAO, Rome, 1994
India's Share in World Production : 13.42%
India's Rank in World Production : 2

ANNEXURE II (i)
WORLD PRODUCTION OF TOMATOES - BY MAJORPRODUCING COUNTRIES

Qty: '000 M.T

	1992	1993	1994
U.S.A	9,733	10,389	12,085
China	8,501	8,665	8,935
Turkey	6,450	6,150	6,300
Italy	5,483	5,223	5,259
India	4,850	4,600	5,029
Egypt	4,694	4,763	4,600
Spain	2,647	2,806	3,066
Brazil	2,141	2,340	2,550
Iran	2,371	2,398	1,940
Greece	1,781	1,886	1,810
Mexico	1,413	1,693	1,560
Russian Fed.	1,450	1,250	1,200
Uzbekistan	1,380	1,150	1,200
Ukraine	1,303	1,148	1,195
World Total	**73,896**	**74,357**	**77,540**

Source: Production Year Book, FAO, Rome, 1994
India's Share in World Production : 6.49%
India's Rank in World Production : 5

ANNEXURE II (ii)
WORLD PRODUCTION OF CUCUMBERS AND GHERKINS - BY MAJOR PRODUCING COUNTRIES

Qty: '000 MT

	1992	1993	1994
China	7,650	7,852	8,051
Iran	1,057		1,510
Turkey	1,050	1,050	1,100
USA	922	961	984
Japan	899	836	800
Ukraine	387	636	516
Netherlands	507	500	514
World Total	**18,268**	**18,726**	**19,261**

Source: Production Year Book, FAO, Rome, 1994

ANNEXURE II (iii)
WORLD PRODUCTION OF CABBAGES
- BY MAJOR PRODUCING COUNTRIES

Qty: '000 M.T

	1992	1993	1994
China	9,407	9,685	9,850
Russian Fed.	4,844	4,772	4,680
India	4,357	3,200	3,300
Japan	2,819	2,698	2,700
Korea Rep.	2,703	2,600	2,600
Poland	1,286	1,954	1,672
U.S.A	1,659	1,636	1,650
Indonesia	1,000	1,282	1,332
World Total	**41,031**	**40,878**	**40,250**

Source: Production Year Book, FAO, Rome, 1994
India's Share in World Production : 8.20%
India's Rank in World Production : 3

ANNEXURE II (iv)
WORLD PRODUCTION OF CAULIFLOWER - BY MAJOR PRODUCING COUNTRIES

Qty: '000 M.T

	1992	1993	1994
India	4,220	4,500	4,800
China	2,068	2,167	2,265
France	489	555	553
Italy	482	441	443
U.K	410	409	414
U.S.A	313	305	294
Spain	302	275	271
Poland	198	256	220
World Total	**10,080**	**10,505**	**10,888**

Source: Production Yearbook, FAO, Rome, 1994
India's Share in World Production : 44.08%
India's Rank in World Production : 1

ANNEXURE II (v)
WORLD PRODUCTION OF ONIONS, DRY - BY MAJOR PRODUCING COUNTRIES

Qty: '000 M.T

	1992	1993	1994
China	4,332	4,426	4,629
India	3,590	4,000	4,300
USA	2,481	2,590	2,859
Turkey	1,700	1,650	2,000
Iran	1,305	957	1,435
Japan	1,397	1,367	1,400
Korea Rep.	810	1,000	1,051
Brazil	896	927	1,024
Spain	1,020	885	1,017
World Total	**29,776**	**30,278**	**32,546**

Source: Production Year Book, FAO, Rome, 1994
India's Share in World Production : 13.21%
India's Rank in World Production : 2

ANNEXURE II (vi)
WORLD PRODUCTION OF PEAS, GREEN - BY MAJOR PRODUCING COUNTRIES

Qty: '000 M.T.

	1992	1993	1994
USA	1291	798	1111
China	452	461	490
France	460	427	413
India	266	267	268
U.K.	262	261	262
Russian Fed.	136	147	140
Belgium-Luxembourg	204	210	210
Hungary	118	108	110
Egypt	105	100	105
Italy	160	146	100
World Total	**4,541**	**4,012**	**4,346**

Source : Production Year Book,FAO,Rome,Italy.
India's Share in World Production: 6.17%
India's Rank in World Production : 3

ANNEXURE II (vii)
WORLD PRODUCTION OF POTATOES BY MAJOR PRODUCING COUNTRIES

Qty.: '000 M.T.

Country	1992	1993	1994
Russian Fed.	38224	38054	33780
China	37826	35037	40039
Poland	23388	36271	23058
USA	19294	19445	20835
UKraine	20277	20949	16102
India	16388	15718	15000
Germany	10897	12260	9257
Belarus	8984	11644	8241
Netherlands	7595	7699	7748
UK	7802	7065	7065
France	6679	5860	5456
Turkey	4600	4650	4350
Spain	5181	3821	4058
Japan	3400		
World Total	**277208**	**291460**	**265436**

Source: Production Year Book, FAO, Rome, Italy, 1994.
India's Share in World Production: 5.65%
India's Rank in World Production: 6

ANNEXURE III (i)
PRODUCTION OF APPLES IN INDIA (1993-94)

Area : Hectares
Production : MT

State/Ut's	Area	Production
Arunachal Pradesh	5523	9730
Himchal Pradesh	72406	294734
Jammu & Kashmir	73103	792750
Uttar Pradesh (Hills)	53903	201000
Total (Incl. others)	**204996**	**1298326**

Source : National Horticulture Board Gurgaon.

ANNEXURE III (ii)
PRODUCTION OF BANANAS IN INDIA (1993-94)

Area :Hectares
Production: MT

State/Ut's	Area	Production
Andhra Pradesh	33302	832550
Arunnachal Pradesh	2210	8540
Assam	41423	572674
Bihar	24913	497860
Goa	1760	10560
Gujarat	28530	1141200
Karnataka	45455	1500015
Kerala	23667	308871
Madhya Pradesh	20000	731000
Maharashtra	57157	2827093
Manipur	3390	9500
Meghalaya	5695	71187
Mizoram	2485	9399
Nagaland	1249	17049
Orissa	34123	322000
Tamil Nadu	83308	2782310
Tripura	3638	26250
Urrar Pradesh (Plains)	1029	23000
West Bengal	15400	189400
Andaman & Nicobar	1570	7495
Pandicherry	361	10296
Total (Incl.others)	**31685**	**11900824**

Source : National Horticulture Board Gurgaon.

ANNEXURE III (iii)
PRODUCTION OF PINEAPPLES IN INDIA
(1993-94)

Area : Hectares
Production: MT

State/ Ut's	Area	Production
Andhra Pradesh	3298	175618
Arunachal Praesh	3869	13860
Assam	13002	188013
Bihar	2815	70400
Goa	460	6700
Karnataka	2530	31675
Kerala	5033	46706
Manipur	6500	61500
Meghalaya	8495	73057
Mizoram	810	4189
Nagaland	1166	28221
Orissa	656	9600
Tamil Nadu	934	39610
Tripura	3706	32000
West Bengal	8950	225540
Toral (incl. others)	62225	1006669

Source : National Horticulture Board, Gurgaon.

ANNEXURE III (iv)
PRODUCTION OF LITCHI IN INDIA - BY MAJOR PRODUCING STATES (1993-94)

Area : Hectares
Production: MT

State/Ut's	Area	Production
Bihar	20753	249036
Himachal Pradesh	1640	225
Nagaland	44	106
Orissa	1165	4800
Tripura	12820	5750
Uttar Pradesh (Hills)	8530	11190
West Bengal	3310	16881
Total (incl.others)	55493	813348

Source : National Horticulture Board, Gurgaon.

ANNEXURE III (v)
PRODUCTION OF SAPOTA IN INDIA - BY MAJOR PRODUCING STATES (1993-94)

Area : Hectares
Production : MT

State/Ut's	Area	Production
Andhra Pradesh	4218	56616
Bihar	5	16
Gujarat	6880	82560
Karnataka	1526	270226
Maharashtra	4387	52615
Orissa	2422	8700
West Bengal	1440	8710
Total (incl. others)	34832	481142

Source : National Horticulture Board, Gurgaon.

ANNEXURE III (vi)
PRODUCTION OF GRAPES IN INDIA - BY MAJOR STATES (1993-94)

Area : Hectares
Production: MT

State/ Ut's	Area	Production
Andhra Pradesh	2258	56450
Haryana	1113	19185
Karnataka	5786	173580
Maharashtra	23948	348963
Punjab	2289	61803
Tamil Nadu	2359	38950
Total (incl. others)	38841	702466

Source : National Horticulture Board, Gurgaon.

ANNEXURE III (vii)
PRODUCTION OF MANGO - BY MAJOR STATES
(1993-94)

Area : Hectares
Production: MT

State/ Ut's	Area	Production
Andhra pradesh	241901	2902812
Bihar	150527	1806324
Himachal Pradesh	23449	1010
Karnataka	88810	843695
Maharashtra	96693	378293
Orissa	58076	321000
Tamil Nadu	67818	422036
Uttar Pradesh (Hills)	20255	73000
West Bengal	55300	1849356
Total (incl.others)	1217362	10113505

Source : National Horticulture Board, Gurgaon.

ANNEXURE III (viii)
PRODUCTION OF GUAVA IN INDIA
BY MAJOR STATES (1993-94)

Area : Hectares
Production: MT

State/Ut's	Area	Production
Andhra Pradesh	7550	90600
Bihar	25903	310836
Gujarat	4833	106326
Karnataka	11834	147925
Madhya Pradesh	7259	141000
Maharashtra	6100	55876
Orissa	6295	36000
Punjab	5367	53670
Tamil Nadu	5851	31950
Uttar Pradesh (Plains)	18548	167160
Best Bengal	4800	50000
Total (incl.others)	118015	1273333

Source : National Horticulture Board, Gurgaon.

ANNEXURE III (ix)
PRODUCTION OF CITRUS IN INDIA
- BY MAJOR PRODUCING STATES (1993-94)

Area : Hectares
Production: MT

State/Ut's	Area	Production
Bihar	12251	87241
Gujarat	8650	173000
Himachal Pradesh	37692	4409
Jammu & Kashmir	9781	10953
Karnataka	35766	380193
Madhya Pradesh	10140	1610000
Maharashtra	98730	11248000
Meghalava	7190	49611
Orissa	13769	62000
Punjab	39128	319755
Rajasthan	9324	38800
Sikkim	6900	18071
Tamil Nadu	11130	2167706
Trpura	12727	44500
Uttar Pradesh (Hills)	21646	62000
Total (incl. others)	433628	3911830

Source : National Horticulture Board,Gurgaon.

ANNEXURE III (x)
PRODUCTION OF PAPAYA IN INDIA - BY MAJOR STATES (1993-94)

Area : Hectares
Production: MT

State/Ut's	Area	Production
Assam	7153	106146
Bihar	3500	105000
Gujarat	4200	210000
Karnataka	4679	407023
Kerala	12108	54840
Madhya Pradesh	2000	50000
Orissa	12363	139000
West Bengal	5350	150200
Total (incl. others)	55907	1266185

Source : National Horticulture Board, Gurgaon.

ANNEXURE IV
PRODUCTION OF VEGETABLES IN INDIA—ITEMWISE

Area : Hectares
Production :

Item	Area	Production
Potato	1231003	18832931
Onion	887314	4279080
Cabbage	228327	3575411
Tomato	345944	4988980
Okra	295227	3029453
Peas	181611	1528371
Brinjal	281884	4424281
Cauliflower	191886	2890388
Total of above items	3643195	43548895
Total (incl. others)	**4829864**	**65094918**
Percentage share of the listed items	75.4%	66.9%

Source: Department of Horticulture/Agriculture of States/Union Territories

ANNEXURE IV (i)
PRODUCTION OF POTATOES IN INDIA (1993-94)

Area : Hectares
Production: MT

State/Ut's	Area	Production
Andhra Pradesh	1117	8042
Arunachal Pradesh	4985	32509
Assam	64030	506857
Bihar	345000	48500000
Delhi	1485	26998
Gujarat	19500	455000
Haryana	14760	245000
Himachal Pradesh	14325	152800
Jammu & Kashmir	4021	62269
Karnataka	2472	760249
Madhya Pradesh	33172	433000
Maharashtra	9557	117143
Meghalaya	18396	168323
Orissa	12288	123056
Punjab	48500	971261
Rajasthan	1762	19822
Sikkim	5280	343220
Tamil Nadu	5816	128360
Tripura	3200	586000
Uttar Pradesh (Hills)	19000	392200
Uttar Pradesh (Plains)	384997	7449327
West Bengal	1766550	1823881
Total (incl. others)	1231003	18832931

Source : National Horticulture Board, Gurgaon.

ANNEXURE IV (ii)
PRODUCTION OF CABBAGE IN INDIA
- BY MAJOR PRODUCING STATES (1993-94)

Area : Hectares
Production : MT

State/Ut's	Area	Production
Assam	18100	331230
Bihar	70915	1134640
Karnataka	7657	183768
Maharashtra	11113	188985
Orissa	44530	685700
Uttar Pradesh (Hills)	4578	20934
Uttar Pradesh (Plains)	20917	310796
West Bengal	26196	270618
Total (incl. others)	228327	3575411

Source : National Horticulture Board,Gurgaon.

ANNEXURE IV (iii)
PRODUCTION OF OKRA IN INDIA
- BY MAJOR STATES (1993-94)

Area : Hectares
Production : MT

State/Ut's	Area	Production
Andhra Pradesh	13991	139910
Assam	10290	1033340
Bihar	73810	1771
Gujarat	6100	30500
Karnataka	1050	4450
Madhya Pradesh	11388	68300
Orissa	79800	688900
Rajasthan	4393	17280
Tami Nadu	3969	41540
Uttar Praedesh (Hills)	3166	13316
Uttar Pradesh (Plains)	26537	310800
Best Bengal	36213	37414
Total (incl. others)	295221	3029453

Source : National Horticulture Board, Gurgaon.

ANNEXURE IV (iv)
PRODUCTION OF PEAS IN INDIA - BY MAJOR PRODUCING STATES (1993-94)

Area : Hectares
Production : MT

State/Ut's	Area	Production
Assam	30694	16097
Bihar	4000	32000
Haryana	6450	83000
Himachal Pradesh	7107	70228
Madhya Pradesh	24500	245000
Punjab	3100	79072
Rajastan	3630	9823
Uttar pradesh (Hills)	10369	44749
Uttar Pradesh (Planins)	66019	817996
West Bengal	3010	31094
Total (incl.others)	181611	1528371

Source: National Horticulture Board,Gurgaon.

ANNEXURE IV(v)
PRODUCTION OF CAULIFLOWER IN INDIA (1993-94)

Area : Hectares
Production: MT

State/Ut's	Area	Production
Assam*	12725	161607
Bihar	38853*	621698
Delhi	4849	139269
Haryana	4600	115000
Himachal Pradesh	5300	106000
Karnataka	1282	78768
Madhya Pradesh	8074	322000
Maharashtra	6985	136609
Orissa	47900	585300
Rajasthan	4472	2380
Uttar Pradesh (Hills)	3255	207199
West Bengal	26190	270600
Total (incl.others)	191886	2890388

Source : National Horticulture Board,Gurgaon.

ANNEXURE IV (vi)
PRODUCTION OF BRINJAL IN INDIA (1993-94)

Area : Hectares
Production: MT

State/Ut's	Area	Production
Andhra Pradesh	16929	169290
Assam	12370	185550
Bihar	66751	1335020
Gujarat	17000	255000
Karnataka	22271	614817
Maharasshtra	22232	444640
Uttar Pradesh (Plains)	29659	41439
West Bengal	69869	216629
Total (incl.others)	281884	4424231

Source : National Horticulture Board, Gurgaon.

ANNEXURE IV (vii)
PRODUCTION OF ONIONS IN INDIA - BY MAJOR STATES (1993-94)

Area: Hectares
Production: MT

State/UT's	Area	Production
Andhra Pradesh	20000	174000
Assam	7108	15138
Bihar	47866	957320
Delhi	1418	33127
Gujarat	23000	549300
Haryana	4300	74000
Madhya Pradesh	15348	182000
Maharashtra	79665	1038065
Orissa	43760	320780
Punjab	2600	50260
Rajasthan	16073	122362
Tamil Nadu	24596	197840
Uttar Pradesh (Hills)	4956	21477
Uttar Pradesh (Plains)	30694	370572
West Bengal	14200	145800
Total (Incl. Others)	337314	4279080

Source: National Horticulture Board, Gurgaon.

ANNEXURE IV (viii)
PRODUCTION OF TOMATOES IN INDIA - BY MAJOR STATES (1993-94)

Area: Hectares
Production: M.T.

State/UT's	Area	Production
Andhra Pradesh	47156	471560
Assam	12840	250380
Bihar	55610	1112200
Delhi	1054	24124
Gujarat	7000	105000
Haryana	5400	99700
Himachal Pradesh	2366	59000
Karnataka	32073	801825
Madhya Pradesh	23389	350000
Maharashtra	43269	382274
Orissa	50200	582300
Punjab	5600	135486
Rajasthan	12892	60296
Tamil Nadu	20445	265580
Uttar Pradesh (Hills)	5803	39203
Uttar Pradesh (Plains)	4145	25667
West Bengal	14109	145755
Total (Incl. Others)	345943	4933980

Source: National Horticulture Board, Gurgaon.

ANNEXURE V
EXPORTS OF FRESH FRUITS FROM INDIA

Qty : Tonnes
Val : Rs Lakhs

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Grapes, fresh	15928.7	3390.0	16813.4	4049.0	22150.9	5357.0
Raisins	0.7	1.1	5.3	6.9	29.2	14.5
Sultanas	2.2	1.7	58.2	28.9	234.0	104.5
other dried grapes						
Mangoes	22793.9	4387.3	25414.4	4502.3	22269.2	3851.9
Mangoes	153.4	34.6	360.1	72.2	348.2	62.3
Sliced & Dried						
Mangosteens	661.7	100.9	1312.2	135.1	435.8	40.4
Apples	5987.7	666.9	6507.6	678.0	9271.0	976.6
Apricots	19.1	6.0	49.3	12.8	142.7	27.4
Avocados	—	—	—	—	—	—
Grapes,fresh	1086.1	147.3	966.1	89.6	1744.0	222.1
Gooseberries	0.2	Neg	—	—	0.4	0.1
(Black,white or red)						
Bore	570.5	61.7	593.8	29.2	644.9	35.5
Cherries	5.9	4.3	18.3	16.7	146.6	95.6
Cranbery Bilbers	39.4	5.0	5.7	0.5	—	—
Custard Apple	182.9	21.4	200.4	17.8	221.2	19.7
Dates fresh	—	—	4.8	1.1	—	—
Dry Dates Hard (Chhohara)	1.6	0.9	Neg	Neg	1.5	0.2
Dry Dates Soft	21.6	43.9	2.0	0.5	215.7	36.2
Figs,fresh	12.6	2.2	3.8	0.3	24.7	8.2
Figs,dried	—	—	28.9	5.1	13.4	3.1
Grape fruits,fresh	51.4	9.5	39.8	5.2	4.6	0.4
Guava	319.3	72.4	233.5	21.6	221.3	30.4
Lemons	357.5	23.9	289.6	28.0	490.3	56.4
Litchi	0.3	Neg.	5.8	3.5	0.9	0.6
Mandarins	8.5	0.9	12.0	324.2	4.5	0.4
Marioc (Cassava)	Neg.	Neg.	—	—	—	—
Oranges,fresh	5986.9	359.5	11764.7	665.5	17767.6	1365.7
Other citrus fruits	403.0	32.1	452.7	29.0	100.9	4.0

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Other edible roots & Tubers	35.5	4.4	—	—	415.2	47.5
Other fresh fruits	2444.5	257.4	4462.9	383.8	4954.2	482.2
Papaya	893.0	85.2	320.9	44.9	316.9	29.7
Peaches	Neg.	Negl.	—	—	—	—
Pear & Quince	1426.3	18.0	649.1	9.2	245.1	8.6
Peel of citrus	Neg.	Negl.	—	—	—	—
fruit or Melons Pineapple,fresh	120.2	12.9	116.8	8.6	262.6	29.2
Plums & sloes	40.8	1.6	2.4	0.5	10.7	1.5
Pomegranates Raspheraies	2623.2	367.2	4144.5	559.4	4255.2	653.1
Blackbns, Mulbrs	—	—	—	—	12.7	1.3
Sago Pith	134.1	27.3	—	—	—	—
Sapota	2007.7	213.8	2600.4	268.5	2328.2	255.8
Sitafal	1477.8	200.2	358.0	29.1	453.4	40.5
Strawberries (fresh)	6.0	1.5	75.0	28.4	71.0	42.0
Sweet Potatoes	—	—	—	—	—	—
Tamarind fresh	3926.9	253.4	2422.2	190.5	5929.8	499.3
Water melons	8624.5	409.5	7959.4	463.5	7040.0	351.9
Shelled Hazelnuts	—	—	20.0	15.7	52.3	50.3
Walnut in shell	842.4	836.1	435.6	371.3	428.0	360.0
Walnut Kernals	5483.7	5881.8	6003.4	5676.9	6445.4	7830.1
Total	***84832.9***	***17944.1***	***94713.0***	***18452.6***	***109704.2***	***22996.2***

Source: DGCI & S, Calcutta.

ANNEXURE VI
EXPORTS OF OTHER FRESH VEGETABLES FROM INDIA

Qty: Tonnes
Val: Rs. Crore

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Potatoes, fresh	7092.8	21329.8	15755.4	66929.8	34490.5	188904.8
Tomatoes	186.8	608.5	1072.5	6293.9	646.3	3611.2
Shallots	—	—	714.0	4390.0	166.0	1327.9
Leeks	Neg.	Neg.	Neg.	Neg	—	—
Cauliflower	Neg.	—	—	24.5	147.8	—
Kohrb/Kale small edible brassicas	Neg.	Neg.	135.4	365.5	34.0	133.5
Cabbage lelthuced	0.3	2.5	18.1	22.6	—	—
Other lilthue, fresh	3.0	31.8	—	—	—	—
Witloof chickory	10.0	99.2	—	—	—	—
Carrots & turnips	—	—	—	—	33.2	271.4
Salad beet root, fresh	—	—	3.0	16.6	—	—
Horse radish, fresh	4.0	133.8	—	—	—	—
Other root, fresh	122.1	846.2	10.9	59.8	143.5	546.3
Cucumbers & gherkins, fresh	179.7	1762.2	1101.4	17805.2	5014.7	64555.3
Peas	7.0	65.8	317.1	6814.9	556.2	12320.5
Beans	1.3	18.5	—	—	69.4	1477.8
Other leguminous vegetables (shelled /unshelled)	0.2	64.6	26.8	304.2	—	—
Globe artichokes, fresh	0.4	6.9	—	—	—	—
Asparagus (fresh)	9.0	39.2	—	—	—	—
Mushrooms (fresh)	41.5	1903.3	289.7	17372.6	1559.6	63990.9
Green chilly	169.5	1842.8	46.4	839.9	141.5	2179.6
Other chilly	123.7	2252.8	70.5	846.5	50.7	1145.0
Olives fresh	10.0	41.9	7.0	30.0	1.6	29.1
Plantatain (curry/Banana)	1.0	5.1	20.0	250.5	151.9	3330.5
Mixed vegetables	6732.2	54824.1	8590.9	74914.2	14279.9	121021.9
Green pepper	81.9	2263.1	19.2	497.2	73.0	1231.3
Pumpkins	21.7	94.2	34.8	70.1	47.5	115.0
Other vegetables fresh/chilled	4044.0	26605.4	6127.0	47597.1	7181.9	55720.7
Frozen potatoes	1984.8	10796.6	5675.0	44152.1	3877.3	29361.0
Frozen peas	—	—	182.8	5040.0	208.9	5794.0

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Beans, shelled/unshelled	Neg.	Neg.	—	—	58.8	734.6
Other leguminous vegetables frozen	25.9	748.3	—	—	6.0	106.5
Terragon	—	—	4.1	135.6	—	—
Other vegetables, frozen	40.0	1004.5	128.9	2250.9	77.6	1924.0
Mixed vegetables, frozen	10025.2	87267.3	7694.9	72870.1	9899.9	103529.8
Total (incl. others)	33366.6	233075.0	58551.8	441257.0	83411.7	704728.0

Source: DGCI&S, Calcutta

ANNEXURE VII
EXPORT OF HORTICULTURE PRODUCE IN IXTH PLAN

Qty. in MTs

		By Air	By Sea
Floriculture (flower, live plants, seeds and bulbs)	1,00,000	1,00,00	
Fruits	3,00,000	75,000	2,25,000
Mango	90,000	20,000	70,000
Grapes	60,000	20,000	40,000
Citrus	20,000	5,000	15,000
Apple	30,000		30,000
Litchi	5,000	5,000	
Banana	30,000		30,000
Others	65,000	25,000	40,000
Vegetables	800,000	150,000	650,000
Onion			500,000
Potato			100,000
Seasonal Vegetables		100,000	50,000
High value vegetables		50,000	

ANNEXURE VIII (a)
EXPORTS OF FRUITS AND VEGETABLES FROM INDIA

Qty : '000 MT
Val : Rs Crore

	Qty.	Val.
1993-94	475	385
1994-95	554	433
1995-96	544	531
1996-97	1150	800
2001-02	1500	1186
2005-06	2000	1500

Source: APEDA, New Delhi.

ANNEXURE VIII (b)
EXPORTS OF FRUITS AND VEGETABLES FROM INDIA

Qty: Thousand Tonnes
Val: Rs crore

	1993-94		1994-95		1995-96	
	Qty	Val	Qty	Val	Qty	Val
Fresh Onions	357.1	182.67	401.3	204.62	351.0	230.72
Other Fresh Vegetables	33.4	23.31	58.6	44.13	83.4	70.47
Walnuts	6.3	67.18	6.5	60.64	6.9	82.40
Fresh Magoes	22.8	43.87	25.4	45.03	22.3	38.52
Fresh Grapes	15.9	33.93	16.9	40.85	22.4	54.76
Other Fresh Fruits	39.8	34.46	46.0	38.01	58.1	54.28
Total	**475.3**	**385.43**	**554.5**	**433.27**	**544.1**	**531.16**

Source : Directorate General of Commercial Intelligence and Statistics, (DGCI&S), Calcutta (Various Volumes)

ANNEXURE IX
FRUITS AND VEGETABLES THAT ENTER INTO INTERNATIONAL TRADE FROM INDIA ALONG WITH HARMONISED CODE NUMBERS[1]

FRUITS

Subhead	:	**Grapes Fresh**
08061000	:	Grapes Fresh
08062001	:	Raisins
08062009	:	Sultanas & Other dried grapes
Subhead	:	**Mangoes Fresh**
08045002	:	Mangoes
Subhead	:	**Other Fresh Fruits**
08081000	:	Apples
08091000	:	Apricots
08044000	:	Avocados
0803000	:	Bananas Fresh
08103000	:	Black, White or Red Gooseberries
08109006	:	Bore
08092000	:	Cherries
08104000	:	Cmbery Bilbers
08109005	:	Custard Apple
08041001	:	Dates Fresh
08041003	:	Dry Dates Hard (Chhohara)
08041002	:	Dry Dates Soft (Khayzur)
08042002	:	Figs Dried
08042001	:	Figs Fresh
08054000	:	Grape Fruit Fresh
08045001	:	Guava
0805300	:	Lemons
08109007	:	Litchi
08052000	:	Manarins
08045003	:	Mangoes Sliced & Dried
08045009	:	Mangosteens
07141000	:	Manioc (Cassava)
08051000	:	Oranges fresh
08059000	:	Other Citrus Fruits
07149009	:	Other Edible Roots & Tubers
08109009	:	Other Fresh fruits
08072000	:	Papaya
08093000	:	Peaches

1. As obtained from Agricultural and Processed Food Products Export Development Authority.

08082000	:	Pear & Quince
08140000	:	Peel of Citrus Fruit or Melons
08043000	:	Pineapple Fresh
08094000	:	Plums & Sloes
08109001	:	Pomegranates
08102000	:	Raspberries, Blackberries and Mulberries
07149001	:	Sago Pitch
08109003	:	Sapota
08109004	:	Sitafal
08101000	:	Strawberries, Fresh
07142000	:	Sweet Potatoes
08109002	:	Tamarind Fresh
08071000	:	Water Melons

VEGETABLES

Subhead	**:**	**Onions Fresh**
07031001	:	Onions
Subhead	**:**	**Other Fresh Vegetables**
07092000	:	Asparagus (Fresh)
07082000	:	Beans
07102200	:	Beans Shelled/Unshelled
07042000	:	Brussels Sprouts
07051100	:	Cabbage Lettue
07061000	:	Cauliflower
07094000	:	Celery Other Celeric fresh/chilled
07070000	:	Cucumbers & Gherkin Fresh
07093000	:	Egg Plants Fresh
07102100	:	Garlic
07091000	:	Globe Artichokes Fresh
07096001	:	Green Chilly
07099004	:	Green Pepper
07069003	:	Horse Radish Fresh
07049000	:	Kohrbi/kale Smaller Edible Brassicas
07039000	:	Leeks
07109000	:	Mixed Vegetables Frozen
07099003	:	Mixed Vegetables
07095100	:	Mushrooms Fresh
07099001	:	Olives Fresh
07052900	:	Other Chickory
07096009	:	Other Chilly
07102900	:	Other Leguminous Vegetables Frozen
07089000	:	Other Leguminous
07051900	:	Other Lettuce Fresh
07069009	:	Other Root Fresh

07108009	:	Other Vegetable Frozen
07099009	:	Other Vegetables Fresh/Chilled
07081000	:	Peas
07099002	:	Plantain (Curry Banana)
07019000	:	Potatoes Fresh
07011000	:	Potatoes Seeds
07099005	:	Pumpkins
07069001	:	Radishes
07069002	:	Salad Beet Root Fresh
07031002	:	Shallots
07097000	:	Spinach
07103000	:	Spinach frozen
07104000	:	Sweet Corn
07108001	:	Terragon
07020000	:	Tomatoes
07095200	:	Truffles
07052100	:	Witloof Chickory
Subhead	**:**	**Walnuts**
08022104	:	Hazelnuts in Shell
08022200	:	Shelled Hazelnuts
08023100	:	Walnut in Shell
08023200	:	Walnut Kernal

ANNEXURE X
MAJOR FRUIT SEASONS IN INDIA

Mangoes	:	March, April, May, June, July
Table Grapes	:	January, February, March, April
Litchies	:	May, June
Apples	:	August, September, October, November.
Bananas	:	Throughout the year
Guavas	:	January, February, March
Bers	:	January, February,March
Sapotas	:	Throughout the year
Pineapples	:	Throughout the year
Pomegranates	:	Throughout the year
Walnuts	:	October, November
Strawberries	:	November, December, January, February, March.

ANNEXURE XI
WORKING GROUP ON HORTICULTURE DEVELOPMENT FOR THE NINTH FIVE YEAR PLAN

Summary of Recommendations

The recommendations made by the Working Group have been arranged in two sections, namely (i) those are common to all crops/schemes, and (ii) those which are crop/activity specific.

A. Common Recommendations :

1. Horticulture sector has established its credibility for improving productivity of land, generating employment, improving economic conditions of the farmers and entrepreneurs, enhancing exports and above all providing nutritional security to the people. This sector therefore, needs to be brought to the forefront in the overall agricultural strategy of the country and continued to be treated as extreme focus area for providing strong support for its overall development by the Government.

2. The basic objective of the development process should focus on improving production, productivity and quality of the produce to enhance its consumption and exports.

3. The total demand of the major horticulture produce is estimated to be 212 million tonnes at the end of IX Plan, comprising fruits, vegetables, cashew, coconut, spices etc. As against this, the targets proposed would be 184 million tonnes leaving a gap of about 28 million tonnes.

4. The targets envisaged can be achieved by promoting development of different crops and related activities to be conceived around specific thrust areas namely, (i) improving productivity and quality of produce from the existing plantations, (ii) developing infrastructure for post harvest handling and marketing (iii) product diversification and improving consumption, (iv) increasing availability of quality seed/planting material, (v) area expansion (vi) transfer of technology (vii) export enhancement (viii) human resource development, and (ix) improving infrastructure and database for horticulture crops.

5. Productivity improvements be achieved through use of high yielding varieties, use of plastics, beekeeping, rejuvenation/rehabilitation of old orchards or plantations, uprooting of senile/diseased plantations and adoption of bio-control measures.

6. Unproductive orchards and plantations which are old or heavily infected with pests and diseases have become major source of infection and contribute to the low productivity. These need to be declared as environmental hazards and uprooted in systematic manner for replanting, using legal means, if required.

7. Intervention of horticulture related activities should be taken up as a new initiative for improving nutritional status of people in general, and for preventing disorders associated with deficiencies of vitamins and minerals in particular.

8. Available infrastructure of governmental seed farms and nurseries be strengthened to improve their capabilities. Private sector be involved in multiplication of seed/planting material.

9. Support for improved technologies of propagation like tissue culture, True Potato Seed (TPS) etc., be continued. New units, centres be set up based on demand and potential.

10. Strong linkages be developed at the State level with the research institutions for producing nucleus seeds/planting material.

11. Jurisdiction of Seed Act be extended to cover certification of nursery plants and other kinds of planting material of horticulture crops. The State be encouraged to introduce appropriate legislation for certification of nursery plants.

12. Area expansion be encouraged and supported on a compact area basis. Assistance for area expansion be extended to vegetables, mushrooms, spices, medicinal and aromatic plants also.

13. Front line demonstrations be undertaken in close collaboration with ICAR/SAU institutions on identified technologies and closely monitored.

14. Use of media (TV & Radio) be strongly supported for giving publicity to new technologies; improved methods of cultivations and input utilisation; post harvest handling; marketing and processing; nutritional values of different horticultural products, their importance in daily diet etc.

15. Organic farming and adoption of IPM should be encouraged. The problem of pesticide residue should receive special attention.

16. Human resource development involving improving professional capabilities of the departmental staff, entrepreneurship development in small and medium scale sectors related to horticulture, use of plastics, beekeeping and developing resource base of the trained personnel in commercial horticulture be given high priority.

17. Women's participation in horticulture development be promoted by reserving 30% of seats in training programmes and targeting certain activities for majority participation by women.

18. While developing programmes and allocating funds for horticulture development, attention be paid for balanced regional development.

19. Integrated programmes for horticultural development involving horticultural-based land use/cropping system in backward/tribal areas be taken up to help in raising the economic status of the inhabitants and encouraging infrastructure development.

20. Building up of a database on different crops and related activities and setting up of an effective management information system both at the Centre and State levels should be given high priority in the Ninth Plan.

21. All Schemes implemented during VIII Plan be continued with suitable modifications as suggested under each crop/activity. The schemes be allocated to different states/UTs on demand driven basis instead of assigning activities and fixing the targets centrally. For this, project proposals should be invited in advance and approved individually for each state with required element of inbuilt flexibility for implementing the same.

22. While implementation of schemes would continue mostly with the states, greater autonomy should be given to the Board/Directorates for direct implementation of selected components under various schemes. Similarly, participation of private and public sector units, NGOs, Panchayati Raj institutions and other field level organisations in implementation of schemes should be encouraged.

23. The implementation agencies should be suitably strengthened with additional staff and required infrastructural facilities, commensurate with the growing investments in the horticulture sector.

B. Crop/Activity - Specific Recommendations

Fruits and Vegetables, including Tuber Crops and Mushrooms

24. The assistance to existing nursery units be provided on revolving fund basis and private sector be encouraged for establishing small nurseries.

25. A new component of providing assistance for establishing of tissue analysis laboratories in the major states be included in the scheme.

26. Cataloguing of elite trees and establishing a national register for multification of these clones be taken up.

27. National Seeds Corporation be involved in a bigger way for production of seeds of vegetables particularly FI hybrids and TPS.

28. More units for production of spawn and pasturised compost for mushroom be set up. Revolving fund for running the old and new units be provided.

29. Assistance for training, post harvest handling facilities including marketing and primary processing of mushrooms be included in the scheme.

Post harvest Management, Marketing and Exports

30. Developing infrastructure for post-harvest handling and marketing of horticulture commodities, particularly perishable, using improved technologies with the primary objective of reducing losses and improving quality of the products should receive highest priority and larger investment in the IX Plan.

31. The required infrastructure need to be developed around each major production zone, adopting the concept of 'Packing Houses', with each such unit linked to the wholesale market.

32. Appropriate combination of post-harvest infrastructure facilities need to be created at the level of primary cooperative societies, intermediary levels and terminal infrastructure projects.

33. While National Horticulture Board (NHB) should continue to play the role of a promoter, financial institutional/banks should come forward in financing post harvest infrastructure projects.

34. Intermediary technologies/project should be encouraged for hinter-lands and difficult areas for the purpose of providing soft loans for marketing projects.

35. Market information service for horticulture crops should be strengthened. Collection and dissemination of market intelligence relating to horticulture crops in foreign markets should also be initiated.

36. Agriculture Produce Market Committee should come under the purview of the Ministry of Agriculture so that proper linkages for providing infrastructure can be facilitated.

37. New regulated markets should be established alongwith secondary and tertiary markets.

38. The financial assistance to professional organisations for the development of horticulture should be enhanced.

39. The national standards for horticulture products should be conformity with the international standards of EEC.

40. There is need to aggressively promote selected horticulture products in overseas markets.

41. Horticulture Development Boards should be set up in each state for promoting horticulture activities particularly post harvest management, marketing and export. These Boards will be linked to the NHB for coordination.

42. Specialised facilities like irradiation for onion and potato, X-ray detection of spongy tissue in Alphanso mango, vapour heat treatment, crop specific curing/ripening chamber etc., are required to be set up to cater to the sophisticated markets abroad and in domestic metropolitan cities.

43. More airports should be converted into international airports for handling perishable commodities with each airport having independent and efficient transit and storage system.

44. Similarly for internal transportation improvement in road network and development of specialised wagons be given priority.

Use of Plastics in Agriculture

45. Use of plastics in agriculture, also known as Plasticulture, involving use of drip and sprinkler irrigation systems, greenhouses, mulching etc., has gained wide acceptablity in major horticultural states, and therefore, its promotion should be pursued vigorously for efficient water management, reducing cost of production, enhancing productivity and quality, and extending area under irrigation through saving on water and power.

46. Evaluation of the impact of Plasticulture, constraint faced and the reasons for poor take-off in other states therefore becomes pre-requisite to make the technology more attractive and ensure benefit of the same spread uniformally to all states.

47. The categorisation of states for cost calculation and subsidy support for drip irrigation should be revised, and based on the coverage achieved during the Eighth Plan.

48. Drip irrigation scheme be integrated with Million Well Scheme under Jawahar Rozhar Yojana for improving water use efficiency.

49. Pattern of assistance for drip irrigation should ensure that the farmers' contribution remains same in all categories of states. Higher rate of assistance be considered for hill/tribal and backward areas.

50. Use of sprinkler system in annual horticulture crops be included for subsidy support in the Ninth Plan.

51. Demonstration on use of greenhouses for protected cultivation and also mulching be covered for support in the Ninth Plan. These may be set up in governmental/institutional farms on priority basis.

52. Use of low tunnels, shading nets and artificial nets be promoted as a part of improved technology for protected cultivation.

53. Quality standards for different components of greenhouses be developed and enforced.

54. Development of eco-friendly bio-degradable plastic film be promoted through imports as well as indigenous efforts.

55. Other applications of plastics such as lining of water courses, PVC water distribution network pond lining, packaging of fruits, vegetables, flowers, be encouraged.

56. NCPA should be upgraded to an autonomous institution, and its office suitably strengthened to allow it to play a major role in future.

57. Similarly, Plasticulture Development Centres (PDCs) should play a greater role in promotion of plasticulture, monitoring of Schemes in the States, location specific research, training etc., and adequately strengthened.

58. Introduction of exclusive course on plasticulture be encouraged.

59. Plastics Design and Technology Centre be set up for developing prototypes keeping in mind optimal product costs, for testing facility of plastic materials and for creating facilities for weathering and field performance tests.

PART II

EXPORT POTENTIAL OF INDIA'S FLORICULTURAL PRODUCTS

CONTENTS

I. FLORICULTURAL PRODUCTS

Definition

As per International Trade Classification, floricultural products encompass the following:

SITC	BTN	Description
292.61	06.01	Bulbs, Tubers, Tuberous Roots.
292.69	06.02	Other live plants (including trees, shrubs, bushes, roots, cuttings and slips)
292.71	06.03	Cut-flowers and flower buds, fresh dried, dyed, bleached, impregnated or otherwise prepared.
292.72	06.04	Foliage, branches and other parts (other than flowers or buds) of trees, shrubs, bushes and other plants, and mosses, lichens and grasses, being goods of a kind suitable for bouquets or ornamental purposes, fresh, dried, dyed, bleached, impregnated or otherwise prepared.

Note: The Government of India has adopted a new Indian Trade Classification which is based on Harmonised System of Commodity Description and Coding Systems. HS Codes of Government of India follow the BTN (Brussels Tariff Nomenclature)

Bulbs, Tubers and Tuberous Roots. These are products that may be planted in pots, boxes or similar containers.

Live Plants. These are plants that are used for permanent or semi-permanent decoration in offices, homes and buildings. These are whole plants which are suitable for planting or for ornamental purposes.

Ornamental plants include flower bulbs, corms and tubers in the dormant as well as growth and blossoming stage and other live plants such as young vegetable plants and mushrooms' spawn which

cannot always be separated from ornamental plants. Live ornamental plants include:

i) Indoor plants ready for sale (pot plants), to be placed indoor or less frequently in the open in pots or flower bowls;

ii) Bed, dining and balcony plants for planting out in the open in beds, tubs, windows or balcony boxes;

iii) Rooted and unrooted cuttings for cut-flowers especially of carnations and chrysanthemums which are supplied to cut flower growers as operational inputs;

iv) Cuttings, canes, air layers, seedings and other young plants for pot plants as described above;

v) Cut flowers and foliage.

Cut Flowers. These refer to flowers and flower buds with a suitable stem of varying length, which makes them suitable for bouquets or for ornamental purposes. Cut flowers generally mean all cut plant components the economic value of which lies in the decorative effects of their blossoms. Examples of cut-flowers are roses, carnations, chrysanthemums, orchids, gladioli and many other types.

Cut Foliage. This refers to plant parts i.e., leaves, twigs, grasses, shoots etc., the economic value of which lies not in the decorative effect of the blossoms but in its colour and shape. Fresh cut foliage is used in combination with cut flowers for bouquets, flower arrangements and decorations when cut flowers and foliage are presented together in pre-arranged bunches. Fresh foliage is recorded in trade statistics as a secondary product and the bunch is classified as cut flowers.

Floricultural products also include dried flowers and foliage, propagating materials (seeds, cuttings, bulbs etc.), tissue cultured plants and starter and adult ornamental plants including house plants.

II. WORLD TRADE IN FLORICULTURAL PRODUCTS

Global trade in floricultural products is recorded in terms of live plants and bulbs, cut flowers and cut foliage.

In 1993, world imports totalled US$6406 million while world exports totalled US$6952 million. The two-way global trade was thus in excess of US$13 billion. In 1994, world imports of floricultural products increased to US$6819 million.

WORLD IMPORTS

Table 1 provides world imports of floricultural products, product-wise.

Table 1
World Imports of Floricultural Products

US$ Million

Product	1990	1991	1992	1993	1994
Live plants and bulbs	4229	3664	3992	2870	3027 (P)
Cut flowers	4105	3390	3592	3055	3792 (P)
Cut foliage	560	471	509	481	
Total	8894	7525	8023	6406	6819 (P)

P: Provisional

Sources: i) International Trade Statistics, Volume II, United Nations, 1993 for data for 1990-1993.

ii) Market News Service (MNS), International Trade Centre, UNCTAD/WTO, April 1996 for 1944 data.

World imports of floricultural products measured in value terms declined in 1993 as compared to the period from 1990 to 1992. Imports fluctuated from year to year showing ups and downs in alternate years. Imports declined steeply in 1993, by over 20%, compared to 1992. In 1994, however, imports showed an increase of over 6 per cent compared to 1993.

World imports of cut-flowers and foliage together accounted for a share between 51 per cent and 55 per cent in the overall imports of floricultural products during the period 1990-94. During the same period, world imports of live-plants and bulbs accounted for a share between 45 per cent and 49 per cent. In 1994, however, imports of cut flowers and foliage accounted for about 56 per cent of all floricultural products.

IMPORTS OF CUT-FLOWERS

A large number of countries import cut flowers. (There are over 50 countries, each of which is importing over US$100,000). Germany, USA, United Kingdom, France, Netherlands and Japan are the major importers and together they accounted for 75.2 per cent of imports in 1993. Germany, by far, is the biggest importer and it accounted for 29.2 per cent of world imports of cut flowers in 1993. Table 2 furnishes imports of cut flowers by major countries.

Table 2
World Imports of Cut Flowers - By Major Importing Countries

Value: US$ Million

Counntry	1990	1991	1992	1993
Germany	2087	1245	1322	893
	(50.08)	(36.7)	(36.8)	(29.2)
USA	406	403	437	469
	(9.9)	(11.9)	(12.2)	(15.4)
United Kingdom	302	306	319	297
	(7.4)	(9.0)	(8.9)	(7.9)
France	315	338	320	243
	(7.7)	(10.0)	(8.9)	(7.9)
Netherlands	165	185	244	238
	(4.0)	(5.5)	(6.8)	(7.8)
Japan	118	144	128	158
	(2.9)	(4.2)	(3.6)	(5.2)
Other countries	710	769	822	757
	(17.3)	(22.7)	(22.9)	(24.8)
World Total	**4105**	**3390**	**3592**	**3055**
	(100.0)	**(100.0)**	**(100.0)**	**(100.0)**

Note : Figures in brackets indicate percentage share in the total
Source : International Trade Statistics, Volume II, United Nations, 1993.

From Table 2, the following market characteristics are evident.

— German market for cut flowers declined substantially from a share of 50.8 per cent in 1990 to 29.2 per cent in 1993.

— US market has been growing steadily. Its share in total imports increased from 9.9 per cent in 1990 to 15.4 per cent in 1993.

— Imports into the United Kingdom market are slowly but steadily increasing

— Imports into French market are showing fluctuating trends

— Netherlands market has been growing steadily

— Japanese market is showing definite trend of growth although slow.

— Imports into 'other countries' are increasing and the trend is continuing.

Imports of Live Plants and Bulbs

The market for live plants and bulbs is characterised by a large number of importers (There are over 50 countries, each country importing over US$100,000)

Import market for live plants and bulbs, however, has been shrinking from the peak of US$4229 million in 1990 to US$2870 million in 1993 but staging a slow recovery to reach US$3027 million in 1994.

Major importers are Germany, France, Italy, United Kingdom, USA and Japan and these six countries together accounted for nearly 61 per cent of total imports in 1994. Germany ranked first among the importers with a share of 19.7 per cent.

Table 3 shows imports of live plants and bulbs by major countries.

Table 3
World Imports of Live Plants and Bulbs

US$ Million

Country	1990	1991	1992	1993	1994
Germany	1649	925	1026	519	596
	(39.0)	(25.2)	(26.2)	(18.1)	(19.7)
France	456	463	448	303	332
	(10.8)	(12.6)	(11.4)	(10.6)	(11.0)
Italy	320	341	340	279	251
	(7.6)	(9.3)	(8.7)	(9.7)	(8.3)
United Kingdom	260	266	276	203	241
	(6.1)	(7.3)	(7.0)	(7.0)	(8.0)
USA	179	194	219	236	259
	(4.2)	(5.3)	(5.6)	(8.2)	(8.6)
Japan	69	97	113	127	163
	(1.6)	(2.6)	(2.9)	(4.4)	(5.4)
Other countries	1296	1378	1500	1203	1185
	(30.6)	(37.6)	(38.2)	(41.9)	(39.1)
World Total	4229	3664	3922	2870	3027
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

Sources : i) International Trade Statistics, Volume II, United Nations, 1993 for data from 1990-93.
ii) Market News Service (MNS), International Trade Centre, UNCTAD/WTO, April 1996 for data for 1994.

From Table 3, the following market chacteristics are observed.

— Germany has been the major importer of live plants and bulbs. Imports into Germany, however, declined steeply from US$1649 million in 1990 to US$596 million in 1994. Nevertheless Germany has maintained its lead and remained number one importer.

— US market has been witnessing growth and during the period 1990-94, the growth was 55 per cent.

— Japanese market registered rapid growth of 136 per cent during the period 1990-94.

— Share of French market remained at 11 per cent in 1994 although it experienced ups and downs in between.

— Italy and United Kingdom registered increases in their respective shares of world imports of live plants and bulbs.

Imports of Cut Foliage

Of the total imports of floricultural products, imports of cut foliage constituted a relatively small share of 6.3 to 7.5 percent during 1990-93. In 1993, the total value of world imports of cut-foliage amounted to US$481 million. Table 4 provides details of imports by major importing countries.

Table 4
World Imports of Cut Foliage — By Major Importing Countries

US$ Million

Country	1990	1991	1992	1993
Germany	286	170	181	137
	(51.1)	(36.1)	(35.6)	(28.5)
Netherlands	78	90	105	112
	(13.9)	(19.1)	(20.6)	(23.2)
United States	52	48	51	56
	(9.3)	(10.2)	(10.0)	(11.6)
Switzerland	27	28	28	27
	(4.8)	(5.9)	(5.5)	(5.6)
United Kingdom	22	25	23	19
	(3.9)	(5.3)	(4.5)	(4.0)
France	13	15	16	
	(1.8)	(2.8)	(2.9)	(3.3)
Japan	9	11	12	17
	(1.6)	(2.3)	(2.4)	(3.5)
Other countries	76	86	94	97
	(13.6)	(18.3)	(18.5)	(20.2)
World Total	**560**	**471**	**509**	**481**
	(100.0)	**(100.0)**	**(100.0)**	**(100.0)**

Note : Figures in brackets indicate percentage share in the total
Source : i) International Trade Statistics, Volume II, United Nations, 1993.

From table 4, the following market characteristics are observed.

— Cut foliage market, in step with world imports of floricultural products, has been declining

— Germany, Netherlands, USA, Switzerland, United Kingdom, France and Japan are the major markets for cut-foliage and they together accounted for about 80 per cent of global imports. Germany, Netherlands and USA together accounted for over 60 per cent of total imports.

— Europe is the largest import market. More than 60 per cent of total imports are accounted for by Europe only.

— Germany continues to be the number one importer of cut foliage, although its share of the total import market declined drastically to 28.5 per cent in 1993 as compared with 51.1 per cent in 1990.

— Netherlands market is growing gradually over the years and achieved a share of 23.2 per cent of the total market in 1993. During the period 1990-93, Netherlands import market registered a growth of 45 per cent.

— Japan has emerged as an important market for cut foliage. Imports nearly doubled from US$ 9 million in 1990 to US$17 million in 1993 and its share increased from 1.6 to 3.5 per cent during the same period.

Major Import Markets

Markets for floricultural products are spread over many countries on the globe. Global markets have been listed as per their ranking vide Annexure 1.

Ten countries, however, are the major importers and they together accounted for over 85 per cent of the total world imports during the period 1990-94. These countries include the following:

Germany	Italy
USA	Japan
France	Switzerland
United Kingdom	Austria
Netherlands	Sweden

Table 5 shows imports into major countries.

Table 5
Ten Major Import Markets for Floricultural Products

Value : US$ Million

Country	1990	1991	1992	1993	1994
Germany					
A. Bulbs/Cuttings/Plants	825	925	1026	536	596
B. Cut Flowers/Foliage	1187	1416	1504	1037	1103
Total	2012	2341	2530	1573	1699
	(29.8)	(31.8)	(32.3)	(25.2)	(24.9)
USA					
A. Bulbs/Cuttings/Plants	179	194	219	236	259
B. Cut Flowers/Foliage	460	451	488	525	574
Total	639	645	707	761	833
	(9.5)	(8.8)	(9.0)	(12.2)	(12.2)
France					
A. Bulbs/Cuttings/Plants	456	463	448	303	332
B. Cut Flowers/Foliage	325	351	335	259	285
Total	781	814	783	562	617
	(11.6)	(11.1)	(10.0)	(9.0)	(9.0)
United Kingdom					
A. Bulbs/Cuttings/Plants	260	266	276	203	241
B. Cut Flowers/Foliage	324	331	342	316	338
Total	584	597	618	519	579
	(8.6)	(8.1)	(7.9)	(8.3)	(8.5)
Netherlands					
A. Bulbs/Cuttings/Plants	207	219	248	161	179
B. Cut Flowers/Foliage	244	275	349	327	326
Total	451	494	597	488	555
	(6.7)	(6.7)	(7.6)	(7.8)	(8.1)
Italy					
A. Bulbs/Cuttings/Plants	320	341	340	263	251
B. Cut Flowers/Foliage	115	144	143	144	134
Total	435	485	483	407	385
	(6.4)	(6.6)	(6.2)	(6.5)	(5.6)
Japan					
A. Bulbs/Cuttings/Plants	69	97	113	127	163
B. Cut Flowers/Foliage	127	156	140	174	215
Total	196	253	253	301	378
	(2.9)	(3.4)	(3.2)	(4.8)	(5.5)
Switzerland					
A. Bulbs/Cuttings/Plants	145	151	159	153	171
B. Cut Flowers/Foliage	168	169	168	160	179
Total	313	320	327	313	350
	(4.6)	(4.3)	(4.2)	(5.0)	(5.1)

Austria					
A. Bulbs/Cuttings/Plants	92	95	103	101	111
B. Cut Flowers/Foliage	98	102	103	96	106
Total	190	197	206	197	217
	(2.8)	(2.7)	(2.6)	(3.2)	(3.2)
Sweden					
A. Bulbs/Cuttings/Plants	164	167	178	137	139
B. Cut Flowers/Foliage	81	90	94	74	77
Total	245	257	272	211	216
	(3.6)	(3.5)	(3.5)	(3.4)	(3.2)
Total of 10 Countries					
A. Bulbs/Cuttings/Plants	2717	2918	3110	2220	2442
B. Cut Flowers/Foliage	3129	3485	3666	3112	3387
Total	5846	6403	6776	5332	5829
Total World Imports of Floricultural Products					
A. Bulbs/Cuttings/Plants	3327	3550	3792	2774	3027
B. Cut Flowers/Foliage	3433	3812	4035	3476	3792
Total	6760	7362	7827	6250	6819
Share of 10 Countries in the total					
A. Bulbs/Cuttings/Plants	49.2	48.2	48.4	44.4	80.0
B. Flowers/Foliage	50.8	51.8	51.6	55.6	89.3
Total	86.5	87.0	86.6	85.3	85.5

Source : Market News Service (MNS), International Trade Centre, UNCTAD/WTO, April, 1996.

From Table 5, following market information emerges:

— Germany, USA, France, United Kingdom and Netherlands, together accounted for about 63 per cent of world imports of floricultural products in 1994.

— Europe is the largest market for floricultural products

— Germany is the single largest market and it accounted for 25 per cent of world imports in 1994.

— Japan is a growing market for horticultural products

Imports from India

India is emerging as a source of supply to global markets.

Table 6 indicates imports from India by selected countries[1].

Table 6
Imports of Floricultural Products from India by Selected Countries

Value : US$ Million

	1990	1991	1992	1993	1994
Bulbs/Cuttings/Plants					
US Market					
Total Imports	178.60	194.18	218.60	235.60	259.00
Imports from India	0.01	0.05	0.15	0.97	0.58
India's Percentage Share	0.00	0.03	0.07	0.41	0.22
Netherlands					
Total Imports	207.17	219.41	248.08	161.39	178.88
Imports from India	0.44	1.06	1.74	0.91	1.20
India's Percentage Share	0.21	0.48	0.70	0.56	0.67
New Zealand					
Total Imports	0.95	1.47	2.50	2.54	3.76
Imports from India	0.00	0.02	0.08	0.10	0.10
India's Percentage Share	0.00	1.36	3.20	3.94	2.66
Malaysia					
Total Imports	1.18	2.17	2.62	2.29	1.72
Imports from India	0.00	0.00	0.00	0.13	0.00
India's Percentage Share	0.00	0.00	0.00	5.68	0.00
Cut Flowers/Foliage					
Germany					
Total Imports	1186.84	1415.60	1503.87	1037.27	1102.80
Imports from India	1.61	1.94	1.99	2.28	3.11
India's Percentage Share	0.14	0.14	0.13	0.15	0.28
USA-Puerto Rico					
Total Imports	459.73	450.86	488.35	525.09	573.92
Imports from India	1.52	2.15	2.78	3.17	5.02
India's Percentage Share	0.33	0.48	0.57	0.60	0.87
Netherlands					
Total Imports	244.05	275.02	349.25	327.32	375.57
Imports from India	0.45	0.44	0.62	0.77	1.84
India's Percentage Share	0.18	0.16	0.18	0.24	0.49
United Kingdom					
Total Imports	324.04	331.38	342.38	315.83	338.07
Imports from India	0.04	0.17	0.25	0.78	0.99
India's Percentage Share	0.01	0.05	0.07	0.25	0.29
France					
Total Imports	324.79	350.90	335.42	258.68	285.13
Imports from India	0.27	0.49	0.12	0.15	0.27
India's Percentage Share	0.08	0.14	0.04	0.06	0.09

1. Value of imports by selected countries in 1994 was US$3739 million as against world imports of US$6819 million, constuting 54.8 per cent of world imports.

Japan					
Total Imports	126.97	155.54	140.17	174.35	215.48
Imports from India	0.13	0.13	0.16	0.11	0.24
India's Percentage Share	0.10	0.08	0.11	0.06	0.11
Italy					
Total Imports	114.76	143.84	143.45	144.05	134.06
Imports from India	0.71	0.99	0.96	1.04	1.34
India's Percentage Share	0.62	0.69	0.67	0.72	1.00
Austria					
Total Imports	97.80	101.54	103.39	96.46	106.22
Imports from India	0.05	0.05	0.10	0.13	0.15
India's Percentage Share	0.05	0.05	0.10	0.13	0.14
Canada					
Total Imports	51.89	47.19	50.99	55.61	59.82
Imports from India	0.03	0.04	0.07	0.11	0.11
India's Percentage Share	0.06	0.08	0.14	0.20	0.18
Denmark					
Total Imports	36.86	39.10	41.39	49.30	49.90
Imports from India	0.00	0.07	0.13	0.19	0.12
India's Percentage Share	0.06	0.18	0.31	0.39	0.24
Spain					
Total Imports	26.75	37.77	44.53	30.45	29.35
Imports from India	0.20	0.22	0.26	0.19	0.16
India's Percentage Share	0.75	0.58	0.58	0.62	0.55
Mexico					
Total Imports	2.49	4.09	10.29	14.15	17.13
Imports from India	0.00	0.00	0.00	0.00	0.72
India's Percentage Share	0.00	0.00	0.00	0.00	4.20
Australia					
Total Imports	7.56	5.54	5.05	4.18	5.50
Imports from India	0.06	0.11	0.09	0.08	0.14
India's Percentage Share	0.79	1.99	1.78	1.91	2.55
Oman					
Total Imports	2.20	2.24	3.03	2.64	2.39
Imports from India	0.06	0.12	0.32	0.01	0.03
India's Percentage Share	2.73	5.36	10.56	0.38	1.26
Sri Lanka					
Total Imports	0.01	0.00	0.06	0.27	0.51
Imports from India	0.001	0.00	0.06	0.12	0.27
India's Percentage Share	0.00	0.00	0.00	44.44	52.94
Total value of Imports by Selected Countries as listed above	3394.64	3777.84	4033.42	3184.41	3739.21
Imports from India	5.58	8.05	9.88	11.24	16.39
India's percentage Share in the selected Countries	0.16	0.21	0.25	0.35	0.44

Source : Market News Service (MNS), International Trade Centre, UNCTAD/WTO, April, 1996.

There has been a significant increase in the exports of floricultural products from India during the last five years as is evident from table 6 above. India's exports registered a nearly three-fold increase from US$5.58 million in 1990 to US$16.39 million in 1994 to the selected markets. The increase has been steady and without any fall in between.

In all the important markets, India's share is insignificant. Export potential for floricultural products is very sizeable and it is for India to tap the potential without losing time. Acceptability of India's floricultural products has been amply demonstrated by leading import markets. The time is opportune to put in place policies that are investor-friendly to strengthen the supply base and delivery systems and mechanisms.

World Exports

Table 7 provides world exports of floricultural products, product-wise.

Table 7
World Exports of Floricultural Products

US$ Million

Product	1990	1991	1992	1993
Live plants and bulbs	3451	3503	3807	3297
Cut Flowers	2857	3075	3395	3207
Cut Foliage	344	372	389	448
Total	**6652**	**6950**	**7591**	**6952**

Source : International Trade Statistics, Volume II, United Nations, 1993.

Overall exports of floricultural products registered an increase from US$6652 million in 1990 to US$7591 million in 1992, an increase of 14 per cent. In 1993, however, exports declined to US$6952 million from US$7591 million, a fall of 8.4 per cent.

Live plants and bulbs, tubers and tuberous roots are clubbed together in international trade statistics and they accounted for the largest item with a share of 47.4 per cent in 1993. Exports of cut flowers too witnessed an increasing trend from US$2857 in 1990 to

US$3395 in 1992, an increase of 18.8 per cent but in 1993 exports declined to US$3207 million, a fall of 5.5 per cent. Exports of cut foliage have shown a steady increase over the years but as a single item their share in overall exports of floricultural products accounted for only 6.4 per cent in 1993. Cut flowers and cut foliage together accounted for the largest share of 52.3 per cent in the total world exports of floricultural products in 1993.

Exports of Cut Flowers

A large number of countries are exporting cut-flowers. Netherlands, Colombia, Italy, Israel and Kenya are the major exporters. India is emerging as an important exporter particularly during the last five years. Table 8 provides world exports of cut-flowers by selected supplying countries.

Table 8
World Exports of Cut Flowers By Selected Exporting Countries

Value : US$ Million

Country	1990	1991	1992	1993
Netherlands	1950	2086	2260	1997
	(68.38)	(67.8)	(66.6)	(62.3)
Colombia	229	280	341	382
	(8.0)	(9.1)	(10.0)	(11.9)
Israel	133	147	123	127
	(4.7)	(4.8)	(3.6)	(4.0)
Italy	143	125	141	103
	(5.0)	(4.1)	(4.2)	(3.2)
Kenya	13	23	63	83
	(0.5)	(0.7)	(1.9)	(2.6)
India	1	3	3	3
	(Neg.)	(0.1)	(0.1)	(0.1)
Others	388	411	464	512
	(13.6)	(13.4)	(13.7)	(16.0)
Total	2857	3075	3395	3207
	(100.0)	(100.0)	(100.0)	(100.0)

Note : Figures in brackets indicate percentage share in the total
Source : International Trade Statistics, Volume II, United Nations, 1993.

Netherlands is the biggest exporter consistently accounting for over 60 per cent of world exports although there have been fluctuations in the value of exports over the years. Besides being a producer and exporter on its own, the Netherlands is also a major distribution centre for the floricultural products of many countries. A

number of countries send their floricultural products to the Netherlands for auctions and onward distribution in Western Europe. The Dutch flower auctions are known all over the world as they provide an open market system of trading. Flower auctions are a very important trade channel. 95 per cent of cut flowers and 70 per cent of pot plants go through the auctions. Two of the world's largest flower auctions are held at AALSMEER (Near Amsterdam) and in the WESTLAND (near Rotterdam).

European markets are highly dependent on the Dutch trade for a variety of floricultural products throughout the year. The Netherlands supplies over 80 per cent of cut flowers imported by Germany, France, Belgium and Denmark. In live plants, the Netherlands supplies over 60 per cent of the total imports of Germany, Italy, Spain, Belgium and Denmark.

Exports from Colombia have increased steadily and during the period 1990-93, exports grew by 66.8 per cent. During the period 1983 to 1993 Colombia's cut flower exports escalated from US$120 million in 1983 to US$382 million in 1993 - an average growth rate of 22 per cent per year over the ten year period. Colombia ranks second next only to the Netherlands but the volume of her exports is only 1/6th of the Netherlands exports.

Colombia's principal exports are carnations, chrysanthemums and roses. Colombia enjoys reputation for the supply of and consistently high quality standard products. Bogota airport has a modern flower terminal of 5,000 square metres area and this has enabled the producers to operate a full temperature—controlled distribution system from the farm to the airport (called the cold chain). Major Colombian producers have well organised marketing arrangements and some of them have established wholly owned importing/wholesaling companies in USA and Europe. USA is Colombia's single largest market. 80-85 per cent of Colombia's total exports of cut flowers are directed to the US market. Geographical proximity to the major consuming centres in the USA is Colombia's major strength and opportunity. The relatively lower airfreight from Colombia to the USA makes Colombia's flowers very competitive compared to European supplies.

Colombia started exports of flowers way back in 1964 and it has an estimated 4,700 hectares under floriculture cultivated under green house conditions. There are around 250 companies engaged in floriculture business in Colombia.

Israel has emerged as the third largest exporter of cut flowers in the world. Although exports fluctuated and even declined in recent years, Israel accounted for 4 per cent of world exports of cut flowers in 1993. Growth in exports from Israel is very impressive and during the period 1985 to 1993 the growth was about 12 per cent per annum (exports increased from US$65.4 million in 1985 to US$127 million in 1993).

Israel has about 1850 hectares under floriculture, about three-fourths of which is covered. Main varieties of flowers exported from Israel include carnations, gypsohila and roses. More than 90 per cent of Israel's flower exports are directed to Europe and the balance to the US market. In Europe the principal markets are the Netherlands, Germany and the United Kingdom.

Agricultural Export Company (AGREXCO) of Israel undertakes export marketing of cut-flowers under the brand name "Carmel". Strict Quality control is observed and the flowers are processed under a complete cold chain from farm to the packing house to the temperature—Controlled flower distribution centre at Lod Airport.

Growth in exports from Kenya is remarkable as during the period 1990-93, exports increased by 638 per cent. Prior to 1993, exports were subject to serious fluctuations. Kenya's share in world exports remained during 1990-92 between 0.5 and 1.9 per cent. In 1993, there was a big turnaround in Kenya's exports when exports touched a level of US$83 million and accounted for a share of 2.6 per cent in global exports. Kenya's rise to fifth position in global exports is a good example for many developing countries with exports spurting from US$8.8 million in 1985 to US$83 million in 1993. A wide range of flowers are exported from Kenya including alstroemeria, Chrysanthemums, roses, spray carnations and standard carnations. Kenya's main export markets are Germany and the Netherlands.

EXPORTS OF LIVE PLANTS AND BULBS

Many countries are exporting live plants and bulbs. Developed countries, however, are the major exporters. World exports declined from US$3451 million in 1990 to US$3297 in 1993, a fall of 4.5 per cent. Table 9 shows world exports of live plants and bulbs by selected exporting countries.

Table 9
World Exports of Live Plants and Bulbs by Selected Exporting Countries

US$ Million

Country	1990	1991	1992	1993
Netherlands	1873	2003	2204	1913
	(54.3)	(57.2)	(57.9)	(58.0)
Denmark	343	373	391	360
	(9.9)	(10.6)	(10.3)	(10.9)
Belgium	279	294	299	200
	(8.1)	(8.4)	(7.85)	(6.1)
Germany	330	176	179	138
	(9.6)	(5.0)	(4.7)	(4.2)
Italy	104	114	121	122
	(3.0)	(3.3)	(3.2)	(3.7)
India	2	2	1.5	2
	(0.05)	(0.06)	(0.04)	(0.06)
Others	520	541	611	562
	(15.1)	(15.4)	(16.0)	(17.0)
World Total	**3451**	**3503**	**3807**	**3297**
	(100.0)	**(100.0)**	**(100.0)**	**(100.0)**

Note : Figures in brackets indicate percentage share in the total.
Sources : i) International Trade Statistics, Volume II, United Nations, 1993.

Netherlands has been the biggest exporter of live plants and bulbs in the world with a share of 58 per cent in 1993. Other major exporters included Denmark, Belgium, Germany and Italy. India is emerging as a supplier to world markets.

EXPORTS OF CUT FOLIAGE

World exports of cut foliage increased by 15 per cent over 1992 to reach US$448 million in 1993. In the overall exports of floricultural products, cut foliage accounted for a share only of 6.4 per cent in 1993. While many countries are in the export business, Denmark, USA, Italy and Netherlands are the major ones; their combined exports accounted for 54 per cent of world exports in 1993. Table 10 provides world exports of cut foliage in value terms by selected exporting countries.

Table 10
World Exports of Cut Foliage By Selected Countries

US$ Million

Country	1990	1991	1992	1993
Denmark	72	97	90	4
	(20.9)	(26.1)	(23.1)	(9.6)
USA	57	65	71	88
	(16.6)	(17.5)	(18.3)	(19.6)
Italy	39	41	36	67
	(11.3)	(11.0)	(9.3)	(15.0)
Netherlands	15	13	14	42
	(4.4)	(3.5)	(3.6)	(9.4)
India	1	1	1	7
	(Neg.)	(Neg.)	(Neg.)	(1.6)
Other countries	160	155	177	201
	(46.5)	(41.7)	(45.5)	(44.9)
World Total	**344**	**372**	**389**	**448**
	(100.0)	**(100.0)**	**(100.0)**	**(100.0)**

Note : Figures in brackets indicate percentage share in the total
Source : International Trade Statistics, Volume II, United Nations, 1993.

While Denmark's exports fluctuated very widely, USA maintained consistent export growth. USA's main export product is the leather leaf fern.

III. CHANGING PATTERNS IN GLOBAL PRODUCTION CONSUMPTION, TRADE AND DISTRIBUTION

Cultivation

Presently more than 140 countries are involved in the cultivation of floricultural crops. However, during the past four decades floricultural crops cultivation has undergone significant changes. The land area under the crop has remained stationery in the traditionally recognized production centres such as the USA, the Netherlands and Mexico.

In the 1950s, Germany had almost twice as much area as the Netherlands under floriculture. In 1992, the Netherlands had 20 per cent greater area under floriculture crop than in Germany.

During the late 1970s and early 1980s, new production centres emerged. These were Colombia, Israel, Thailand and Kenya and

these countries specialised in the export of cut flowers. During the late 1980s and early 1990s, the developed countries faced the problem of increasing production costs and thus more production was shifted offshore. New countries like Zimbabwe and Morocco in Africa, Ecuador and Costa Rica in Latin America and Singapore, Malaysia and India in Asia started production and export of floriculture products, mainly cut flowers.

Table 11 depicts area under flower crops in selected countries. India stands out separately with relatively large area under floriculture.

Table 11
Area Under Flower Crops Selected Countries (1991)

Area : Hectares

Europe	:	15,000 to	16,000
Japan	:	13,400	
USA	:	5,000	
Mexico	:	4,000	
Colombia	:	4,300	
Taiwan	:	6,300	
Kenya	:	800	
India	:	38,000	

Source : Paper on "Floriculture Industry in India", by Vishnu Swarup, Into-American Hybrid Seed, Delhi.

In Europe, most of the flower production is under Green Houses. Country-wise area is shown below:

Table 12
Floriculture under Green House Cultivation in Europe

Area : Thousand Hectares

Country	Total	Floriculture
Italy	....	5
Spain	....	1
Netherlands	9	5
Germany	-	2
France	6	2
Greece	3	...
Great Britain	2	1
Belgium	2	1
Portugal	....	+
Denmark	1	+
Ireland	+	+
Luxembourg	...	+

Source : Paper on "Floriculture Industry in India", by Vishnu Swarup, Indo-American Hybrid Seed, Delhi.

Consumption

Consumption of floricultural products is closely linked to the GDP of countries. Developed countries with high per capita incomes obviously are the major consuming markets. With rising incomes, consumption of floriculture products is on the increase. Consumption in Germany spurted by 150 per cent since 1970. In USA, increase in consumption resulted in more and more imports to supplement domestic production. Despite being the largest producer of cut flowers, a significant percentage of carnations (80 per cent), chrysanthemums (70 per cent) and roses (40 per cent) are imported from Latin America. Consumption of floricultural products in major consuming countries is shown in Table 13.

Table 13
Capita Consumption of Flowers and Plants in Major Consuming Countries

Value: Dfl.

Country	1991			1993		
	Flowers	Plants	Total	Flowers	Plants	Total
Norway	120	150	270	112	158	270
Switzerland	155	93	248	143	90	233
Germany	81	73	154	83	79	162
Denmark	68	145	213	55	101	156
Sweden	72	105	177	64	83	147
Austria	73	70	143	78	66	144
Italy	95	38	133	98	39	137
Holland	73	51	124	79	51	130
France	54	47	101	58	49	107
Belgium/Luxembourg	66	67	133	68	36	104
United States	47	—	—	44	48	92
Japan	93	—	93	81	—	81
Greece	33	32	65	29	31	60
Great Britain	38	16	54	38	15	53
Spain	27	20	47	28	20	48

Note : Dfl : Approx. Rs. 22

Source : Flower Council of Holland.

Increased consumption of floricultural products is envisaged to lead to increased demand particularly in the late 1990s. This would call for additional supplies from new production centres in developing countries.

Cultivation of floricultural products in some of the developing countries is on the increase to cater to the global markets mainly to earn foreign exchange. The leading exporting developing countries are:

—	Colombia	:	Carnation and roses
—	Thailand	:	Orchids
—	Malaysia	:	Orchids
—	Singapore	:	Orchids
—	Kenya	:	Carnations, roses, chrysanthemums and statice
—	Zimbabwe	:	Roses and gladiolus

Other emerging developing countries include Morocco in Africa, Ecuador and Costa Rica in Latin America and India in Asia.

Demand Pattern

Some of the estimates indicate expansion in demand for floricultural products in Western Europe, Japan and USA as may be seen from Table 14.

Table 14
Estimate of Demand for Floricultural Products in Selected Regions/Countries

Value : US$ Billion

Region/Country	Year	Demand (in Value)
Western Europe	1990	12
	1995	15
	2000	18
Japan	1990	05
	1995	07
	2000	09
United States	1990	06
	1995	08
	2000	11

Source : Bureau of Holland.

The consumer has wide range of floricultural products to choose from as could be seen from the cut flowers and pot plants that are auctioned at Holland. Tables 15 and 16 indicate the cut flowers and pot plants that are popular at the auctions in Holland.

Table 15
Top Ten Cut Flowers

Auction Turnover: Dfl: Million.

		1993	1994	Percentage
1.	Rose	902	994	10%
2.	Chrysanthemum	581	278	%
3.	Tulip	265	569	1%
4.	Carnation	275	261	5%
5.	Lily	237	244	3%
6.	Gerbera	133	150	13%
7.	Freesia	145	138	5%
8.	Cymbidium	102	110	8%
9.	Alstroemeria	79	81	3%
10.	Limonium	68	72	6%

1 Dfl. = Approx. 22 %
Number of cut flowers : 10,14,90,00,000
Source: Flower Council of Holland.

Table 16
Top Ten Pot Plants

Auction Turnover: DfL: Million

		1993	1994	Percentage
1.	Ficus	119	125	5%
2.	Dracaena	69	64	-7%
3.	Kalanchoe	51	53	4%
4.	Begonia	45	48	7%
5.	Chrysanthemum	43	46	7%
6.	Rhodoendron Simsii (Azalea)	40	39	-3%
7.	Hedera	33	38	15%
8.	Saintpaulia	35	36	3%
9.	Spathiphyllum	30	33	10%
10.	Yucca	36	33	-8%

1 Dfl. = Approx. 22 %
Number of Plants : 95,40,90,00,000
Source : Flower Council of Holland.

Channels of Distribution

Product quality and assortment are important in the final delivery. Quality is also a function of the distribution chain.

The quality of the flower is determined both by its external and internal qualities. Externally, the flower should have a good appearance, free from all bruises, the colour should be clear and no insects or disease should be visible. Vase life is determined by the internal quality.

Quality of the product can be ensured by growing good quality and this is possible through right selection of varieties. Equally it is necessary to ensure that the selected varieties have good vase life.

Good growing practices need to be practised which should include fertilizer application, pest and disease management, post harvest handling etc.

Sending a quality product from the farm to the destination and finally to the end-user is very crucial. The distribution chain is very important. Some of the problems encountered in the distribution chain are:

— Long periods of transport (including transhipments)
— Absence of optimal temperatures
— High ethylene levels
— Bad handling
— Bad water quality (high bacterial count)
— Inappropriate packaging.

The Dutch auctions have a five digit system for coding for the types and varieties of flowers available.

End-Uses and Channels of Distribution. Usage pattern and channels of distribution are closely related. Table 17 indicates the market segments.

Table 17
Market Segments

Percentage

Country	Occasions	Home Use	Funeral	Institutional	Total
Germany	14	39	17	—	100
Holland	35	42	8	15	100
Italy	66	14	14	6	100
USA	61	10	25	4	100

Source : Bureau Holland

Channels of distribution differ from market to market. It is the customer's buying habits that determine the channels of distribution. Florists and Supermarkets play an important role in reaching the buyers. Supermarkets have become very effective outlet in a number of countries and they are threatening the florists at the lower end of the market. The frequency with which the customers visit the supermarkets and the customers' impulse buying largely contribute to the popularity of Supermarkets. Table 18 shows the channels of distribution in selected markets.

Table 18
Channels of Distribution in Selected Countries

As percentage of Turnover

Channel	USA	Holland	UK
Florists	75	56	36
Garden centres	—	2	3
Street vendors	—	26	20
Supermarkets	15	12	29
Others	10	4	12

Source : Bureau Holland

In the US market, florists play a very important role as 75 per cent of sales take place through this distribution channel. In Holland and UK, florists, street vendors and Supermarkets are important channels of distribution. In Holland, petrol stations have also emerged as important sales outlets. Table 16 provides data on sales outlets in Holland:

Table 19
Sales Outlets for Horticultural Products in Holland

	Number
Traditional flower shops	4,270
Street and Van Sales	1,740
Supermarkets and Department Stores	2,150
Garden centres	920
Petrol Stations	1,200
Total	**10,280**

Source : Flower Council of Holland.

Packaging

Packaging plays a decisive role, since the success or failure of an export tends to a large extent depend on the packaging - the type selected, its particular features and how well it is suited to the contents. Packaging must preserve the intrinsic qualities of the products.

Losses occur, over 20 per cent, at every stage from harvesting of flowers to retail sale. It is, therefore, necessary to ensure reduction of losses during the various stages of marketing process to make exports a viable proposition. Careful handling, better temperature regulation, phyto-sanitary precautions and use of suitable preservation agents - all these contribute to control of losses and along with it selection of appropriate packaging to protect the products during transportation, handling, storage and distribution.

The package and its contents, commonly referred to as the "package - contents due" are exposed throughout the shipping process to a variety of stresses. The stresses are (i) Mechanical stresses, and (ii) Physical and chemical stresses. Mechanical stresses are directly connected with transportation, handling and warehousing. These are shocks, drops, compression and vibrations. In the physical and chemical stresses, there are many factors. These are heat, cold, humidity (water vapour in the air), dampness (water in a liquid state) and desiccation (lack of water or humidity).

Corrugated fibreboard is the material most frequently used for shipping cut-flowers and foliage as well as certain varieties of green plants and cuttings overseas. It is employed to manufacture many types, sizes and structures of boxes. The corrugated boxes for packaging are a success. This is because the material is suitable for the floricultural products for this shipping, handling and storage requirements from standpoints of strength, lightness and economy.

Wooden boxes could also be used for packaging but they need to be adapted to the flower and they need to be adapted to the flower and foliage market.

Adaptation to Markets. Importing countries' requirements and preferences differ in respect opf package dimensions, arrangement of the products within the container, number of units or bunches, packaging colour, labelling etc.

In Netherlands market, importers normally open the box, immerse the flowers in water for several hours to refresh them, and then repackage them. The original packaging is not kept; instead, new packaging bearing the importer's brand mark and colours, is used.

French market for roses requires all the buds in a single bunch to be of the same height, whereas in most other countries, the buds are arranged in a graduated pattern. The diameters of bunches in France are larger than those elsewhere.

The packaging needs of different markets are to be taken into account while ensuring that packaging is serving the basic purposes right from production until export marketing including consolidation, adaptation to transport modes, identification and presentation.

IV. DEVELOPMENT OF FLORICULTURE IN INDIA

Growing flowers in the country for domestic use is intimately connected with Indian culture itself. But floriculture as an industry for commercial purposes has taken root only during the last six to seven years. Development of floriculture offers many socio-economic benefits in terms of employment generation, higher incomes and foreign exchange earning. Floriculture provides excellent employment opportunities for agricultural labour especially women e.g., as pickers in rural areas and as garland makers in the cities. A large semi-skilled labour force is required for such operations as emasculation and hand pollination of F1 Hybrid seeds and other forms of intensive floriculture. Floriculture generates a lot of economic activity right from production until export marketing including packaging, transportation, storage and forwarding. The scope for earning foreign exchange is ample.

Expert Group on Floriculture

Recognising the immense potential of floriculture, the Government of India in the Ministry of Agriculture, set up a high level Expert Group on Floriculture Development, under the Chairpersonship of Mrs. P.P. Trivedi, a former Secretary to the Government of India and a dedicated floriculturist. The Group which reviewed in depth the various issues involved submitted its report in 1989. Recommendations of the Expert Group are of great significance as they laid the foundation for future growth. Some of the recommendations are as follows:

i) Constituting the Identified Floriculture Development Areas (IFAs) in 10 zones/States for taking up intensive programme on floriculture development for domestic and export market in the first phase.

ii) Strengthening and setting up of necessary infrastructures for research, training, extension, production, propagation, post-harvest treatment, storage and transportation to be provided at the IFA level.

iii) To strengthen and intensify need-based research adequately at the Agricultural Universities/Research Institutes by providing necessary infrastructure, scientific and technical personnel and funds. Emphasis should be given on protected cultivation of flower crops and related aspects of management and production.

iv) To import germplasm of important commercial flowers and plants and develop new and outstanding varieties.

v) To develop improved methods of propagation of important flower crops by providing facilities of mist and fog houses and through micro-propagation.

vi) To organise training programme on advanced research and production for scientific, technical and extension staff and growers including the small and marginal growers.

vii) To facilitate clearance of imported plant materials by the customs and quarantine at the airport without damaging them.

viii) To provide facilities for storage of floricultural products at the airport for import and export.

ix) To relax the import policy and customs duty with regard to import of materials including green house components, media, plant protection chemicals, fertilizers etc., for green house cultivation of flowers and plants.

x) To set up National Council on Floriculture for formulating the policy at the National level and to advise on all aspects of floriculture.

xi) To set up State Floriculture Committees for formulating the policy and advise at State level; and State Executive Committee for implementing the decisions of the State Committees and monitoring the progress of IFAs.

xii) Floriculture should not be viewed as an elitist programme. It should be linked with employment and income generation programmes. Floriculture growers' cooperative societies should be promoted in the IFAs on the pattern of Amul.

xiii) Employment generation small schemes for production of flowers to supply to the domestic market must get priority in allocation of funds.

xiv) Air-freight for export should be nationalised keeping in view the freight charged by other developing countries like Sri Lanka, Pakistan & Kenya; Internal air-freight also to support transport of a highly perishable commodity.

xv) 100% export-oriented projects should have a minimum limit of 50% of estimated production.

xvi) Cash Compensatory Support withdrawn recently from export of cut flowers and plants should be reintroduced

xvii) Special infrastructure of cold chain must be provided for transport and storage.

xviii) About 5% of the cost of construction of new buildings and roads and of their maintenance should be provided for landscaping and environmental protection.

Various economic reforms and liberalisation policies ushered in into the economy from July 1991 onwards and exim policies modifications have given a fillip to the development floriculture. Government of India gave tremendous boost to horticulture development by allocating a sum of Rs. 1,000 crore in the VIII Plan as against Rs. 24 crore in the VII Plan.

Area Under Cultivation of Floriculture

Although flowers are cultivated in the country from times immemorial, no clear data are available on a regular basis for many hor-

ticultural crops including floriculture. The absence of data renders it difficult to plan the development of the sector. Data available on area under cultivation are as follows:

Table 20
(A) Estimates of Area Under Floriculture in India

Year	Area (Hectares)	Source
1962	4,000	ICAR Survey (Indian Council of Agricultural Research)
1976	7,500	National Commission on Agriculture
1989	34,000	APEDA (Agricultural and Processed Food Products Export Development Authority)
1992-93	37,987	Dr. Vishnu Swarup, Indo-American Hybrid Seed, New Delhi
1995	40,671	State Directorates of Horticulture.

(B) APEDA's Estimates (1989)

States	Area (Hectares)
Karnataka	8,827
Tamil Nadu	8,384
West Bengal	3,150
Andhra Pradesh	3,055
Rajasthan	2,164
Maharashtra	2,045
Total (incl. others)	**34,000**

(C) Dr. Vishnu Swarup's Estimates (1992-93)

States	Area (Hectares)
Karnataka	14,253
Tamil Nadu	8,384
Maharashtra	4,500
West Bengal	3,200
Andhra Pradesh	3,055
Rajasthan	2,500
Uttar Pradesh	600
Haryana	500
Gujarat	405
Punjab	250
Jammu & Kashmir	100
Delhi	100
Himachal Pradesh	50
Manipur	50
Assam	40
Total (incl. others)	**37,987**

(D) Estimates of Directorates of Horticulture (1995)

Andhra Pradesh	5,788
Assam	280
Delhi	100
Goa	50
Gujarat	400
Haryana	50
Himachal Pradesh	50
Jammu & Kashmir	25
Karnataka	15,243
Madhya Pradesh	650
Maharashtra	4,000
Manipur	300
Nagaland	100
Punjab	250
Rajasthan	100
Sikkim	45
Tamil Nadu	12,340
Uttar Pradesh	1,000
West Bengal	3,200
Total	**43,971**

From the estimates of Directorates of Horticulture, it is clear that Karnatka, Tamil Nadu, Andhra Pradesh, Maharashtra and Uttar Pradesh are the leading States in the country where the land under floriculture is significantly high. Particularly Karnataka and Tamil Nadu have emerged as the major floriculture States in the country. Thanks to the various development schemes being implemented under the Central and State sectors, intensive cultivation of cut flowers has been undertaken in certain areas around Pune, Nasik, Delhi, Bangalore and Trivandrum.

Information regarding the area under floriculture is not available in respect of Arunachal Pradesh, Bihar, Kerala, Lakshadweep, Meghalaya, Pondichery, Tripura. This does not mean that there is no production of flowers in these States and Union Territories. It is necessary to estimate the area under cultivation on a regular basis in all the States and Union Territories of the country as that would help in planning the projects both for domestic and export markets.

Varieties of Flowers Grown in the Country

Flowers cultivated in the country are generally classified as 'Traditional Flowers' or 'Modern/Cut Flowers'.

Traditional Flowers. Traditional flowers are those that are cultivated in the country for hundreds of years for the purpose of wor-

ship, festivals, social occasions, public functions and personal adornments. These include Jasmine, Tuberose, Crossandra, Marigold, Lotus and Chrysanthemum. These are used as single or in groups strung together or in the form of a garland and the emphasis here is only on the petals, colour and natural fragrance of the flower. Traditional flowers such as rose, jasmine and tuberose are also used in the production of essential oils and perfumes. Area under traditional flowers is as follows:

Table 21
Area Under Traditional Flowers in Selected States

States	Area (Hectares)
Andhra Pradesh	3,055
Karnataka	10,761
Maharashtra	2,045
Tamil Nadu	8,384
West Bengal	3,150
Total	**27,395**

Source : Paper on Traditional Flowers by Dr. T.V. Reddy, University of Agricultural Sciences, GKVK, Bangalore.

Here again, as in the case of floriculture cultivation as a whole, Karnataka and Tamil Nadu are the two major States that have large areas under cultivation of "Traditional Flowers". Table brings out the distribution clearly.

Table 22
Estimates of Area Under Cultivation of Traditional and Modern Flowers in Selected States

(Hectares)

State	Area Under Traditional Flowers	Area Under Modern Flowers	Total
Karnataka	10,761		15,243
Tamil Nadu	8,384		12,340
West Bengal	3,150		3,200
Andhra Pradesh	3,055		3,055
Maharahstra	2,045		3,045
Total	**27,395**	**10,000+**	**37,395**

Source : Paper on Traditional Flowers by Dr. T.V. Reddy.

All the traditional flowers are produced outdoor in the country. The traditional flower growers are mainly small farmers and their income levels are generally better than the marginal farmers of other agricultural crops.

Domestic demand for traditional flowers is on the increase and because of this, production is spread over many States.

Variety-wise area under cultivation of traditional flowers is not available. Available estimates are as follows:

Variety	Area (Hectares)	Areas
Jasmine	8,000	Cultivated through-out the country
Marigold	NA	West Bengdal, Karnataka (1728 hectres
Chrysanthemum	NA	Bihar, Delhi
Tuberose		West Bengal, Karnataka (1456 Hectares) Tamil Nadu Andhra Pradesh

Usage pattern of traditional flowers is as follows:

Jasmine. Jasmine flowers and buds are used for preparing garlands, bouquets, etc. The flowers are also used for the production of perfumed hair oils and attars particularly in Uttar Pradesh. Jasmine oil is extracted from the flowers of the Spanish jasmine (Jasminmum grandiflorum). Jasmine oil is used for producing high grade perfumes. The oil is also used for producing soaps and cosmetics.

India is also exporting jasmine flowers to Sri Lanka, Singapore, Malaysia and Gulf countries.

Marigold. Different types of marigold, namely, African, French, Hybrid are produced in the country.

Chrysanthemum. The flowers are used largely for garland making and for religious purposes.

Tuberose. The flowers are used as 'cut flowers' with spike and loose flowers are used for garland making. The flower is valued for its fragrance.

Domestic Market

The domestic market for traditional flowers at the retail level is

estimated at Rs. 150 crore per year.

The distribution chain is as follows:

Farmers
Commission Agents/Wholesalers
Retailers
Small Vendors — Consumers
Consumers

Commission agents/wholesalers have strong business relationships with the farmers/growers.

Wholesale Prices

Indicative wholesale prices and arrivals of traditional flowers in Bangalore market during 1994 are shown in Table 23.

Table 23
Wholesale Prices and Arrivals of Traditional Flowers in Bangalore Market during 1994

A: Arrival in Tonnes
P: Average Price in Rs. per kg.

Month	Arr. (A) Price (P)	Jasmine	Kakada	Marigold	A.Marigold	Tuberose	Crossandra	Chrysanthemum
Jan	A	13	55	113	132	55	63	83
	P	113	32	5	3	15	90	11
Feb	A	15	51	105	103	45	67	67
	P	65	39	3.5	5	19	70	9
Mar	A	26	41	99	70	38	78	68
	P	45	40	5	4	19	40	10
Apr	A	38	53	89	30	55	80	16
	P	109	39	5	11	12	45	11
May	A	45	63	98	7	58	87	—
	P	75	55	6	7	17	45	—
June	A	64	55	84	—	72	90	10
	P	35	60	5.5	—	14	37.5	17
July	A	67	64	82	—	71	77	74
	P	26	40	5.5	—	11	60	15.5
Aug	A	85	76	81	—	82	104	133
	P	90	40	5.5	—	12	52.5	9.5
Sep	A	81	83	91	—	80	109	115
	P	50	35	6	—	20.5	180	11
Oct	A	55	56	67	—	65	72	131
	P	45	45	6.5	—	27	67.50	8
	A	77	75	105	73	83	94	179
	P	82.5	47.50	6	7.5	14	90	8
Dec	A	33	66	86	135	69	85	183
	P	165	21.50	3.5	3	14.5	100	8

Source : National Horticulture Board, Bangalore.

Modern Flowers

The cut flowers that are used with long stem in bouquets and for other decoration purposes come under this category. Flowers included in this category are rose, gladiolus, carnation, chrysanthemum, tuberose, orchids, anthurium, gerbera, etc.

Trade in modern flowers is estimated at around Rs. 100 crore.

For the development of floriculture, Government of India initiated many schemes. Some of these schemes are as follows:

Central Sector Scheme on Commercial Floriculture

The Govt. of India took up a scheme and earmarked an outlay of Rs. 10 crore for the development of all major cut flower crops as well as traditional flowers. The scheme, which will be operated in all the 32 States and Union Territories, envisages to introduce improved varieties of flowers of commercial importance to intensify production of planting material, to introduce modern systems of production of flowers and post-harvest techology; and to impart training to farmers and entrepreneurs. Establishement of nine (9) Model Floriculture Centres (MFC) in the Public Sector in the following places is an important component of the scheme.

i) Srinagar in Jammu & Kashmir
ii) Bangalore in Karnataka
iii) Trivandrum in Kerala
iv) Pune in Maharashtra
v) Mohali in Punjab
vi) Gangtok in Sikkim
vii) Ooty in Tamil Nadu
viii) Lucknow in Uttar Pradesh
ix) Calcutta in West Bengal

These centrs would serve as focal units for development of floriculture in the regions.

In addition, eight (8) more centres in private sector, in the above states except Jammu & Kashmir, are also proposed to be set up.

These MFCs will be the focal units for procurement and multiplication of elite varieties/hybrids for commercial use, distribution of the planting material to nursery men, training of farmers/entrepreneurs.

Each unit in Public sector is allocated Rs. 44 lakhs while those in Private sector Rs. 25 lakhs (10%) in the states. All these centres would also have a facility of a large tissue culture unit.

20 small tissue culture units on cottage scale are also planned to be set up in private sector. Each unit will be provided with an assistance of Rs.1 lakh (25%). These will be set up in the following states.

i) Andhra Pradesh, ii) Andaman & Nicobar Islands, iii) Assam, iv) Bihar, v) Delhi, vi) Goa, vii) Gujarat, viii) Haryana, ix) Himachal Pradesh, x) Lakshadweep, xi) Madhya Pradesh, xii) Manipur, xiii) Meghalaya, xiv) Mizoram, xv) Nagaland, xvi) Orissa, xvii) Rajasthan, xviii) Sikkim, xix) Tripura and xx) Uttar Pradesh.

Five large post harvest handling centres are proposed to be established in private sector in the States of Andhra Pradesh, Delhi, Maharashtra, Tamil Nadu and West Bengal. Each unit will receive an assistance of Rs.10 lakhs (10%).

During the current plan period, area expansion programme is also being taken up with a target to increase the area under floriculture by 2000 hectares. Each cultivator receives support at Rs.1000 per unit of 0.1 hectare.

Schemes of National Horticulture Board

The board has two major schemes. Soft loan upto a maximum limit of Rs. 1 crore is advanced for setting up infrastrucutral facilities like cold storage, pre-cooling units, packing and grading sheds, refrigerated transport etc. Assistance is available to Public sector undertakings, Cooperatives, Farmers' Associations and Corporate sector. No interest is charged except bank handling changes of 4-5 per cent after two or three years depending upon the loan sanctioned. The loan facilities are also available for the integrated projects involving production and disposal of floricultural products on the same terms and conditions. Under these schemes several floricutlture projects have received assistance for setting up export-oriented units in the corporate sector.

Scheme for use of Plastics in Agriculture

The Ministry of Agriculture is implementing a scheme for the use of plastics for horticulturre crops with a total outlay of Rs. 250 crore. Subsidy is provided for use of drip/micro irrigation systems, green-houses/polyhouses of low, medium and high cost and plastic mulch. The floriculture projects are also eligible to avail of the assistance available. Each entrepreneur/beneficiary can avail of the facility with a limit of Rs. 15,000 per hectare or 50% of the cost for the drip irrigation, while for greenhouse the rates of assistance differ for low, medium and high cost greenhouses. While for the low cost units assistance is available upto 50% of the cost or Rs.31,500 per unit of 500 sq. mts., for the latter two the assistance is restricted to 40% of the total cost for medium cost units and 10% for high cost units or Rs.1 lakh.

Export Promotion

The Ministry of Agriculture has initiated a project which provides for setting up of infrastrucutre for promoting exports. National Horti-culture Board (NHB) and Agricultural and Processed Food Products Export Development Authority (APEDA) are involved in the project. A sum of Rs. 50 crore has been earmarked for utilisation by NHB.

APEDA has following schemes to assit Export-oriented Floriculture projects.

i) Scheme for development of infrastructure and services (25% of cost; Rs. 1.5 lakh for purchase of reefer van).

ii) Scheme for development of post harvest infrastrucutre (50% of cost; maximum Rs. 5 lakhs for setting up of pre-cooling and cold storage facilities).

iii) Scheme for packing development (30% of cost; maximum Rs.1 lakh).

iv) Scheme for export promotion and market development (40% of cost; maximum Rs. 50,000/-).

v) Scheme for Survey, feasibility, consultancy and data base (40% of cost; maximum Rs. 2 lakhs)

vi) Scheme for airfreight subsidy (25% of IATA rates; maximum Rs. 10/- per kg for Europe & USA and Rs.6/- per kg for export to West Asia and S.E. Asia).

Setting up of Wholesale Market-cum-Auction Centres for Flowers

Under this scheme APEDA will set up wholsesale Market-cum-Auction Centres for flowers at Delhi, Bombay, Pune, Bangalore and Madras in Association with one of the agencies of the concerned State Governments. The Government of India will meet 50% of the cost and the balance 50% by the concerned State Government.

In Maharashtra, the State Government nominated the Maharashtra State Agricultural Marketing Board to work with APEDA for the setting up of the centres at Bombay and Pune. Similarly Karnataka Agro Industries Corporation Ltd. would associate itself with APEDA for setting up a centre at Bangalore. The land for establishing the centres at Pune and Bangalore has since been identified. The Government of Tamil Nadu is still to identify the agency. In Delhi, the Government of National Capital Territory has approved the proposal of Delhi Agricultural Marketing Board to work with APEDA for establishing the centre but the land is still to be identified. Thus the establishment of wholesale Market-cum-Auction centres for flowers is still to take place.

APEDA'S Programmes for Export Promotion

Joint Ventures with Dutch Companies. Arising from the initiative taken by APEDA in 1993 to give thrust to the floriculture industry, a number of joint sector ventures for export-oriented production of cut flowers have emerged between Indian companies and Dutch companies who are manufacturers of green houses, refrigeration equipments and suppliers of planting materials and technical know-how.

Japanese Market. APEDA, in collaboration with Japan External Trade Organisation (JETRO) and Japan cut-flower Importers' Association organised meetings between Indian Floriculture industry and prospective entrepreneurs and Japanese importers and Thailand floriculture industry representatives during 1993, 1994 and early 1995 to study cut flower production and marketing. Possibilities of export of tropical flowers like orchids and anthurium from India to Japan were also explored. As a result of these efforts, regular exports of cut flowers have started from India.

Implementation of UNDP Project

The Ministry of Commerce of Government of India is implementing a UNDP assisted three year project (1994-95 to 1996-97) through APEDA. The project aims at achieving a quantum jump in cut flowers exports from the country based on improved production expertise and market intelligence. The results of the project are envisaged to make India a global player of repute.

Important components of the projects are as follows.

a) Direct advice to 12 selected entrepreneurs on production, post harvest handling and strategies for export of cut flowers.

b) Preparation of crop manuals on Roses, Carnations, Chrysanthemums for use by Indian growers.

c) Market survey reports on Europe, Singapore, Hong Kong and Japan.

d) Regular information on market prices and conditions through ITC - Market News Service.

e) Preparation of a report on the design, management and role of auction centres for the major markets in India.

f) Feasibility study on assessment of potential for production of orchids on commercial scale in North East India.

g) Study tour to Africa for studying competitor's production system.

h) Market orientation missions for producers to Europe and Japan including Buyer-Seller meets.

i) Industry level seminars for dissemination of information to existing and prospective entrepreneurs.

State Level Programmes

At the States level, the State Governments are evincing considerable interest in developing production of horticultural products for domestic markets and export. Many schemes are drawn up to give fillip to increase export-oriented production.

The State of floriculture in different States is as follows:

Andhra Pradesh. The traditional flowers are grown to cater to the local requirements. Export-oriented cut-flowers production is slowly emerging. In addition to Pune, Bangalore and Delhi, Hyderabad has also been identified as one of the centres for cut-lower production specially for roses and carnations. Already there are well established Tissue Culture Units in Hyderabad and export-oriented flower production will be an extension of that activity. Twelve export-oriented units are being set up in the State.

The Government of Andhra Pradesh is planning to establish Floriculture Parks in an area of 40 hectares in and around Hyderabad and Kuppam and also to create infrastructural facilities such as pre-cooling, cold storage and refrigerated vans. The Floriculture Parks would make available land to the prospective entrepreneurs on long term lease or outright sale. Customs clearance facilities and issue of phytosanitary clearance at the point of production for export are being created. The Government of Andhra pradesh is providing subsidies towards plant material for crops like rose, chrysanthemum, jasmine, tuberose etc.

Assam. The State has around 280 hectares area under flower crops such as rose, gladiolus, marigold, jasmine, tuberose and chrysanthemum. An export-oriented unit for orchids and cut-flower production with facility of tissue-culture units are being set up in the State. The State is providing support for floriculture development.

Arunachal Pradesh. The utilisation of orchids is being promoted in the state. The state has suitable climate for production of a variety of flowers. Area under floriculture is not known clearly, but the government of India's scheme would help promote floriculture.

Bihar. The State has been growing flowers for long but commercial cultivation is yet to make a beginning. Major flowers grown in the State include marigold, jasmine, tuberose and rose. There is ample potential for promoting floriculture in Bihar.

Goa. Flowers such as crossandra, jasmine and chrysanthemum are grown traditionally but commercial floriculture is yet to become popular in the State. About 50 hectares of land are under floriculture. Climatic conditions also exist for growing foliage plants. Goa

offers opportunities for growing rose, gladiolus, tuberose, chrysanthemum aster and marigold.

Gujarat. The State offers good climate for growing flowers. The State has an estimated area of 400 hectares under floriculture which is likely to go up to 1,000 hectares by 1998. The flower crops grown popularly include marigold, rose, chrysanthemum, jasmine, tuberose; aster, spider lily, gaillardia etc. Private enterprise is taking initiative to produce flowers for export markets.

Haryana. Floriculture is fast developing in the State and production of flowers on a commercial basis is undertaken. The area under floriculture has increased from 50 hectares during 1989-90 to 1600 hectares during 1994-95. Marigold, tuberose, chrysanthemum rose and gladiolus are grown in the State.

Himachal Pradesh. The State is emerging as a flower grower with around 30 hectares of land under commercial floriculture out of a total area of 50 hectares of land in 1993-94. An additional 100 hectares of land will be under floriculture in about 2 years.

Flower crops gladiolus, marigold, carnation, lilies and other bulbs and chrysanthemum are grown in the State. In addition, there is potential to grow tulips and roses in the State.

Jammu & Kashmir. The State possesses temperate, tropical and sub-tropical climate. The climatic conditions enable cultivation of almost all types of flowers and plants in the State.

The estimated area under floriculture is 25 hectares. The major crops of the Kashmir valley are lilies, tulips, gladiolus and rose, while for Jammu region, gladiolus and rose are the main crops. The other crops being grown in Kashmir valley are liatris, paeoni, iris, gerbera, hyacinth, narcissus/daffodil, chrysanthemum, carnation, static and several seasonal flowers.

Kerala. Floriculture is yet to develop in a big way in the State. Progressive farmers are evincing interest to take up commercial cultivation of orchids, anthuriums and also bush jasmine. Foliage plants are also cultivated. Estimates of area under floriculture are not available.

Karnataka. Karnataka State is the pioneer State in floriculture development in the country. Nearly 27 per cent of the total flower production in the country comes from Karnataka. The total area under various flower crops has been assessed at 15243 hectares with an annual production of 88,000 tonnes.

Flowers grown on commercial basis in the State include rose, gladiolus, chrysanthemum, tube-rose, aster, jasmine, crossandra, marigold and champaka and cut-flowers including anthurium, gerbera, orchids, carnation, birds of paradise and certain other bulbous crops and foliage.

The Government of Karnataka is providing all support and assistance to give fillip to floriculture development in the State including export marketing. The Government had a plan to give the horticulture sector the Status of an industry. Cut-flower production in the State particularly in and around Bangalore city is well poised for tremendous growth because of the mild and favourable weather conditions that prevail in the State and the availability of infrastructural facilities.

Madhya Pradesh. An estimated area of 650 hectares is under flower production in Madhya Pradesh. Major production centres are located around Ujjain, Indore and Gwalior. Ujjain has an estimated area of 400 hectares producing nearly 2,000 tonnes of flowers per annum valued at Rs. 2 crore. Flower crops grown in the State include marigold, chrysanthemum, gaillandia, tuberose, aster, rose and jasmine. The State Government is providing financial assistance to small and marginal farmers for growing traditional and non-traditional flowers in 1/25 hectare plots upto Rs. 3,000 per plot for inputs such as planting material, fertilizers, pesticides etc. and the farmers are also given technical know-how.

The State has also taken up Government of India scheme on commercial floriculture. Incentives are also provided to large scale producers. Infrastructural facilities including post-harvest management are also developed. Encouragement is given to formation of Growers' Cooperative and Marketing Soceities.

Maharashtra. The State has more than 4,000 hectares under floriculture. The regions of Pune and Nasik are ideally suitable for floriculture development. The major traditional flowers grown in the

State are rose, chrysanthemum, marigold, jasmine and tuberose. Non-traditional flowers such as gladiolus, aster, zinnia, gaillardia, statice, lilies, gerberas and carnations are also grown.

Several tissue culture units have come up in the State in private sector with commercial production of selected floriculture crops.

Maharashtra State Agricultural Marketing Board is providing assistance in the marketing of flowers. Value-added traditional flowers are being exported to Middle East countries.

A large number of Export-oriented Units have come up in the State with foreign collaboration and investments.

Manipur. The State with salubrious climate ranging from the subtropical in the valley area to the temperate in the hills, has good potential for growing many flower crops. The State grows world famous Siroy Lily (Lilium machliniae). More than 500 varieties/species of orchids are grown. Irish variety known as Iris Bakeri grows wild in the State.

The State has an estimated area of 300 hectares under floriculture. Important flower crops cultivated in the State include rose, chrysanthemum, jasmine, tuberose, marigold, carnation, orchids, gladiolus, dahlia and lilies.

Nagaland. The State has the climatic condition for growing floriculture crops. Gladiolus, begonias, chrysanthemum and orchids are grown in the State. Growing of roses, anthuriums, carnations and several types of foliage plants is also undertaken. Many entrepreneurs are taking up commercial cultivation of floriculture crops. There are no estimates of land area under floriculture in the State.

Orissa. The State of Orissa has an estimated area of 100 hectares under flower crops. Tuberose, marigold, chrysanthemum, rose and jasmine are cultivated. Commercial cultivation of flowers is being undertaken by the farmers.

Punjab. Floriculture in Punjab is acquiring importance. The State has an estimated area of 250 hectares under flower crops. Major flower crops grown in the State include marigold, chrysanthemum, rose, gladiolus and jasmine. There is also production of flower

seeds. Many farmers have taken up production of cut flowers particularly gladiolus. Some export oriented units are coming up in the State.

Rajasthan. The State has about 100 hectares of land under floriculture. Rose, marigold and chrysanthemum are cultivated in the State. Nearly 50 hectares of land is under Damask rose cultivation and about 7,000 tons of roses are produced mainly in the Pushkar area of Ajmer district and Haldighati area of Udaipur district. Nearly thee-fourths of rose production is exported to Middle East countries.

Sikkim. The State has ideal climatic conditions for growing a variety of flowers particularly bulbs and several types of orchids. The State has 45 hectares of land under floriculture. Major crops grown in the State are gladiolus, cymbidium orchids, anthuriums, lilies, begonias, geraniums etc.. Gladiolus is largely cultivated and nearly 90 per cent of the area is under this crop. Cymbidium orchids are also grown by a number of growers. The State Government is encouraging cultivation of gladiolus, cymbidium orchids and anthuriums on commercial scale. Bank finance is offered at subsidised terms.

Tamil Nadu. The State has emerged as one of the major flower growing States in the country accounting for about 25% of All India production. The area under flower production has been increasing and in 1993-94, 12,340 hectares were under floriculture. Traditional flowers grown in the State include jasmine, crossanda, marigold, scented and red roses, celosia, tuberose, gompherna and some species of scented foliage.

Commercial cultivation of cut-flowers is taking place in the State particularly around Hosur in Dharmapuri district. Gerbera, carnation and gladiolus are grown around Hosur area. The hilly terrains of Nilgiris, Yercaud and Kodaikanal are being developed for production of anthurium, alstromeria and lilies.

Tamil Nadu Government is giving utmost importance through policy support for the development of floriculture in the State to take advantage of the growing trade in the domestic market as also to undertake exports from the State.

Uttar Pradesh. The State has suitable agro-climatic conditions of tropical to alpine to develop cultivation of a wide range of floriculture

crops. Crops grown in the State include rose, gladiolus, marigold, jasmine and tuberose. The State is giving all assistance by providing inputs like planting materials, fertilizers, pesticides etc., for the development of rose, marigold and jasmine. Under another scheme, assistance is given for the development of gladiolus and tuberose. A World Bank assisted scheme is in operation in the eight hill districts of the State.

V. INDIA'S EXPORT EFFORTS

India has long recognised the production and export potential of flowers and other floricultural products (live plants and decorative cut-foliage). In 1962, ICAR made a survey of domestic market for flowers and found that flowers grown in 4,000 hectares in the country generated an income of Rs. 9.26 crore annually. In 1976, the National Commission on Agriculture identified floriculture as a significant sector of the national economy with great potential.

Early initiative for the export of flowers was taken by the scientists at IARI in 1969. The first consignment of roses was exported to Europe with the assistance of the State Trading Corporation of India. Although this made the beginning of export of flowers, the activity, for a variety of reasons, did not gain the necessary momentum. Around the same time, other developing countries like Israel, Kenya, Thailand and Columbia were emerging as important players of international trade in floricultural products. Among the floricultural products, cut-foliage and pot plants are the most important items of world trade. The other products include dried flowers and foliage, propagating materials (seeds, cuttings, bulbs etc.), tissue cultured plants and starter and adult ornamental plants including house plants. Columbia became a leading exporter of carnation and roses, Thailand for orchids, Kenya for carnation, roses, chsysanthemums and statice, Singapore for orchids, Mauritius for anthurium, Malaysia for orchids and Zimbabwe for roses.

The new seed policy of 1988 has liberalised the import of seeds and propagating materials. This policy has encouraged many investors to take to horticulture business mainly for exports.

The setting up of an Expert Group on Development of Floriculture by the Government of India on 14.6.1988 reflected the concern of the Government of India at the slow pace and unplanned devel-

opment of floriculture in the country. However, looking back, one would say that the Government's decision to set up a committee was a historic and a landmark decision and laid the foundation for an orderly development of floriculture industry in the country with focus on export markets.

The Ministry of Commerce, Government of India included floriculture among the extreme focus areas along with a number of products and has provided subsidies, duty concessions and other incentives through Agricultural and Processed Food Products Export Development Authority (APEDA).

Since then, floriculture came to be regarded as an item for new investments mainly for export business. With liberalisation process initiated by the Government of India in 1991 to integrate the Indian economy with the global economy, investment opportunities became lucrative both for Indian investors and foreign investors. Joint venture projects have been set up in Pune (Maharashtra), Bangalore, Hyderabad, Guargaon (Haryana), Panchkula (Punjab), Saharanpur (Uttar Pradesh) and a few other places.

As per information available with APEDA, there are at present, about 30 units with export-oriented production of cut-flowers under poly houses over an area of about 75 hectares. About 30 more units are expected to be completed during 1996. Another 100 proposals have been approved for technical and financial foreign collaborlation mainly with the companies from the Netherlands, Israel and Thailand. Most of these projects are to be set up as Export-Oriented Units.

Exports

India's exports of floricultural products are growing steadily as more and more investors are evincing interest in the field supported by various policy measures and schemes launched by the Government of India through institutions such as National Horticulture Board, Agricultural and Processed Food Products Export Development Authority (APEDA) etc. The economic, investment and exim policies are providing the fillip to the growth of production and exports. Table 24 providers data on India's exports of floricultural products in detail:

Table 24
India's Exports of Floricultural Products

Value: Rs. lakhs

Item/Code	1991-92	1992-93	1993-94	1994-95	1995-96
Bulbs, tubers, tuberous roots etc. (0.6.01)	120.59 (8.1)	78.34 (5.3)	51.99 (2.9)	108.35 (3.5)	192.15 (3.2)
Other live plants incl. roots, etc. (06.02)	401.53 (27.1)	305.66 (20.50)	430.34 (23.9)	579.73 (18.9)	795.32 (13.2)
Cut flowers & flowers buds suiteable for bouquets or ornamental purposes, fresh (06.03)	683.31 (46.2)	844.37 (56.6)	1189.16 (66.1)	2257.62 (73.4)	4648.86 (77.3)
Foliage branches & other plant parts, etc. (06.04)	274.75 (18.6)	262.32 (17.6)	128.09 (7.1)	128.08 (4.2)	377.80 (6.3)
Total	**1480.18 (100.0)**	**1490.69 (100.0)**	**1799.58 (100.0)**	**3073.78 (100.0)**	**6014.13 (100.0)**

Source : International Industries Annual, 1966.

Among the floricultural products, the category consisting of cut-flowers and flower buds suitable for bouquets/ornamental purposes, fresh, dried, dyed, bleached, impregnated/otherwise prepared is the one that dominates as it accounted for over 77 one cent of the total in 1995-965.

Major markets for cut-flowers are Netherlands, Japan, UAE, Germany, USA, UK and Hong Kong; for dried flowers the major markets are USA, Germany, UK and New Zealand.

Constraints in Production and Export Marketing

A number of constraints are experienced in production as well as domestic and export marketing of horticultural products. These are as follows:

Land Ceiling Policies. Land ceiling laws do not permit purchase of land for development of floriculture.

Taking into account the potential for employment, incomes and exports, States have to take steps to exempt floriculture from land ceiling policies. As an immediate measure, long-term lease of land has to be permitted to encourage large scale investments.

Domestic Marketing. Floriculture development being at a very nascent stage, marketing is not well organised. The consumer is yet not fully conscious of the varietal and quality aspects of various flowers and their usage pattern. As incomes are raising, the life styles of certain segments of the population are changing and a new trend is emerging which supports usage of flowers round the year for various occasions. The industry has to adopt innovative techniques to encourage usage of flowers with the help of electronic and print media. Generic promotion is essential at this stage to cultivate the domestic market which has ample potential for expansion. An institutional arrangement for promotion preferably by the trade and industry would give a fillip to domestic demand. The establishment of wholesale-cum-market auction centres at major cities by APEDA would do a lot of good for the development of floriculture as an industry in the country.

Infrastructure at Airports. Separate air cargo handling areas and facilities for export of flowers at international airports are still to be created. APEDA should expedite creation of such facilities.

Shortage of Airfreight Capacity. There are serious shortages of air-freight capacity to target markets. In addition, the freight costs are also very high. The creation of additional capacity brooks no delay. The open skies policy allows charters. Bilateral negotiations between India and target market countries will be necessary. Development of production units in cluster will make the operation of charters feasible. Subsidies offered on airfreight will take care of the high freight cost.

Plant Breeder Rights. So far there is no legislation to provide security. The legislation is under consideration. India is, however, bound by WTO rules and discipline.

EU Customs Duty. India's floricultural products are subject to full tariff rate in the European Union countries which would cut down India's competitiveness. The cut-flowers and tissue culture products from India will attract 35% of the MFN Tariff. If import tariff is brought down, India's floricultural products will become cost effective. Common Import Tariff for cut-flowers is applicable in all countries of the European Community which are as follows:

June 1 to October 31	:	Full Tariff	20%
		ACP countries	Free
		LDC countries	Free
November 1 to May 31	:	Full Tariff	15%
		ACP countries	Free
		LDD countries	Free

ACP : African, Caribbean & Pacific countries

LDDC : Least Developed & Developing Countries.

India comes in the category of countries attracting full tariff. The European Commission has formulated the new generalised system of preferences (GSP) for the developing countries in the agriculture sector which is under consideration by the EEC Council. The new GSP policy which is likely to be effective by 1.1.1997 will allow some concessions to India.

Government Assistance and Support Policies

Floriculture development is very high on the agenda of the Central Government. A number of incentives and facilities are offered by the Government. These include:

Zero Import Duty on Seeds, Bulbs, Cuttings. The import duty on live trees and other plants, bulbs, roots and the like, cut-flowers and ornamental foliage has been reduced from 55% to 10%. Customs duty has been exempted totally on seeds, tubers, bulbs, cuttings or saplings etc. for sowing\planting.

Procedure Simplification. Plant quarantine procedures have been streamlined and simplified for the import of seeds, plants, tubers and cuttings. Tissue culture consignments are now cleared within six hours and other consignments requiring PEQ are cleared within two days.

Phyto-sanitary Certificate and Certificate of Origin. The Plant Quarantine and other officers are authorised to issue phyto-sanitary certificate as also the certificate of origin in respect of horticulture exports including floriculture.

Flower Seed and Tissue Culture material on OGL. There is no need for any import licence for the import of flower seeds and tissue culture material of any plant origin as imports of these items are put on Open General Licence (OGL).

Lower Import Duties on Machinery. Import duties are reduced on seeds development machinery, machinery for soil preparation and specified goods for green houses.

50% of Sale in Domestic Market. Units under EOU and EPZ Schemes are permitted to import capital goods, raw materials, technology and other inputs required duty free and could also sell 50% of their production in the domestic market, if they wish.

Cold Storage Facilities at International Airports. Walk-in-type cold storage facilities for export consignments have been created at the international airports. The facilities are available at Delhi, Bombay, Calcutta, Bangalore, Madras and Trivandrum. APEDA is setting up bigger cold storages at Delhi and Bombay international airports with separate handling facilities for perishable products export cargo.

Air-freight Subsidy. Subsidy on air-freight is available for the export of cut-flowers and tissue culture plants. The subsidy is subject to a maximum of 25% of the IATA freight rates or Rs. 10 per kg for export to Europe (other than CIS countries), USA and Far East and Rs. 6 per kg for export to West Asia and South East Asia and CIS countries, whichever is lower.

Customs Bonding. EOUs in some of the agricultural related activities including floriculture have been granted exemption from the requirement of custom bonding with permission for duty-free import of specified goods for being used in connection with production, manufacturing or packing.

Encouragement for the use of Plastics. In order to improve productivity of horticulture crops, the Government is encouraging the use of plastics in the form of drip-irrigation, green houses and plastic mulches. An investment of Rs. 250 crore has been allocated in the Eighth Plan period (1992-97). Of this, Rs. 200 crore is earmarked for drip irrigation alone. The earlier restriction of permitting assistance for only one hectare per beneficiary for drip irrigation has been re-

moved during 1995-96 and assistance is now provided for the entire holding of the beneficiary for growing horticultural crops, as permitted under the State Land Ceiling laws. Green houses are being encouraged for export-oriented floriculture projects.

Agricultural Credit

Timely and adequate credit to farmers is vital for increasing agricultural and horticultural production and productivity. Providing access to institutional credit for small and marginal farmers and other weaker sections to enable them to adopt modern technology and improved agricultural practices has been the major objective of the credit policy.

Loans are disbursed through a multi-agency network consisting of Commercial Banks, Regional Rural Banks (RRBs) and Cooperatives. In October 1994, the Reserve Bank of India deregulated the interest rate structure for cooperatives for lending (subject to a minimum of 12 per cent) and for raising deposits. As envisaged in the budget for 1995-96, Reserve Bank of India has taken steps for setting up the Rural Infrastructural Development Fund (RIDF) at National Bank for Agriculture and Rural Development (NABARD) with the Corpus of Rs. 2000 crore. With the establishment of RIDF 2247 projects with a loan amount of about Rs. 1827 crore could be sanctioned by NABARD to eighteen States.

The Common Minimum Programme lays emphasis on broad-based agricultural development and calls for a doubling of the flow of credit to agriculture and agro-industries, particularly to small and marginal farmers, within five years. Government has already evolved an integrated plan consisting of several elements for fulfilling this important objective.

The share capital of National Bank for Agriculture and Rural Development (NABARD) is being increased from the present level of Rs. 500 crore to Rs. 2,000 crore in the next five years. NABARD's paid-up share capital is being doubled to Rs. 1,000 crore in 1996-97. A budgetary provision of Rs. 100 crore is being made towards Government of India's share and the balance of Rs. 400 crore will be contributed by the Reserve Bank of India.

As a part of the integrated plan, State level agricultural development finance institutions are being set up, to promote investment in commercial or high technology agriculture and allied activities such as horticulture, floriculture and agro-processing. NABARD is the chief promoter. Other national level financial institutions as well as State Governments concerned are being requested to participate in the equity.

Research Efforts

Most of the flowers and ornamental plants available in the country today were obtained and planted in the country from abroad from the 15th century onwards. It was only in the early 60s that the Indian Council of Agricultural Research took up research through many projects in different parts of the country. The early introductions of flowers and ornamental plants and the research efforts chronologically were as follows:

Period & Organisation	Introduction/Research
Mughal Period - 1526 Babar introduced	Damask rose from Persia
1619 - Jehangir brought	Chinar, weeping willow, cypress trees,roses carnation, lilies and tulips.
18th & 19th centuries British rulers introduced at Government gardens	A large variety of flowers, plants, seeds and bulbs
Lalbagh Botanic Garden Bangalore 1760	Amherstia, magnolia, kigelia, parkia, and flower seeds (1859 - 1874)
Botanical Garden, Saharanpur, 1779	Canna and Jatropha in 1817.
Indian Botanic Garden, Sibpur, Calcutta, 1787	.....
Lloyd Botanic Garden, Darjeeling, 1878	.....

Botanical Garden, Ootacamund, 1884	.....
Royal Agri-Horticultural Society, Calcutta.	Gladiolus, tulip, stock, anemone, scabious, calceolaria and flower seeds in 1821 Bougainvillea in 1858. Amaryllis, Camellia, kalanchoe, tradescantia, aloe, cereus, dahilla, tecoma, calla,buddleia in 1862.
Indian Council of Agricultural Research 1960-65 - A co-ordinated Research Scheme at Simla, Mussoorie, Ootacamund, Saharanpur, Darjeeling, Shillong, Pune, Hyderabad and Bangalore, New Delhi, Coimbatore.	Orchids and various flowers including jasmine, crossandra and chrysanthemum.
Indian Institute of Horticultural Research, Bangalore	Gladiolus, bougainvillea, croton, hibiscus, aster and orchid.
Council of Scientific and Industrial Research at Lucknow	Floriculture research and essential oils
Council of Scientific & Industrial Research, Palampur (Himachal Pradesh)	Damask rose for essential oils, chrysanthemum for cultivation
ICAR research Institutes and Agricultural Universities	State Rose, gladiolus and bougainvillea at IARI
Tamil Nadu Agricultural University, Coimbatore	Jasmine and tube rose
Punjab Agricultural University, Ludhiana	Rose, carnation and gladiolus
BCKVV, Kalyani (West Bengal)	Tuberose and jasmine

National Botanical Research Institute, Lucknow	Chrysanthemum, bougainvillea, amaranths, amarillis and gladiolus, lotus, nymphaea and other ornamental aquatic plants.

Research results of many institutes have not reached the grower due to absence of extension services in floriculture. Propagating materials (seeds, bulbs, rooted cuttings or plants) are not available in most cases because of lack of multiplication of the improved cultivars lin large quantities/numbers. Post -harvest studies/research on flowers have been almost negligible except some studies on packaging of flowers by the Indian Institute of Packaging. Table below shows pre and post harvest losses in selected varieties of flowers.

Table 25
Pre and Post-Harvest Losses in Selected Varieties of Flowers

(Percentages)

Mode of Loss	Rose	Gladiolus	Carnation	Chrysanthemum	Orchid	Tube rose
Plant mortality loss at growers'level	9	9	9.7	7.3	15	3.2
Packing loss at growers'level	4	9.1	4.9	6.5	8	5
Non-availability of cold storage facility at growers' level	4.2	4.6	7.8	11	5	6.6
Transportation	15	9.7	10	10.5	—	12.7

Source : Floriculture Industry in India, a Paper by Dr. Vishnu Swarup, Indo-American Hybrid Seed, New Delhi.

Research efforts have remained confined to only cut-flower crops like rose, gladiolus, chrysanthemum. Even with the cut-flower crops, where a large number of varieties were developed and released, most of these could not be commercialised, mainly due to poor extension support. In addition, there is the problem of limited availability of the planting material of the improved varieties. Research efforts are also limited or lacking for developing varieties for specific use.

The absence of information is a serious bottleneck in the development of floriculture industry. There is no well documented information on the package of practices for production of major crops under different agro-climatic regions. Information on production technology under protected environment which is essential for the production of quality produce is not easily available. No information is available on

post-harvest handling of the produce. Equally, information on markets for floricultural products both within the country and abroad is not easily available. Information on investment/business opportunities and credit availability is not available. Dissemination of information particularly from Government and Goverrtment aided organisation is extremely inadequate.

Commercialisation of floriculture calls for cutting down costs at every stage from production through marketing. Pre and post-harvest losses need to be curtailed to make India's floricultural products competitive particularly in the international markets where the competition is fierce.

Weaknesses in Production

In general, both agro-techniques and quality of flowers and other floricultural products are poor and inconsistent, especially of traditional flowers.

— The varieties being grown presently are in many cases old and obsolete, low yielding and inferior in quality as compared to the modern cultivars grown in other countries having advanced floriculture, like Holland, Israel, USA, France and the UK.

— Planting material, including seeds, bulbs, cuttings of desired varieties is either not available, or the quantity, if available, is insufficient and of sub-standard in many cases.

— Pre and post-harvest losses at various levels in cultivation and marketing of flowers are high mainly due to lack of proper infrastructural facilities, like green houses, equipments, cold storage, packaging and transport. On an average these losses varied between 28-35 per cent depending upon the kind of flower.

Infrastructural Deficiencies

The nascent floriculture industry has to encounter many infrastructural deficiencies in the absence of organised collection centres, pre-cooling, grading, packing and storage and post-harvest handling facilities at major international airports. Domestic marketing facilities are absent. Credit facilities need to be augmented to improve the export performance of the industry.

Human Resource Development

Since commercialisation of floriculture is relatively of recent origin, it is necessary to train people at all stages from production through export marketing. Imparting training through specialised courses by establishing an Institute for horticulture including floriculture is vitally needed. In the absence of special training programmes at home, the dependence on foreign technology and technicians will become a permanent feature which would not help achieve a quantum jump in India's exports of floricultural products. Any delay in imparting training through specialised Diploma and Degree and short duration certificate courses would cost the country dearly.

VI. STRATEGY FOR TAPPING EXPORT POTENTIAL

Export potential for India's floricultural products is immense. India is a late entrant into global floriculture business. But this need not stand as an obstacle in the growth of the industry. Mindset of the Government, industry and trade today is much better than ever before. The process of economic reforms initiated in July 1991 is continuing with greater vigour and they are surely irreversible irrespective of the political philosophies of the Government in power.

Particularly in the case of floriculture industry development, there will be no opposition from any quarter as the growth of the industry will be benefiting the farming community and contributes immensely to the rural development. Floriculture industry enjoys certain special advantages. This is an industry which does not clash with local consumption needs; there is no clash with environmental standards; the industry will earn net foreign exchange. The industry will generate employment opportunities.

In order to develop the floriculture industry on sound footing, the first and foremost task is to organise estimates of area and production of floricultural products in the country so as to facilitate planning for future on a more systematic and scientific basis.

Domestic production needs to be encouraged apart from the existing areas, particularly in potential areas of West Bengal, Orissa, eastern UP, North East Himalayan belt etc. to enlarge the community of investors and exporters.

Floricultural industry in the country being at a nascent stage of

development, there are a number of constraints. Removal of the constraints, however, calls for a collective effort and cooperative endeavour of the Government, industry and trade. With proper policy framework by the Government and initiatives by the industry and trade, it is opportune for India to harness the production potential and exploit the overseas market opportunities. By a proper blend of policy support and incentives and facilities, India should make an endeavour to achieve an export target of Rs. 800 crore to Rs. 1,000 crore (US$300 million) by the year 2,000, which by all means, is in the realm of possibility. However, removing the constraints and creating an enabling atmosphere is an important pre-requisite. The steps required include the following:

— Planting material needs to be augmented by stepping up the application of technology of tissue culture.

— Technology has to be developed indigenously to make it easily accessible and to dispense with any imports.

— Research efforts are to be strengthened to produce varieties that are in demand in overseas markets and to increase the shelf-life.

— Domestic marketing has to be strengthened and facilitated by opening up, auction centres. Encouraging growers' cooperatives would help considerably.

— Infrastructure has to be created by way of cold chains, storage at airports, reefer transport facilities, etc.

— Credit facilities particularly the rate of interest and the quantum of funds have to be investor-friendly. NABARD has to give utmost importance to the floriculture industry.

— Human resources are to be developed by imparting specialised knowledge through training programmes right from production through export marketing.

— India need to strengthen her export efforts to tap markets such as USA, European countries and Japan.

— Exim-policies have to be modified to exploit the full potential of floriculture industry. EOUs may be encouraged to market as much as 75 per cent of the output in the domestic market. The

effort should be to spread export culture and to create an enabling atmosphere. Growth in domestic consumption will help in boosting exports and provide greater employment opportunities and incomes.

— Information in respect of all facets of floriculture industry needs to be disseminated as widely as possible to encourage entrepreneurs to take advantage of the market opportunities.

— As a part of information dissemination, organisations such as National Horticulture Board (NHB) and Agricultural and Processed Food Products Export Development Authority (APEDA) should jointly produce video film covering all facets of industry for greater exports.

— Seminars need to be conducted in all the potential States to encourage new investors to take to floriculture business.

India has vast potential for production and exports of floricultural products. A combination of factors including infrastructure, environment, ecology and Government policy would ultimately decide the competitiveness of India's floriculture industry. Liberalisation of industrial and trade policies has opened up several avenues for growing floricultural products for exports. Combined with this, the availability of credit and incentives for taking up floriculture business would help India to retain her competitiveness to emerge as an important supplier to global markets.

ANNEXURES

ANNEXURE I
GLOBAL MARKETS FOR BULBS, CUTTINGS, PLANTS, CUT-FLOWERS AND FOLIAGE

SITC: 2926 Bulbs/Cuttings/Plants

Germany
France
USA - Puerto Rico
Italy
United Kingdom
Netherlands
Switzerland
Japan
Sweden
Belgium-Luxembourg
Austria
Canada
Spain
Denmark
Finland
Norway
Korea Rep.
Portugal
Mexico
Greece
Singapore
Ireland
Turkey
Australia

Kuwait
Argentina
China
Israel
Cyprus
New Zealand
India
Jordan
Malaysia
Tunisia
Brazil
Philippines
Reunion
Indonesia
Thailand
Iceland
Martinique
Chile
Oman
Faeroe Islands
Guadeloupe
Romania
Mauritius
Tunisia
Venezuela
Sri Lanka
Pakistan

SITC 2927: Cut-Flowers/Foliage

Germany
USA - Puerto Rico
Netherlands
United Kingdom
France
Japan
Switzerland
Italy
Austria
Belgium-Luxembourg
Sweden
Canada
Denmark
Singapore
Norway
Spain
Mexico
Ireland
Greece
Finland
Kuwait
Argentina
Portugal
Australia
Thailand
Korea Rep.
Oman
Martinique
Iceland
Guadeloupe
Reunion
Venezuela
Malaysia
Brazil
New Zealand
Israel
China
Sri Lanka
Philippines
Fr.Guiana
Turkey
Chile
Indonesia
Faeroe Islands
Cyprus
Romania
India

ANNEXURE II
FLOWER AUCTION SYSTEM IN NETHERLANDS

Flower auction in Aalsmeer in Netherlands takes place in a huge warehouse, the size of several football fields. This is where the thousands of bidders and flower sellers do traditional business in extremely modern way.

The huge hall contains rooms and trolleys and clocks and computers. The pivotal role is played by the ingenious and justly famous Dutch auction clocks systems. As the vivid and varied flowers are displayed by the sellers, the clock's hand is set at the highest price on the dial. It then runs back wards through the lower prices until a buyer presses an electronic button and stops the clock. The price on the dial at that very moment is the price that he or she pays. The trick is to hit the button at the right second: too soon, and you pay too much; too late and another buyer will have got in first.

Interestingly, the clock's hand falls below a pre-determined reserve price without a buyer putting in a bid, the lot is not sold but destroyed. Millions and millions of flowers in different varieties, colours and shapes from all over the world are sold in minutes and leave for various destinations.

Virtually all the country's floriculture production is sold through the auction. More than 1,000 people work at the Aalsmeer Flower Auction, which is the largest business under one roof in the world. There are high standards of quality-there must be uniformity and beautiful colours,fresh buds, perfect leaves, straight stems and not a scratch or a bend or any damage. New technology for flowers is constantly being evolved to create new colours, increased vase life, thornless roses, stems over four feet long, etc.

A few venerable traditions are gradually changing. The advent of modern communication methods in the form of tele-auctioning-which enables buyers to choose from the products on offer at several auctions-is giving buyers a competitive edge. And putting increasing pressure on growers. Another possibility is of customers buying directly,outside the auction systems, as is becoming common in the case of vegetables.

Such changes are inevitable, as its's a buyer's market, after all. And the Dutch floriculture industry knows that providing customers exactly what they want is the best bet for the industry's continued growth.

ANNEXURE III
EXPORTERS OF FLORICULTURAL PRODUCTS

M/s A V Thomas & Co. Ltd.
P.O. Box 1685,
Panampilly Nagar
Cochin -682015

Tele :0484-355312

M/s Akhshan Floritech
73, Jolly Maker Chamers-II,
Nariman Point
Bombay-400 021

Tele: 022-2850383,
Fax : 022-2021040

M/s Asiatic Agencies
4850, 24, Ansari Road
Darya Ganj,
New Delhi-110 002

Tele:011-3275670
Fax: 011-32481

M/s Becimpex
International Pvt. Ltd.
Bec House, DDA Comml. Complex
13th Masjid Moth
New Delhi-110 048

Tele:11-6445815
Fax: 011-6445819

M/s Bharati Glaxy
116, Gangandeep
Rajendra Place
New Delhi-110008

Tele: 011-5713928
Fax : 011-5754200

M/s DHK Kartik Export
Ist FIR. No. 9,
66, Vaju Kotak Marg
Bombay-400001

Tele: 022-2612627
Fax: 0225611700

M/s Durga Seeds
24/8, Indl. Area, Phase-II
Chandigarh-160002

Tele: 0172-604685
Fax : 0172-44388

M/s Ajaypartap Singh
H.No. 213, Sector 36-A,
Chandigarh- 160 023

Tele: 172-600624

M/s Andhra Seeds Corp.
3-6-295, Ponnlor Chambers,
Hyderguda
Hyderabad -500 029

Tele:040-236312

M/s Bafna Agro
Industries Ltd.
10, Sajan Nagar
Indore - 453 001

Tele:0731-400121
Fax: 0731-400125

M/s Bhargab & Co.
Bhatpara House, Plot 8,
H-Block. New Alipur
Calcutta-700 053

Tele:033-4781655
Fax :033-4788181

M/s D Banerjee & Co.
131, B.K. Park Avenue,
Calcutta-700001

Tele: 033-366486

M/s Duncans Biotech
41, Shakespeare Sarani,
Calcutta-700017

Tele: 033-2477588
Fax : 033-2471909

M/s East West Trade Links
B-5/69 Safdarjung Enclave
New Delhi-110029

Tele : 011-600840
Fax : 011-6882609

M/s Empee Distilleries
Limited
693/695, Mount Road
Madras-600006

Tele: 044-8522510
Fax : 0448523412

M/s Fauna International
R.No.6-E & 34-A, Metcalfe St.
Calcutta-700013.

Tele : 033-264366
Fax : 033-271697

M/s Floral Technology Ltd
Plot No. A-62(A), Sipcot
Industrial Complx. Therku
Veerapandia Puram P.O.
Tuticorin-628002.

Tele: 461-23507
Fax: 0461-23407

M/s Flowrwood Nursery
Dr. B. 1 Dikshit Road
P.O. Kalimpong
Kalimpong-734301.

Tele: 03552-651
Fax: 022-3420979

M/s Ganeshrajah
Orgnisations Pvt. Ltd.
558, Anna Salai, Teynampet,
Madras-600018.

Tele: 044-450575
Fax : 044-459456

M/s H J Irani
8, Opp. Bandra Police Station
St. Martin's Road, Bandra
Bombay-400050.

Tele: 022-6423068

M/s Harisons ICE & Refrigeration
Butand Est. Badaun Road
Nekpur
Bareilly-243001

Tele: 0552-79296
Fax : 080-5589026

M/s Essar Agrotech Ltd.
Essar House, 11, Keshavrao
Khadge Marg,Mahalaxmi,
Bombay-4000346

Tele : 022-4950606
Fax : 022-4954793

M/s Feroze Noshir Masani
Yamuna Nivas, Vakilwadi
Nasik-422001.

Tele: 02553-350515
Fax : 0253-78902

M/s Flower India
International
H.No. 5, Sector 4,
Chandigarh-160001.

Tele: 0172-540540
Fax : 0172-44388

M/s Fragrance & Aroma
(Eastland) Pvt. Ltd.
305, Swasti House
70, Kazi Sayed Street
Bombay-40003.

Tele: 3427842,3435424

M/s Giripai International
P.H. Extn. Road
Cochin-682018.

Tele: 0484-366270
Fax : 0484-351476

M/s H S Bajaj & Sons
391, Mahesh Chambers,
2nd Fl. Narshi Natha St.
Bombay-400009.

Tele: 022-3422002
Fax: 022-3400906

M/s Harrisons Universal Flowers Ltd.
3rd Floor, Centenary
Building,28, M.G. Road
Bangalore-560001.

Tele: 080-5581145

M/s Hem Enterprises
20, 2nd Flour, Strand Road
Calcutta-700001.

Tele: 033-2205523

M/s Indo Australian Flora
Pvt. Ltd.
B-19, Westend Colony
New Delhi-110021

Tele: 011-6873230
Fax : 011-68732390

M/s Indrayani Biotech Ltd
12, Thubhe Park
Shivaji Nagar
Pune-411005.

Tele: 0212-323241
Fax: 0212-326201

M/s Jayalakshmi Exports
2-34-14, Gandhi Nagar
Gudibandi Street Tenali,
Guntur-522201.

Tele: 08644-6338
Fax : 08644-2433

M/s L K Pradhan Nursery
Chibo Busty, PO Kalimpong
Kalimpong (Distt Darjeeling)
Kalimpong-734301.

Tele : 03552-55685
Fax : 034552-55290

M/s B Vania & Sons
Cusrow Baug
D-5, Causeway
Shahid Bhagat Singh Road,
BombaY-400039.

Tele : 022-240239
Fax : 022-2873974

M/s Minex Agencies
71, Ist Floor,
Ganesh Chandra Avenue,
Calcutta-700013.

Tele : 033-261178
Fax : 033-270162

M/s Indo American Hybrid
Seeds, 17th Cross 2nd A Main
Banashankeri 2nd Stage, PO Box 7099
K.R. Road
Bangalore-560070.

Tele: 080-6650111
Fax : 080-6650479

Indo Bloom Ltd.
3rd Floor, Empire Infantry,
No.29, Infantry Road
Bangalore-560001

Tele: 080-572692
Fax : 080-557077

M/s International Garden
Centre
S-366, Panchsheel Park
New Delhi-110017.

Tele: 011-6442542
Fax : 011-6852133

M/s Jyoti Corp
No.7,Ramkrishna Bldg.
160,Off S V Road
Vile Parele (W)
Bombay-400056.

Tele: 022-6121365
Fax : 022-6104872

M/s Lotus & Co.
48, Ezra Street
Calcutta-700001.

Tele: 033-257122
Fax : 033-254953

M/s S Puri & Co.
D-5, Pushpanijali Enclave,
Pitampura
Delhi-110034.

Tele : 011-72744565
Fax : 011-7276747

M/s Mohanraj Enterprises
151, Chetak Marg
Udaipur-313001.(Raj.)

Tele : 0294-526965
Fax : 0294-523493

M/s Natural Products
Export Corp. Ltd.
53-A, 5th Floor,
Mirza Ghalib St.
Calcutta-700016.

Tele: 033-299150
Fax : 033-291583

M/s Nitin Govind Sable
1196, Laxmi Niwass,
Subhas Nagar
Shukrawar Peth
Pune-4110521.

Tele : 0212-441105

M/s Oriental Floratech
India Pvt Ltd
Darabshaw House
Ballard Est.
Bombay-400038.

Tele : 022-2610021
Fax : 022-2623729

M/s Photon Biotech Ltd
554, Market Yard,
Pune-411037.

Tele : 0212-652520
Fax : 0212-671686

M/s Punjab Blossoms Ltd
House No. 46, Sector-10
Panchkula-134109.

Tele : 0172-565221
Fax : 0172-565221

M/s Rainnow International
5, Ambika Soc.,Subhash Road
Anand-388001.

Tele : 02692-24140
Fax : 02692-26546

M/s Ramesh Flowers Pvt. Ltd.
Plot No. A 62(A), Sipcot
Indl. Complx.
Turicorin-628002.

Tele : 0461-23507
Fax : 0461-23407

M/s Natural Synergies Ltd
3, Centur Court,
8th 2nd St.
Kasturi Est.
Madras-600086

Tele : 044-4997747
Fax : 044-452546

M/s Nurseryman's Haven
Rishi Road
Kalimpong
(Distt. Darjeeling)
Assam-734301.

Tele : 03552-55435

M/s Paresh & Co.
36/E-2,
Girish Mukherjee Road
Bhawanipore,
Calcutta-700025.

Tele : 033-4750372
Fax : 033-282314

M/s Pocha Exports
P.O. Box 55,
Near Sholapur Bazar
Pune-411040.

Tele : 0212-671978
Fax ; 0212-672987

M/s Radharam Sohanlal
3, Malick St.
Calcutta-700007.

Tele : 33.2384781
Fax : 033-2384781

M/s Radhani Nursery
Kerbala Jor Bagh
New Delhi-110003.

Tele : 011-4631999

M/s Roseland
S-366, Panchsheel Park
New Delhi-110017.

Tele : 011-6442542
Fax : 011-6852133

M/s Rose Garden
Nayavyard, Chhani Road,
Baroda-390002.

Tele : 0265-481336
Fax : 0265-481080

M/s Sahara International
12, 2nd Fl. B B D Bag (E)
Calcutta-700001.

Tele : 033-2200666
Fax : 033-2483724

M/s San-Ind International
P.108, F.Blk, Annexe Bldg.,
New Alipore
Calcutta-700053.

Tele : 4780030
Fax : 033-2486871

M/s Saral Exports Pvt Ltd
Sopari Bhuvan,5th Fl.
83/85,Kazi Sayed t.
Bombay-400003.

Tele : 022-3441039
Fax : 022-3432476

M/s Shanti Kunz Nursery
Bong Road
Kalimpong-734301.

Tele : 03552-552993
Fax : 03552-55290

M/s Sivaskti Enterpprises
Ist Fl. M-1, Lajpat Nagar III
New Delhi-110024.

Tele : 011-6837190
Fax : 011-6847269

M/s Synthite Industrial
Chemicals Ltd.
Synthite Valley
Koadoyiruppu
Kolencherry-682311.

Tele : 04853-60285
Fax : 0484-370405

M/s Sagar Enterprise
No.5/88, BIT Chawl
Chandanwadi,
Bombay-400002.

Tele : 022-2080447
Fax : 022-2089731

M/s Samak Farms & Nurseries
5, C.S.C. S.F.S. Apts.,
Hauz Khas
New Delhi-110016.

Tele : 663442
Fax : 011-6892581

M/s sanghvi International
158/60, Narayan Dhuru St.
Bombay-400003.

Tele : 022-3447415
Fax : 0223447415

M/s Shangrila Gardens
Dr. B.L. Dikshit Road
Kalimpong-734301.

Tele : 03552-55850

M/s Shivalik Seeds Corp
47, Panditwari
P.O. Prem Nagar
Dehra Dun-248007.

Tele : 0135-83348
Fax : 0135-29944

M/s Sterling Farm
Research & Services Pvt Ltd.
Sterling House,PO Box 2344,
39/3209, Alappatt Cross Rd.
Ravipuram
Cochin- 682 016.

Tele: 084-365618
Fax : 0484-371308

M/s Tata Exports Ltd.
Blk.A, Shivasagar Est.
Dr. Annie Besant Road
Worli
Bombay-440018.

Tele : 022-4920300
Fax : 022-4950574

M/s Tropicana Exports
58-A, Shakespeare Sarani
Calcutta-700017.

Tele : 033-2477167
Fax : 033-2429044

M/s Universal Bulb &
Plant Nurseries
8th Mile, Kalimpong,
Darjeeling-734301.

Tele : 03552-55387
Fax : 03552-55290

M/s Vikram Greentech
(India) Pvt Ltd.
Sector No.24, Plot No. 99,
Pradhikaran, Nigdi
Pune-411001.

Tele : 0212-628876
Fax : 0212-620225

M/s Aditya Agriflora Ltd
6-3-655/2/2, Somajiguda
Hyderabad-500482.

M/s Annagha Flor Exports Limited
202,Sandhya Enclave,
Dwarakapuri Colony,Punjagutta
Hyderabad-500082.

Tele : (040-391602
Fax : (040)-391602

M/s Asian Flowers Ltd.
411,Topaz
Building,Panjagutta,
Hyderabad-500482.

Tele :(040)-313421
Fax :(040)-248993

M/s Blooming Meadows Ltd
7-1-70, Arunodaya Apartments,
Dharam Karam Road, Ameerpet
Hyderabad-500016.

Tele : (040)-291608
Fax : (040)-841697

M/s Brother Floratech India Ltd.
302, Shakuntla,
59, Nehru Place
New Delhi-110019.

Tele : (011)-6444008
Fax : (011)-6444007

M/s United Exports
Triveni Warriam Road
Cochin-682016.

Tele : 0484-352628
Fax : 0484-370498

M/s V G Agro Industries
Pvt. Ltd.
M-1, Lajpat Nagar-III,
New Delhi-110024.

Tele : 6821406
Fax : 011-6847269

M/s Yuppa International
26, Madhu Indl. Est.
P B Marg,
Worli
Bombay-400013.

Tele : 022-4941936
Fax : 022-4928814

M/s Andrew Yule & Co.Ltd.
8,Dr. Rajendra Prasad Sarani
Calcutta-700001.

M/s Arun Europe Floriculture Ltd.
146, Serling Road,
Nungambakkam
Madras-600034.

Tele : (044)-8253823

M/s Blooming Dales
Floriculture Ltd.
12-11-1373 Boudha Nagar
Secundrabad-5003621.

Tele : (040)-618820
Fax : (040)-618820

M/s Bommidala Florex Ltd.
D-4, Samrat Complex
Saifabad,
Hyderabad.

Tele : (040)-233981
Fax : (040)-240198

M/s Bubna Major Biotech Ltd.
201, Marine Chambers,
11, New Marine Lines
Bombay-400020.

Tele : (022)-2031744
Fax : (022)-2084018

M/s C.C.L.Flowers Ltd.
7-1-24/2/D,Green Dale, Ameerpet
Hyderabad-500016.

Tele : (040)-292455
Fax : (040)-292499

M/s Camson Agritech Ltd.
223 Ist Main
Domlur II Stage,
Bangalore-560071.

Tele : (080)-5260232
Fax : (080)-5260232

M/s Contitental
Floriculture Pvt. Ltd.
26, Jorbag
New Delhi

M/s Crystal Agritech Ltd
Ameerpet
Hyderabad-500016.

Tele : (040)-313181
Fax : (040)-313181

M/s Dhannyalakshmi Florihouse Ltd.
49-E,Drowpathiamman Koil Street
Rajapalayam-626117.

Tele : (04563)-20054
Fax : (04563)-22850

M/s Eurotech Flora Ltd.
352-A, M.I.A. Colony Road
12, Banjara Hills,
Hyderabad-500034.

Tele : (040)-315176
Fax : (040)-394885

M/s Farmtech Agro Exports Ltd.
8-3-903/A/3, Omega Apartments,
B5 IInd Floor,Nagarjuna Ngr.Rd.,Am.
Hyderabad-500873.

Tele :(040)-220753

M/s Flodale
27, Bull Temple Road
Bangalore.

Tele : (080)-608310
Fax : (080 608310

M/s C.S. Agros Ltd.
3-6-781/2 Street No. 14
Hyderabad-500029.

Tele : (040)-638720
Fax : (040)-638720

M/s Century International
No. 201-204,IInd Floor
Narangi Bagh Road
P.B.No. 261
Pune-411001.

Tele : (0212)-624113
Fax : (0212)-623241

M/s Cosco Blossoms LTD.
301,A.V.G. Bhavan
M-3, Connaught Circus,
New Delhi-110001.

M/s Das Flowers Pvt. Ltd.
131, Lal Bagh Road
Bangalore-560027.

Tele : (080)-2239648
Fax : (080)-3311109

M/s Euro Asia Flowers Ltd.
28 Adhchini Sri Aurobindo Marg
New Delhi-110017.

M/s Farm Specialities
India Ltd.
5 & 6,Ist Floor,
Market Complex,Sector-1 Nerul
New Bombay-400706.

Tele : (022)-7670076
Fax : (022)-7632606

M/s Fermenta Pharma Biodil Ltd.
F/5, Shiv Sagar State
Dr. A.B. Road,Worli
Bombay-400018.

Tele : 022-4927190
Fax : 022-4936940

M/s Flora Continental Ltd
131 H.S.I.D.C.
Kundli Industrial Estate
Delhi Border, G.T. Road

Fax:(0) -7011

M/s German Gardens Ltd.
A-24/A, Kailash Colony
New Delhi.

M/s Global Industries Ltd
10 Gauri Apartments,
3-4 South End Lane
New Delhi-110011.

Tele :(011)-3013423
Fax :(011)-3011168

M/s Grandleas Florex Ltd.
805 Barton Centre,
M.G. Road,
Bangalore-560001.

Tele :(080)-5594775

M/ Gujarat Agrigenetics
Ltd.
Relief Palika Salapose Road
Ahemadabad-380001

Tele :(0272)-354092

M/s Hindustan
Agrigentetics Ltd.
806 Meghdoot,
94 Nehru Place
New Delhi-110019.

Tele : (011)-6665442
Fax : (011)-6864547

M/s Indo-French Biotech
Entgerprises Ltd
5, Bhaskar Mansion,
31 Sitta Devi Temple Road,Mahim
Bombay-16.

Tele : (022)-4226819
Fax : (022)-4303143

M/s Indo-Holland Agro Exports LTD.
B-17,Som Datt Chamber-I,
5, Bhikaji Cama Place
New Delhi-110066.

Tele :(011)-688665
Fax :(011)-6872515

M/s Global Blooms (India) Ltd.
7, Race Course,
Coimbatore-641018.

Tele : (0422)-212750
Fax : (0422)-211104

M/s Golden Sash
Agroexport Pvt. Ltd.
No. 1, Kempapma Yamalur Post
Bangalore-500037.

Tele : (080)-5262424
Fax : (080)-5262424

M/s Green House Agri
India Ltd.
40-3-2/E, Krishna Nagar
Cabbi-pet,
Vijayawada-520010.

M/s Harrisons Universal
Flowers Limited
Centenary Building,IIrd Floor
28,M.G. Road
Bangalore-560001.

Tele :(080)-5581158
Fax :(080)-5589026

M/s I.D.I. Chemicals Ltd.
Chinoy Trade Centre,
IVth Floor,
116, Parklane
Secundrabad-500003.

Tele : (040)-844100
Fax : (040)-841933

M/s Indo Holland
Agritech Ltd.
2-Radha Krishnan Street
T. Nagar
Madras-600017.

Tele : (044)-44256971
Fax : (044)-448256971

M/s Indryani Biotech Ltd.
12 Thube Park
Shivaji Nagar
Pune-411005.

Tele : (0212)-323241
Fax : (0212)-326201

M/s Indus Flortitech Ltd
8-2-703/4/1 Road No. 12,
Banjara Hills,
Hyderabad-500034.

Tele : (040)-316145
Fax : (040)-392820

M/s J.K. M. Sayag
Floriculture Pvt. Ltd.
303 Ashiyana, 6th Cross
Rajmahal Vilas Extension
Bangalore-560080.

Tele : (080)-3341271
Fax : (080)-8394936

M/s Jaya Ram Floriculture
M/s Jain Floriculture Ltd
A-12, West End
New Delhi-110021.

Tele : (011)-607994
Fax : (011)-6885919

M/s Jeevan Flora Ltd.
S 48,Ist Floor
Greater Kailash Colony,
New Delhi-110048.

Tele : (011)-6430884
Fax : (011)-6430884

M/s Kanishka Agrotech Ind. Ltd.
707 Deepak Building,
92 Nehru Place,
New Delhi-110019.

Tele :(011)-6229297
Fax :(011)-6229298

M/s Karisma Floiculture Ltd.
G-14 Mansrovar
90 Nehru Place
New Delhi-110019.

Tele : (011)-6446525
Fax : (011)-6446525

M/s Kora Roses Ltd.
41 Nagarijuna Hills, Panjagutta
Hyderabad-500482.

Tele :(040)-227436
Fax :(040)-393559

M/s Inovative Export Flowers LTD.
6-3-1089/A-3-I Gulmohar Avenue
Raibhawan Road
Hyderabad-500482.

Tele : (040)-393109
Fax : (040)-224314

M/s Jagadamabe
Agrigenetics Ltd
1,New DEH Colony,
West Marrapally
Secundrabad-500026.

Tele : (040)-800402
Fax : (040)-501716

Indo Holland Ltd.
Jaya Ram House
129 Thombu Chetty Street1
Madras-600001.

Tele : (04)-5224487
Fax : (044)-5224487

M/s Kanoria Fleurs &
Naturals Ltd.
170, IInd Cross, 10th Main,
Rajmahal Vilas Extension
Bangalaore-560080.

M/s Kamson Pharmaceuticals Pvt. Ltd.
Sayaji Hotels
Kalaghoda
Baroda-390005.

Tele : 330088
Fax : 330284

M/s Karuturi Floritech Ltd.
204,IInd Floor
Embassy Centre,11,Crescent Road
Bangalore-560001.

Tele: (080)-2257470
Fax : (080)-2260396

M/s Kuber Plantation Ltd
S-32, Greater Kailash-I,
New Delhi-110048.

Tele : (011)-6372685
Fax : (011)-6420378

M/s Lakshmi Machine
Works Ltd. Agro Division).
2 A, Jubilee Building,45 Museum Rd.
Bangalore-560025.

Tele : (080)-5594808
Fax : (080)-5596065

M/s Maheshwari Floritech Limited
86 Radha Krishna Salai
26 Aarthi Arcade
Madras-600004.

Tele :(044)-8281418
Fax :(044)-8281840

M/s Malav Agrotech Ltd.
C-3 Local Shopping Centre,
Vasanth Vihar
New Delhi-110057.

Tele :(011)-6114986

M/s Manjushree Plantations Ltd.
14th Floor, A Wing
Mittal Tower,M.G. Road
Bangalore-560001.

Tele : (080)-558559
Fax : (080)-5588589

M/s Mishan Flora India
Limited
K-30 A,Hauz Khas Enclave,
New Delhi-110016.

Tele :(011)-6858802
Fax :(011)-6473378

M/s Nagarjuna Agritech Ltd
62 Nagarjuna Hills
Punjagutta,
Hyderabad-500482.

Tele : (040)-224445
Fax : (040)-225189

M/s Natural Synergies Ltd
3,Century Court
Kashturi Estate II Street
Poes Garden,
Madras-600086.

Tele : (044)-4991490
Fax : (044)-452546

M/s L.R. Brothers Indo Flor Ltd.
D-36, Ist Floor
NDSE Part-II
New Delhi-110049.

Tele : (011)-6217040
Fax : (011)6858494

M/s Mahyco Ltd.
Raheja Tower, IVth Floor
(West Wing),M.G. Road
Bangalore.

Tele:(080)-5589587
Fax :(080)-5588179

M/s Mali Florex Ltd.
1-5,6-3-652,Ist Floor
Dhru Tara,Behind Medinova,
Somajiguda
Hyderabad-500482.

Tele : (040)-392501
Fax : (040)-392501

M/s Megha Orchids (I)
Pvt. Ltd.
8B, Bhadur Shah Zafar Marg
New Delhi-110002.

Tele : (011)-3316722
Fax : (011)-3317947

M/s Multi Hue Flora Ltd.
G-9 Harsh Bhavan,
64-65,Nehru Place
New Delhi-110019.

Tele :(011)-6479105
Fax :(011)-6447347

M/s Naisargik Agritech
(India) Ltd.
306, Kailash,
Navrangpura P.O.
Ahemadabad-380009.

Tele : (0)-400759
Fax : (0)-425876

M/s Navneet Aggarwal
NECEM Cements Ltd
Housing Colony Road
Rukmani Nagar, Dispur
Guwhati-781006.

M/s Nexgen Floritech Ltd
No. 221 Amrutha Village,
Rajbhavan Road,
Somajiguda
Hyderabad.

M/s Noel Agritech Ltd.
C-10, Dalia Ind. Estate
Off. New Link Road
Andheri (W)
Bombay-400053.

Tele :(022)-6264573
Fax : (022)-6318496

M/s Oriental Floritech India Ltd.
Darabshaw House
Ballard Estate
Bombay -400038.

Tele :(022)-2623729
Fax :(022)-26213729

M/s Parinika Harvest Floratech Ltd
308, IIIrd Floor, Hi-Line Complex
Road No. 12,Banjara Hills
Hyderabad-500034.

Tele :(040)-312677
Fax :(040)-397512

M/s Pristine Booms Ltd.
No.3-4 A, 151, Eldams Road
Teynampet
Madras-600018.

Tele :(080)-3347987
Fax :(080)-3347987(Bangalore)

M/s Ramesh Flowers
Pvt. Ltd.
A-629A) Sipcot Ind. Complex
Therku Veerapandiya Puram P.O.
Tuticorin-628002.

Tele : (0461)-23507
Fax : (0461)-23407

M/s Rosette Agritech Ltd
C 309, Vijaya Hill
Apartments
A.C. Guards
Hyderabad -500004.

M/s Nirmal Floratech Ltd.
8-2-629/1/A.IInd Floor
Road No. 12, Banjara Hills
Hyderabad-500043.

Tele : (040)-393038
Fax : (040)-399309

M/s Olympic Agro
Industries Ltd
419 Hind Rajasthan Building
D.S.Phalke Road,Dadar
Bombay-400014.

Tele : (022)-4113225
Fax : (022)-4147537

M/s P.P.L.Floriculture Limited
Mittal Towers 'A' Wing IIrd Floor
Nariman Point
Bombay-400021.

Tele : (022)-2851636
Fax : (022)-2853007

M/s Pochiraju Floritech Limited
121 A, T.T.K. Road
Alwarpet
Madras-600018.

M/s Punjab Blossoms Ltd.
H No. 46, Sector 10,
Panchkula
Haryana-134109.

Tele : (0172)-565221
Fax : (0172)-547664

M/s Rermenta Pharma
Biodil Ltd.
F/5 Shivsagar State
Dr. A.B. Road,Worli
Bombay-400018.

Tele : (022)-4917190
Fax : (022)-4936040

M/s Rosette India Ltd
137 Mandakini Enclave
Kalkaji
New Delhi-110019.

M/s Rozendia Limited
C-3/3010,Vasanth Gunj
New Delhi-110070.

Tele :(011)-6899417
Fax : (011)-6899417

M/s Sachin Floritech Ltd
23, Pancom Chambers,
6-3-1090/1/A,Rajbhavan Road
Hyderabad-500082.

Tele : (040)-310267
Fax : (040)-397162

M/s Scarlet Flowrs & Agritech Ltd
284, IInd Main
J.P. Nagar,III Phase
Bangalore-560078.

Tele :(080)-6640751

M/s Siddarth Paradise Floriculture Ltd.
58/59 Andheri,Kurla Road
J.P. Nagar Andheri (East)
Bombay-59.

Tele : (022)-83910117
Fax : (080)-5534652

M/s South India Bromide
& Allied Chemicals Pvt.Ltd.
Post Box No. 1383
64, Armanium Street
Madras-60001.

Tele : (044)-583025
Fax : (044)-564575

Surriangal Properties Ltd
H-106-D,Connaught Circus
New Delhi-110001.

M/s Sun Floriculture
Biotech Ltd.
6-3-788/29/32 Vidhya Bharati
College Building,Opposite Gold Spot
Hyderabad-500016.

Tele : (080)-333396
Tele : (040)-315945

M/s S.P.A. Agros Ltd.
1 Acharya J.C. Bose Road
Calcutta-700020.

Tele : (033)-2427581
Fax : (033)-248584

M/s Sajjala Agritech Pvt. Ltd.
No.3-5-874/4 Ist Floor
Hyderguda
Hyderabad-500029.

Tele : (040)-231075
Fax : (040)-596314

M/s Shakti Sai Flowers & Tissue Ltd.
6-2-39/B A.C. Guard
Hyderabad

Tele :(080)-6335462

M/s Southern Greenfields Limited
318 Raheja Arcade,
1/1, Koramangala
Bangalaore-560095.

Tele : (080)-5534965

M/s Sree Royyal Seema
Dutch Kassembouw Ltd.
40/304 Bhagya Nagar
Kurnool-518004.

Tele : (08518)-22098

M/s Suravanshi Florex Ltd
2A, Badan Soohana Apartments,
6-3-1085, Rajbhawan Road
Hyderabad.

Tele : (040)-311237
Fax : (040)-355968

M/s Syvarna Florex Ltd.
34,4th Cross, UAS Layout
Snajay Nagar
Bangalore-560094.

Fax : (080)-339730
Fax : (040)-315946

M/s T.M.T.Industries Ltd
5-8-113, 11th Floor
21st Century Complex,
Nampally
Hyderabad.

M/s Trozen Agro Comples Limited
205-206 Vishwadeep
Dist. Centre Janakpuri
New Delhi.

Tele : (011)-5742053
Fax : (011)-5730699

M/s Valplus Biotech Ltd.
18, Beuna Mote Opp.
N.C.I. Main Gate
Pune-411018.

Tele : (0)-349015
Fax : (0)-331737

86, Vasavi Florex Ltd.
I-206,Divya Sakti Complex,
Hyderabad-500016.

M/s Venus Floriculture Exports
29, Mardia Plaza,
C.G. Road, Navrangpura
Ahemadabad.

Tele :(079)-404953
Fax :(079)-462831

M/s Vishwa Flora Limited
J-1/35,DLF Qutub Enclave
Phase-II
Gurgaon-12002.

Tele : (0124)-351901
Fax : (0124)-351161

M/s Yaturi Gardens Ltd
Yathuri,Banjara Avenue
Banjara Hills
Hyderabad-500034.

Tele : (040)-396163
Fax : (040)-395703

M/s Toubro Industries Ltd
SCO 94-95, Frontier Chambers
Sector 17/C,
Chandigarh.

Tele :(0172)-542444
Fax :(0172)-542444

M/s Unity Agrotech Industries Ltd
430, Kalian Das
Udyog Bhawan,Near Century Bazar,
Bombay-400025.

Tele :(022)-43377378
Fax :(022)-4229721

M/s Varlak Agrotech
Pvt Ltd
156, R.J. Nagar Main Road
M.L.A. Layout
Bangalore-560032.

M/s Vatsa Exim Ltd.
Vatsa House, 5th Floor
Janam Bhumi Marg
Bombay-400001.

Tele : (022)-2835051
Fax : (022)-2833668

M/s Versatile Biotechnologies Limited
3/21, Patrakar Puram
Gomti Nagar
Lucknow-226010.

Tele :(0522)-245728
Fax :(0522)-258386

M/s Worldwide
Horticulture Ltd.
D-5, Pushpanjali Enclave
New Delhi-110034.

Tele : (011)-7274565
Fax : (011)-7276747

M/s Zenith Floriculture
India Ltd.
131 Mittal Chambers
Nariman Point
Bombay.

M/s Zygo Flowers Ltd.
Sy,21,koleer Village
Anthrahalli P.O.
Dodballapur-561203.

Tele :(080)-8462370
Fax :(080)-8460955

M/s A. Boseck & Co.
65, Golf Club Road
Calcutta-700033(WB).

M/s Agri-Horticultural Society
1,Alipore Road
Calcutta-700021.

M/s Ajanta Seeds & Plants
Shop No. 11, Near Indian Coffee
House, Railway Station
Gwalior-474006.

M/s Argosy
97, Yashwant Place
Chanakyapuri
New Delhi-110021.

M/s Beena Nursery (P) Ltd
Vellayambalam
Trivandrum-695010.

Tele : (0471)-604336

M/s Bonanza Decorators
50,Naveen Market
Kanpur-208001.

M/s Deb Narayan Nursery
Vill.Borechanpur,P.O. Sukdevpur
Bishnupur South,24 Parganas
(West Bengal)-743503.

M/s Edward Nursery
Andul Road
P.O. Botanic Garden
Howrah-711103.

M/s Evergreen Nursery
P.O. Thiruvangad
Thalassery-3
Distt. Kannur, (Kerala)

M/s Flowerwood Nursery
Dr. B.L. Dixit Road
P.O. Kalimpong
Darjeeling-734301 (WB).

M/s Aahaar Uphaar
Nelson Mandela Road
Munirka Vihar Shoping Complex
New Delhi.

M/s Aggarwal Nursery &
Seed Store Panditwari
P.O. Prem Nagar
Dehra Dun-248007(UP).

M/s Agri-Horticultural
Society
Hyderabad-500004.

M/s Anurag Nursery &
Agricultural Farm
Indira Nagar
Dehra Dun-248006(UP).

M/s Basant Farm and Nursery
Ram Baugh
Jamuna Bridge
Agra-282006.

M/s B.K. Nursery
20-C.Y. Chintamani Road
George Town
Allahabad-211002.

M/s Branching Out
21, Maude Road
Delhi Cantt-110010.

Tele : 3292926

M/s Division of
Floriculture & Landscaping,
IARI
New Delhi-110012.

M/s Everest Nursery & Co.
Kalimpong
Distt. Darjeeling(WB)
Kalimpong-734301.

M/s Farmer Nursery
Guirim, Bardez
Goa

M/s Fredi Surti Co.
2, Saklat Place
Calcutta-700013.

M/s Frieds Rosery
B-110, Mahanagar
Lucknow-226006.

M/s G. Glads
655, Gurdev Nagar
Ludhiana-141001(PB).

M/s Globe Nursery
25, Ram Dhane Mitter Lane
Shyam Bazar
Calcutta-700004.

M/s Green Cross
Horticulture Service
G-1, Peter Apartments
Dr. Peter Dias Road,Bandra
Bombay-400050.

M/s Gulmarg Nursery
Golibar13/272, Shah Vilayat Street
Saharanpur(UP).

M/s Habib Nursery
Malihabad
Lucknow (UP)

M/s Hidustan Nursery
Diamond Harbour Road
P.O. Shirakole
Shirakole-743513 (WB).

M/s Imperial Nursery
9, Rai Charan Pal Lane
Calcutta-700046.

M/s Indian Institute of
Horticulture Research
Hessaraghatta
Bangalore-560089.

M/s Itmadpur Nursery
P.O. Amarnagar
Faridabad-121003.

M/s Krishnendra Nursery
69, Lalbagh Siddapur,
Jayanagar Ist Block
Bangalore-560011.

Tele : 621674

M/s Gaya Nursery & Strawberry Farm
A/P-Sasure Tal. Koregaon (Dt.)
Satara
Maharashtra)-415511.

M/s Garden
Firnar Gate,Publi Road
Junagadh-362001 (Guj.).

M/s Govt. Sunder Nursery
Nizamuddin.
Near Humayun Tomb
New Delhi-110013.

M/s Greenwoods Nurseries
71, Saket
Meerut-250001.

M/s Gulshan Nursery
1-A Phyare Road, Near Maidan
Sholapur Bazar
Pune-141001.

M/s Hallem Nursery
Malihabad
Lucknow (UP)

M/s Ikebana
M-1/1, Gole Market
Near Bank of India
Mahanagar
Lucknow-226006.

M/s Indian Horticulture
Co.,P.O. Kalimpong
Distt. Darjeeling (WB)
Kalimpong-734301.

M/s Indo-American Hybrid
42/1, 17th Cros
2nd 'A' Main K.R. Road
Banashankari 2nd Stage
Bangalaore-560070.

M/s K.S. Gopalaswamiengar
Son, Fifth Main Road
Chamarajpet
Bangalore-560018.

M/s Krishi Kranti Kendra
Dhanwati Ashram,Sitabuldi
Nagpur-440012.

M/s K.S.G.'s Farm &
Nursery,44-A, Kasturi Ranga Road
Alwarpet
Madras-600018.

M/s L.B. Pradhan & Sons
Kalimpong
Distt. Darjeeling(WB)
Kalimpong-734301.
New Delhi-110017.

M/s Manak Nursery
Ingraham Instt., Hapur Road
Ghaziabad (UP)

M/s Model Nursery
5/1, Tiljala Road
Calcutta-700046(WB)

M/s Nimin Rose Farm
Usgaon
Goa.

M/s Obalappa Nursery
Yediyur Post
Bangalore-560011.

M/s Parivartan
217, DDA Apartments SFS
Hauz Khas
New Delhi-110016.

M/s Plants and Seeds
19, Lake Terrace
Calcutta-700029.

M/s Prabha Floriculture
K.I.K. Road, Near Chinhat
Lucknow-226019.

M/s Pratap Nursery & Seed
Store, Panditwari
P.O. Prem Nagar
Dehra Dun-248007.

M/s Rajdhani Nursery
Karbala, Jorbagh Road
New Delhi-11003.

M/s R. Dutta (Florists)
C/o M/s B.K. Paul & Sons
19, Flower Range
New Market
Calcutta-700013.

M/s Laxman Nursery Gauri
Kanpur Road,
Sarojini Nagar
Lucknow-22008.

M/s Maheshwari Farms and
Nurseries
A-1, Sarvodaya Enclave
Main Mehrauli Road

M/s Meen Nursery
Thaliyal, Karamane,
Thruvanthapuram-695002.

M/s National Botanical
Research Institute
Rana Pratap Marg
Lucknow-226001.

M/s N. Cooper and Co.
3, Queen Garden
Pune-411001.

M/s Osmania University
Nersery
Hyderabad-500001.

M/s Parliament Street
Nursery
Purana Quila Road,
New Delhi-11001.

M/s Pocha Seed Pvt. Ltd.
Post Box No. 55,
Near Sholaapur Bazar
Pune-411001.

M/s Pradhan Brothers
Relli Road
Distt. Darjeeling
Kalimpong-734301.

M/s P. Pocha & Co.
Near Sholapur Bazar
Pune-411040.

M/s Ratna Nursery
Kalimpong
Distt. Darjeeling (WB)
Kalimpong-734301.

M/s Rishi Farm and
Nursery
Dr. K.L. Dikshit Road
Distt. Darjeeling
Kalimpong-734301.

M/s Rodney Rose Farm
Near Seraulim Railway Station
Salcite, Margao
GOA.

M/s Samak Farms &
Nurseries
52, DDA,SFS, Hauz Khas
New Delhi-110016.

M/s Sanjay Kumar Mehta
102, Parekh Nagar
Opp.Muncipal,Centenary General
Hospital,S.V. Road, Kandivili (W)
Bombay-400067.

M/s Shanthi Nursery
Lalbagh Siddapur
Bangalore-560011.

Shri Kadumba Nurseries
Nurserymen,Seedsmen & Florist
24/4, RTI,IGH, Barkatpura
Hyderabad-500001.

M/s Shyam Nursery
Gauri, Kanpur Road
Sarojini Nagar
Lucknow-226008.

M/s Standard Nursery
P.O. Kalimpong
Kalimpong-734301.

M/s Sutton & Sons (India
Pvt. Ltd.)
13-D, Russell Street,
Calcutta-700071.

M/s Himalaaayan Nursery
Bagaicha Kothi,East Main Road
P.O. Kalimpong
Distt. Darjeeling
Kalimpong-734301.

M/s Triveni Nursery
Sonpura House
Abadganj, Daltonganj,
Palamau-822101.
(Bihar)

M/s Vasundhra Farms &
Plantations Pvt. Ltd.
265, Zone II, Maharana Pratap Nagar
Bhopal-462011 (Bihar).

M/s Venkatesh Nursery,
Lal Bagh,Siddapur,
Bangalore-560011.

M/s Sikrupa Farm & Nursery
7, Jai Appts. Laxmi Bhuvan Compound
Palgar,Distt Thane-401404.
(Maharashtra)

Sandeep Nursery
B-69, Mandir Marg
Mahanagar Extension
Lucknow-226006.

M/s Shadab Nursery
P.O. Malihabad
Distt. Lucknow
Lucknow (UP)

M/s Shanti Van Agriculture Farm
93, Sindhi Society
Chembur, Bombay-400071.

Shri Prasad Nursery
P.B. Road
P.O. Koganoli-591229.
Distt Belgaum (Karnataka)

M/s Srinivasa
237/46 Fifth Main Road
Chamrajpet
Bangalore-560018.

M/s Suraj Nursery
Neasr Ranmukteshwar Mahadev Hansol
Ahmedabad-382475.

M/s Tara Pradhan
C/o T.P.O. 1654,
Kalimpong(WB)

M/s Janak Nursery
P.O. Pradhan Nagar
Mallaguri
Distt. Darjeeling
Siliguri-734403.

M/s Twin Borthers
Nurseries
8th Mile Post
P.O. Kalimpong
Kalimpong-734301.

M/s Vatika Nursery
47, Kulsi Road,
Sakchi
Jamshedpur- 831001.

M/s Venus Trading Co.
Panditwari, P.O. Prem Nagar
Dehra Dun-248007.

M/s Y. Munivenkatappa
& Sons, 69, Lalbagh Siddapur
Bangalore-560011.

M/s Indian Institute of
Horticulture Research
Hessaraghatta,
Bangalore-560089.

M/s CSIR Complex,
Palampur
Himachal Pradesh.

IARI Regional Research
Station, Katrain
Kullu Valley (HP)
Himachal Pradesh

Dr. Y.S. Parmar
University of Horticulture & Forestry,
P.O. Nauni, Solan
Himachal Pradesh.

M/s Kerala Agricultural
University
Vellanikkara
(Thrishoor)

M/s Sher-E-Kashmir
University of Agriculture &
Technology, Shalimar Campus
Srinagar (J & K)

M/s Andhra Pradesh
Agricultural University,
Rajendra Nagar
Hyderabad-500030.

M/s Regional Plant
Resource Centre,
Bhubaneshwar-751015.

M/s Indian Society of
Ornamental Horticulture, Division
of Floriculture & Landscaping,
Indian Agricultural Rsearch Instt.
New Delhi-110001.

M/s Indian Agricultural
Research Institute
New Delhi-110012.

M/s National Botanical
Research Institute
Lucknow.

M/s ICAR Research Complex
for NEH Region Barapani
Shillong.

M/s Punjab Agricultural
University,
Ludhiana (Pub.)

M/s Tamil Nadu Agricultural
University
Coimbatore (TN).

M/s Bidhan Chandra Krishi
Vishwa Vidyalaya
Mohanpur
(Kalyani, (WB).

M/s Mahatma Phule
Agriculture University,
NARP (Plains Zone) Station,
Ganeshkhind
Pune-411005.

M/s University of
Agricultutal Sciences,
GKVK
Bangalore-560065.

M/s Horticultural
Experiments & Training Centre,
Chabattia (Ranikhet), UP.

The Orchid Society of India,
Department of Botany,
Punjab University
Chandigarh.

The Bougainvillea Society of India,
Division of Floriculture & Landscaping Indian Agricultural Research Institute,
New Delhi-110012.

Chysanthemum Society of India
C-48,Gulmohar Park
New Delhi-110049.
Calcutta-700063.

M/s Indian Bonsai
Association, 22, Kapil Vihar,
Pitampura
Delhi-110034.

M/s All India Kitchen
Garden Association
162, Jorbagh
New Delhi-11003.

The Dahlia Society of India,
12, Bhattacharjee Para Road
Plot-5,

M/s Indian Society of
Cactil & Succulents,
20/78. Panjabi Bagh
New Delhi-110026.