1

Fruits & Vegetables Sector : An Overview

Introduction

India is the second largest producer of fruits & vegetables in the world with an annual production of around 94 million tonnes. It has the distinction of producing almost all-tropical and exotic fruits and vegetables because of varied climatic conditions. Due to the short shelf life of these crops, as much as 30-35% of fruits and vegetables perish during harvest, storage, grading, transport, packaging and distribution. Only 2% of these crops are processed into value-added products. Hence, there is a need for maximum commercial utilisation of fruits and vegetables and to adapt production and marketing activities to the requirements of the world market and to cater to domestic demand which, over the past few years, has been increasing because of various socio-economic factors. If the nutritive value of the processed food products could be maintained, this sector will emerge as a major value-added food industry.

Fruits and vegetables are processed into a variety of products such as juices and concentrates, pulp, canned and dehydrated products, jams and jellies, pickles and chutneys etc. The extent of processing of fruits and vegetables varies from one country to another. The estimated processing capacity as a percentage of production for some of the major countries is given in **Annexure 1**.

Historically speaking, processing of fruits & vegetables in the simplest form like pickling, sun-drying and/or making preserves has been practised in the country from very ancient times almost in every home. Since then it has been progressing fairly well and has been meeting the entire local demand and has successfully entered the exports market. In fact, India is the second largest producer of fruit and vegetables in the world. Total area under fruit and vegetable cultivation is estimated at 12 mn hectares, which is 7% of total cropped area in the country. The commercial processing of fruit & vegetables is approximately 2.0%. India exported processed fruits and vegetables worth Rs. 5240 million in 1997-98.

India is the second largest producer of fruit and vegetables in the world.

The following table gives the value of food products (categerywise) for the past 3 years:

Table 1

Value (Rs Lakh)

	98-99	99-00	00-01
Fresh Mangoes	7913.66	7154.92	6860.70
Fresh Grapes	3788.59	14082	8297.60
Other fresh fruits	7172.91	11271.67	11549.99
Dried & Preserves vegetables	38305.60	58989.60	73829.40
Mango Pulp	13856.40	19652.60	26384.87
Pickles & Chutneys	7595.670	8998.50	13645.67
Other procesed fruits & vegetables	10811.15	11723.12	20694.30
Total	89,444.01	1,31,813.01	71,262.44

The past 3 years export performance indicates that there is a steady growth in processed fruits and vegetables. Year 2000-01 showed a decline of exports from Rs. 13187.3 m to Rs. 7126.2 m. The major destinations for processed fruits and vegetables are :

Dried & preserved vegetables	Sri Lanka, USA, UAE, Germany, France, Netherlands
Mango Pulp	UAE, Saudi Arabia, Kuwait, Netherlands, Hongkong
Pickle & Chutney	UK, USA, UAE, Germany, Canada, Netherlands, Saudi Arabia
Other processed Fruits & vegetables (Tomato paste, jams, juices etc.)	USA, Netherlands, UK, UAE, Indonesia, Philippines, Russia

- The total value of production in 2000-01 of processed fruits and vegetables was Rs (mn) 7126.24. Of this, the production of processed fruit is estimated to be Rs (mn) 4707.90.
- The largest segment in processed fruit products is Ready to Serve (RTS) beverages followed by fruit pulp, pickles/preserves/chutneys, Frozen fruit & vegetables and jams/squashes/syrup respectively.
- The processing sector has grown to about 23% per annum. However, the growth rates have been substantially higher for frozen fruits, & vegetables (103%), dehydrated fruits & vegetables (61%). These products were not the traditional products for Indian industry and development in these areas started only in the late 1980s.

The total value of production in 2000-01 of processed fruits and vegetables was Rs (mn) 7126.24. Of this, the production of processed fruit is estimated to be Rs (mn) 4707.90.

- Of the total processed fruit production in the country about 45% is contributed by mango-based products and 15% by pineapple-based products.

  It is estimated that 10% of the production of processed fruit products is currently exported. The remaining caters to the defence, institutional and household segments. As against this, almost 45% of the processed vegetable products are exported. Of the remaining 10% is consumed by the household segment and 45% by the defence and institutional segments.

It is estimated that 10% of the production of processed fruit products is currently exported.

As against this, almost 45% of the processed vegetable products are exported.

Processing Units

Presently there are approximately over 5200 units registered under the Fruit Product Order of 1955 distributed all over the country. Most of the units fall in the cottage and /or small-scale sector. A few modern processing plants have, now come up. The yearwise rise in number of Fruits and Vegetables processor's in India is given in Annexure 2. The segment has witnessed total investments to the tune of Rs. 75 billion in the last six years. The installed capacity of fruits and vegetable processing industry increased from 11.08 lakh tonnes in Dec.93 to 21 lakh tonnes at the end of the year 1999. But capacity utilisation continues to remain low at 45-50%. Production of processed fruits and vegetables was 940,000 tonnes in 1999, a 3.3% growth over the previous years.

Modern Units

After the liberalisation of the economic policies in the country, a few highly modern plants to produce mango pulp, tomato paste etc. in aseptic packing, have been setup and freeze

drying of many fruit & vegetables including mushroom is being taken up. It is expected that in the years to come many modern, state of the art plants shall come up.

Joint Ventures

Since liberalisation, during July 1999 till February 2000, 1120 proposals of industrial licenses and 100% export oriented units were approved and about 248 such proposals have already been implemented.

- The countries with which the Joint Ventures have been signed are U.S.A., U.K., Netherlands, Switzerland, and Germany. (The proposals put forward include fields like technology transfer, financial and/or marketing tie-ups.) These tie-ups include production of items like canned mushrooms, banana & mango puree, fruit concentrates, and dehydration of vegetables particularly onion. A few proposals of frozen fruit and vegetables have also been approved.

Since liberalisation, during July 1999 till February 2000, 1120 proposals of industrial licenses and 100% export oriented units were approved and about 248 such proposals have already been implemented.

India Vs World

The extent of processing of fruits and vegetables varies from one country to another. The estimated processing capacity as a percentage of production for some of the major countries in the processing sector is given in **Annexure 1.** The processing capacity as a percentage of production is as low as 2% in India while in developed countries, this ratio is as high as 83%.

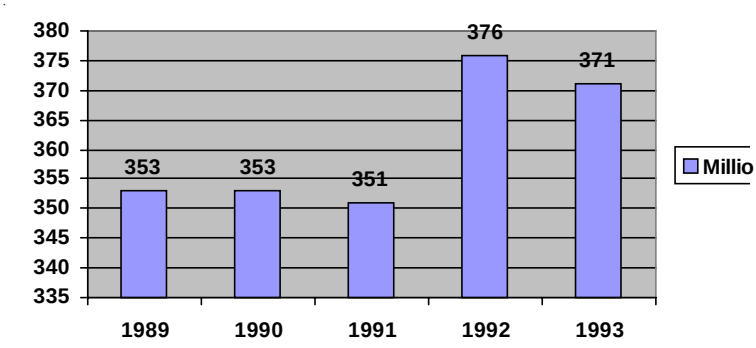
2

Fruit Industry

The fruit-farming sector in the world comprises the production of and trade in citrus fruit, bananas, semi-tropical fruits, soft fruit, pommes and stone fruits. The main representatives of citrus fruit are oranges and lemons; of semi-tropical fruits; pineapples and avocados; pommes and stone fruits; apples, pears, peaches and grapes. The total export value of fresh fruit amounted to 20 billion dollars in 1990. There are two segments; fruit farming in the Southern Hemisphere, with the emphasis on citrus fruit and bananas, and fruit farming in the Northern Hemisphere, with emphasis on grapes, pommes and stone fruits.

In International trade market tropical fruit products are sold in a variety of processed or semi-processed forms of which the three main product groups are: (1). Canned Fruit. (2). Fruit Juices/Pulp/Concentrates. (3). Dried/Dehydrated Fruit.

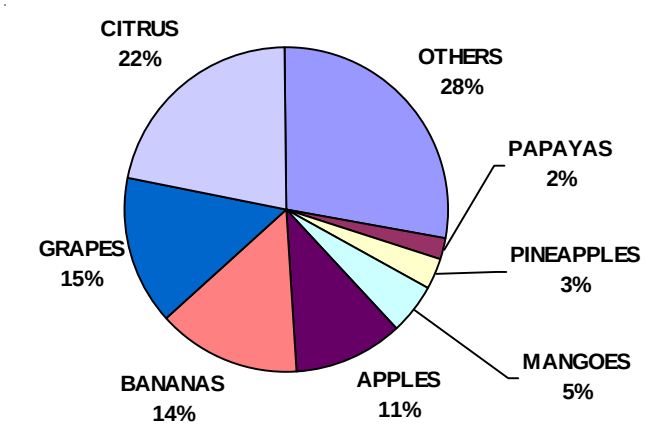
International Production Trends



The consumption of fruit in both fresh and processed form is increasing worldwide. Consumption rose by 9% in the period 1995-2000. The main types of fruit, in order of importance, are citrus, grapes, bananas, mangoes and apples.

Presently there are almost 180 families of fruits which are cultivated all over the world. Of these, major fruits constituting about 72% of the total production of fruits in the world are enlisted in Annexure 3.

Share of Major Fruits



Global Demand

On the basis of the development in processing of the seven main types of fruits, the total estimated consumption of fresh fruit is 250 million tonnes.

The consumption of fruit in both fresh and processed form is increasing worldwide. Consumption rose by 9% in the period 1995-2000. The main types of fruit, in order of importance, are citrus, grapes, bananas, mangoes and apples.

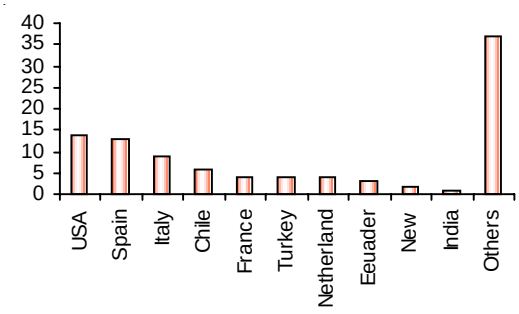
The regional preference for particular types of fruit links up with its regional production. The highest consumption takes place in Asia.Apples, citrus fruit and bananas, are all important products there. In North and South America there is a preference for citrus fruits. Europe has a high

consumption of both citrus fruits and apples. The volume of fruit consumption greatly depends on the production. This relative restriction has a great influence on price levels.

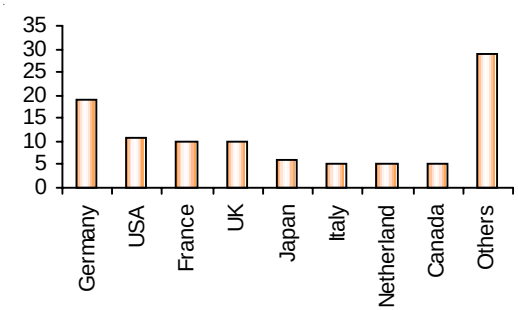
In Europe consumption of processed food is growing strongly; especially in Spain & Germany. Japan and the countries in Eastern Europe are potential growth regions. In various countries (mainly in the West) fruit products are increasingly regarded as essential foods and not purely as a luxury. Besides being consumed fresh, a great deal of fruit is also processed, e.g. into juices.

Major Exporters & Importers

The major exporters of fruits, are the USA, Spain and Italy. India has a 1% share in the export market of the world trade.



Germany is one of the leading importers of fruits followed by the USA and France. The following graph shows the share of major impoters.



The major expoter of fruits, are the USA, Spain and Italy. India has a 1% share in the export market of the world trade.

Germany is one of the leading importers of fruits followed by the USA and France.

Global supply

The main types of fruit produced in the world are citrus, grapes bananas and apples with 20%, 17%, 13% and 13% respectively, of the total fruit production.

The main types of fruit produced in the world are citrus, grapes bananas and apples with 20%, 17%, 13% and 13% respectively, of the total fruit production. In the seventies, this rose by almost 30% while growth amounted to about 15% in the eighties. The decline in grape production due to a decrease in the consumption of cheap wine, contributed particularly to this slowdown in growth. The other types of fruit grew by 21%. As a result of increased prosperity and the healthy conception of fresh fruit, consumption is still rising, indicating that there is an adequate demand for the growing production.

Generally speaking, with the exception of bananas, citrus and some exotics, fruit production takes place in the temperate climatic regions. Fruit production is still increasing, but less rapidly (under the influence of the decrease in the cultivation of wine grapes) than in the seventies. The range of fruit is still being further expanded.

As regards the supply of citrus fruit, substantial growth is expected in the coming years. Whether the consumption of citrus fruit will grow equally rapidly is still uncertain, so that surpluses should be expected, probably also in concentrates. Good quality products and the spread in sales will therefore become progressively more important.

The United States and Brazil are the dominant countries as regards citrus juice production.

The United States and Brazil are the dominant countries as regards citrus juice production. The U.S. produces mainly for its own market, while Brazil is the largest exporter.

World apple production rose by 20% to 40.3 million tonnes in the period 1990-2000. There is hardly any international

trade in the products of the two largest producers (China and the U.S.). India's share in world production is less than 1% (FAO estimate).

Bananas are grown in the subtropical climate region, with India and Brazil as the largest producers. Production is still growing. The rise in production is equally divided over the continents. The well-known banana republics are not the main producers but owe their reputation to their tremendous exports.

Grape production for the fresh market is still increasing, while grape wine production is slowing down. Most of the production is located in Europe (50%). The market is becoming increasingly international because grape producers have to export in order to dispose their surplus produce.

Only a small proportion of the fruit produced in the world is traded internationally as fresh produce.

Global trade

Only a small proportion of the fruit produced in the world is traded internationally as fresh produce.

The export of processed products is very important, particularly in the case of grapes, apples and citrus. The improved methods of preservation of fruit during transport have made the trade in fresh produce possible.

In addition, the international trade has received a powerful boost from the increased prosperity and the consumer's need for a wider range and a year-round supply. Around 12% of the world citrus production is exported as fresh produce, the percentage for grapes being 2%, bananas 18%, and apples 9%. The share of export can vary sharply from one country to another and is not always linked to

Around 12% of the world citrus production is exported as fresh produce, the percentage for grapes being 2%, bananas 18%, and apples 9%.

production. The U.S. and EC are by far the largest import markets, although the importance of the Far East (Japan) is increasing.

World imports of fruits and nuts amounted to 33 billion guilders in 1990. Between 1984 and 1988 imports increased by over 42%. The European countries together are the largest importers with a 61.9% share of the total world imports of fruit. The intra-EC trade in fruit amounts to 45% of the total world trade. The main products imported are citrus, bananas and apples. The southern Hemisphere is becoming increasingly important in the importation of apples.

The European countries together are the largest importers with a 61.9% share of the total world imports of fruit.

The relative importance of the American continents as an importer is declining, as is that of Asia and Middle East, Africa and Oceania which play a very minor role. Expressed in absolute quantities, imports have risen in virtually every country since 1984. Relatively speaking, the share in total world imports has fallen for a number of countries, whereas in the case of Germany, France, the United Kingdom and Japan it has actually gone up.

The European share is almost entirely accounted for by the EC countries. North and South America mainly export citrus and bananas, while Europe exports citrus, apples and grapes.

The main exporting countries are the U.S. (citrus, apples and pears), Spain (citrus), Italy (grapes, apples and peaches), the Philippines (pineapple) and Ecuador (bananas). Together, they represents 40% of the total world exports. The share of the American continent in exports has gone down slightly since 1984 as a result of the growing

importance of other countries. The same applies to exports from Italy. As against this, Spain's share in the world exports has risen. That country's accession to the EC has given an extra boost to Spanish citrus exports.

World Production of Select Tropical Fruits & India's Share

Table 2

Qty in Million Tonnes

Fruit	World	India	% share of India
Bananas	58.6	10.2	17%
Mangoes	23.5	12.0	51%
Papayas	4.8	0.5	10%
Pineapples	12.1	1.1	9%

Source : FAO Production Yearbook 1998.

(For purposes of comparison it should be noted that the world crop of oranges amounted to 59.6 million tonnes & that of apples 53.7 million tonnes).

World Fruit Juice Trade

The year 1998 was marked by a phenomenal increase in prices, particularly those of Mango and Passion Fruit, owing to drastic shortfalls in production, as a result of adverse weather conditions, particularly in EL NIÑO. This signifies the highly volatile situation in global fruit juice trade, which include pulps, puree, concentrates. The global trade in fruit juices is subject to the vagaries of weather in different regions & erratic world supplies on account of this. It may be frost in Brazil, rain in Spain or drought in

Thailand, which would effectively determine world supply and prices. Speculation, in such a situation, plays no less a part. Sometimes a surge in demand in a year of tight supplies, gives further philip to a volatile price situation.

The world trade in fruit juices is said to be highly competitive.

The world trade in fruit juices is said to be highly competitive. Though a number of countries in Latin America, Africa & Asia, participate in this trade, it is, by and large, concentrated in the hands of a few dominant suppliers, who determine the overall supplies & dictate the prices. The dominance of Brazil in orange juice, Thailand in Pineapple juice, Spain & Argentina in Grape juice, Poland & Germany in apple juice and the US and Israel in Grape fruit juice, is prominent.

The world trade in fruit juices is currently estimated to be worth close to US$ 5 billion.

World Trade In Processed Tropical Fruits

Processed pineapple products – namely, Canned pineapple and Pineapple juice – dominate world trade in processed tropical fruits, accounting for almost 75% of the total trade.

Processed pineapple products – namely, Canned pineapple and Pineapple juice – dominate world trade in processed tropical fruits, accounting for almost 75% of the total trade. This is followed by tropical fruit juices, concentrates and pulp/puree, which account for a share of 15%. Dried/ Dehydrated tropical fruits form about 4% of the world trade.

Canned Fruits

Among canned tropical fruits traded internationally, Pineapple is by far the most popular. It is followed by fruit cocktails (tropical fruit salads), Litchi Mango & Papaya. Thailand is the world's major supplying country, accounting

for 42% of total world exports. It is followed by Philippines, Indonesia, Kenya, Malaysia & South Africa.

No precise figures are available for trade in other canned tropical fruits. However, the trade estimates the sales to be about 5% that of canned pineapple. Thailand appears to be by far the largest supplier of most of these products.

Fruit juices, fruit concentrates & fruit pulp/puree

Pineapple juice is the most important among tropical fruit juices and concentrates that are traded, accounting for little over 60% of the world trade in tropical fruit juices.

With the exception of pineapple, there are no reliable statistics on world trade in tropical fruit juices, concentrates & pulp/puree according to ITC (UNCTAD/WTO). However, based on information from trade sources, it has been estimated by ITC that the world trade in these products (excluding pineapple) is estimated to be in the range of 185,000 to 210,000 tonnes (in single strength the equivalent, valued at between US$ 175 and US$ 225 million). The three most important fruits, apart from pineapple, are banana, passion fruit & mango. The major markets are the European Union, the United States & the Middle East.

The three most important fruits, apart from pineapple, are banana, passion fruit & mango. The major markets are the European Union, the United States & the Middle East.

Fruit juices, concentrates & pulp/puree continue to be traded internationally, mainly in bulk form, and used as raw material by various industries.

The beverage industry is by far the biggest end-user of these products. It produces juices, nectars, fruit juice drinks, multi-fruit & multi-vitamin beverages, alcoholic liqueurs, syrups, etc. Mango pulp is now stated to be a vital ingredient in the increasingly numerous multi-blend &

value-added drinks. Ten to fifteen varieties of mangoes in varying qualities and flavour, are now said to be offered in world trade. Major consuming countries now enjoy an increasing range of products, using banana pulp also. It is relatively low-priced compared to other fruit flavours. Banana pulp/puree are used as flavour enhancers in the expanding range of multi-blend and banana-based fruit drinks.

Other food industries produce a range of products containing some tropical fruit such as bakery products, baby foods, jams & confectionery. The baby food industry is the largest end-user of banana puree.

Other tropical products, traded internationally, most of which are sold in fairly small quantities include:

- *ACEROLA*
- *CHERIMOYA*
- *GUANABANA/ SOURSOP*
- *LYCHEE*
- *STARFRUIT*

Other tropical products, traded internationally, most of which are sold in fairly small quantities include:

- ACEROLA (puree & concentrate) – mainly from Brazil.
- CHERIMOYA (pulp) – from Venezuela, Brazil & Ecuador.
- GUANABANA/SOURSOP (pulp) – from Peru, Colombia & Venezuela.
- LYCHEE (Concentrate)- from Malaysia
- STARFRUIT (Concentrate)

Dried/Dehydrated Tropical Fruit

Precise overview of world trade in this product group is not possible, as separate trade statistics on dried/ dehydrated tropical fruit are not available, according to ITC (UNCTAD/WTO). However, rough estimates put total world trade at around 30,000 – 35,000 tonnes (including banana chips & dried bananas). This constitutes only a

small part – i.e. 5% of total world trade in all dried fruit, including temperate-zone, sub-tropical & tropical.

On the basis of fragmented data from trade sources, World trade in dried/dehydrated tropical fruit (estimated) is given in Annexure 4.

The major markets are the European Union (mainly Germany, France, UK & the Netherlands), the U.S. & Japan.

The major markets are the European Union (mainly Germany, France, UK & the Netherlands), the U.S. & Japan.

End User of dried/dehydrated tropical fruit

- The dried fruit and nut industry is the largest end-user of dried/dehydrated tropical fruit. It produces a wide range of products, the most popular being fruit & nut mixes, though some tropical fruit are also sold in single-fruit packs, such as banana chips, pineapple pieces or slices, and papaya pieces or spears.
- The breakfast cereal industry is believed to be the second largest end-user of dried/dehydrated tropical fruit, e.g., in musli, tropical fruit being used more for their strong colours than flavour.
- The confectionery industry is said to use dried/ dehydrated tropical fruit in various products like health bars, snack bars, musli bars, fruit bars and chocolate bars, which are more often taken as a snack between meals.
- There are several other food products which include some dried, dehydrated and even freeze-dried tropical fruit e.g., bakery products, dairy products, baby food, rice packs, prepared dishes, instant deserts and fruit teas.

Among the other dehydrated tropical fruits include Guavas, Kumquats, Durian, Starfruit, Jack fruit, Guyabanos, longans, crystallised ginger & stargooseberry, which are currently sold in very small quantities. Packers and end-users are, however, said to be interested in new fruits, if available.

Most importers and end-users are said to have usually their own, generally strict specifications, which suppliers must meet. They specify cut/style, moisture content, sugar content, whether with or without SO_2 etc. Pineapple, for example is usually offered in three forms : regular sugar (75 – 85%), low sugar (50 – 65%) and no sugar (40% natural sugar content). Tropical fruit is also traded in freeze-dried form. Such products are considered of high quality and used for special purposes e.g.., instant desserts & Musli. Prices for such products are high and the market small, though sales may be rising on account of new end-uses by the industry.

Other Processed Tropical Fruit Products

i. Tropical Individual Quick Frozen Fruits – A market for frozen tropical fruits (mainly IQF, as opposed to block-frozen) is said to be developing, for use as ingredients in bakery products, dairy products, baby food, fruit salads, etc.

ii. Tropical Jams/Jellies/syrups & others – smaller export markets are said to exist for such retail-packed products. However, such products are usually produced by domestic manufacturers, based on imported raw material.

iii. Tropical Fruits organically produced – currently organically-grown tropical fruits are mainly traded as

fresh produce. However, some processed tropical fruits are also in demand, e.g., Banana Puree (e.g., for baby food industry), pineapple juice, dried fruit (like Pineapple, Mango, Banana) for dried fruit packs, and musli as ingredients in various processed foods.

Indian Scenario of the Fruit Industry

India is the third largest producer of fruits in the world, (next to Brazil and USA) with an annual production of 33 million tonnes. The following present the Indian scenario of fruit cultivation.

Area in million ha	2.94
Production in million tons	27.90
Productivity (Tonnes/ha)	
India	9.17
Indian share in world production	8.61
Per capita Consumption (gm/day)	
India	60
Recommended	250
National requirement in million tonnes at the present level of population	53

India is the third largest producer of fruits in the world, (next to Brazil and USA) with an annual production of 33 million tonnes.

In combination with the possibility of doubling the averages yield through various development measures, the total production of fruits is expected to increase by more than 4 times.

In order to achieve export potential, it is suggested that a selective approach be adopted and efforts be concentrated on developing a few products for sale to a few markets. Based on the existing demand and potential demand, and

our ability to meet them over the next few years, the following fruits have been identified as having good market potential:

1 Mango

2 Grapes

3 Banana

4 Litchi

5 Exotic fruits : Chikoo, Ber, Pomegranate, Custard Apple and other fruits.

Presently, most of our fresh fruits are destined for west Asia with small quantities going to meet the requirements of ethnic population in U.K. However, with development of refrigerated transportation systems, it should be possible to enter the more attractive markets like Singapore, Malaysia and Japan.

The following fruits have been identified as having good market potential:

1. *Mango*
2. *Grapes*
3. *Banana*
4. *Litchi*
5. *Exotic fruits*

India's Production

The estimated production of fruits in the country is estimated at 33.0 million tonnes or 8% of the world production. It, therefore, ranks third after Brazil, which is number one, and USA being number two in the world. The total area under fruits is 3.3 million hectares. The important temperate fruits grown are apples, apricots, pears, peaches, cherries, etc. In the tropical and sub-tropical group, the major types of fruits are mangoes, bananas, citrus, oranges, guavas, melons, pineapples, grapes, leaches, pomegranate etc. Besides, there are many exotic fruits like starburst, avocado pears, kinnoos, artichoke, sapota, mangosteen,

olives, kiwi which are also grown and can be commercialized.

The Indian fruit juice and pulp industry (beverage industry) has made considerable progress in the last decade, and, according to trade information, has started contributing significantly to the international trade in tropical regions.

No precise data is available on domestic production of processed tropical fruits. However, it is estimated that the total annual production of fruit juices and concentrates is around 80,000 tonnes. The estimated product-wise break-up is given in Annexure 5.

Exports of Processed fruits & Vegetables

The estimated production of fruits in the country is estimated at 33.0 million tonnes or 8% of the world production.

Major product category in processed fruits and vegetables which are exported are :

Mangoes (fresh and pulp), Grapes, other fresh fruits, dried and preserved vegetables, pickles and chutney's & fruit beverages.

- Export of fresh mangoes have shown a decline in the year 2000-01 as compared to 1999-00. The major destination of fresh mangoes has been UAE.
- Exports of fresh grapes has shown an increase of almost 28% as compared to the year 1999-00 with UAE as a major destination. The emerging markets for fresh grapes are the Netherlands, Oman, Bangladesh and Sri Lanka.
- Exports of other fresh fruits have also shown an increase by 4%, as compared to the previous year (1999-00). The major destinations were Middle East

(UAE, Saudi Arabia) and Bangladesh. The emerging markets for fresh fruits are Belgium Egypt, Maldives and Italy.

Exports of fresh grapes has shown an increase of almost 28% as compared to the year 1999-00 with UAE as a major destination.

- Export of dried and preserved vegetables during 2000-01 had an increase of 37% compared to the year 1999-00. The major destination for dried & preserved vegetables were : SAARC (Bangladesh, Sri Lanka, Pakistan), European Union (France, Germany, Netherlands , Poland), Asia (Japan, Malaysia), USA, Canada, Africa (Egypt, Sudan, South Africa), Middle East (UAE, Saudi Arabia, Kuwait). The emerging markets are : LAC (Argentina), Africa (Zambia, Uganda, Kenya).

Exports of other fresh fruits have also shown an increase by 4%, as compared to the previous year (1999-00).

- Export of mango pulp had are increae from Rs (mn) 1965.3 to Rs (mn) 2638.5. The major destination were: Middle East (UAE, Saudi Arabia, Kuwait). Immense potential for export of mango pulp lie in countries in European Union (Germany, UK, France and Finland), Latin America and USA.

Product Characteristics

The range of products presently offered by India comprises of:

Export of dried and preserved vegetables during 2000-01 had an increase of 37%

- Totapuri Mango Puree (14 brix)
- Totapuri Mango Concentrate (28 brix)
- Neelam Mango Concentrate (28 brix)
- Raspuri Mango Puree (15 brix)
- Alphonso Mango Puree (17 brix)
- Guava Puree (10 brix)

- Banana Puree (20 brix)
- Papaya Puree (9 brix)

Domestic Consumption

The domestic off take of fruit juices, fruit nectars and fruit drinks continues to be very low. One estimate has placed the domestic demand at 100 million litres annually, valued at about US$ 100 million. The average per capita consumption remains low at just 0.10 Litres. The consumption is mainly mango nectar and drink.

One estimate has placed the domestic demand at 100 million litres annually, valued at about US$ 100 million.

The share of fruit juices is insignificant but is expected to grow rapidly with the launch of fruit-based beverages, based on domestic and imported fruit concentrates.

Industry Segment : Fruit Beverages

Traditionally, the Indian life style has a predilection for fresh fruits and vegetables or those processed at home. There is a sea change. People, are now increasingly going in for fresh fruit vending from kiosk fountains which produce instant juices from fresh fruits in the presence of the consumer. It could be due to the non-availability of hygienically produced and well-preserved products with the use of preservatives.

The share of fruit juices is insignificant but is expected to grow rapidly with the launch of fruit-based beverages, based on domestic and imported fruit concentrates.

There has been a steady rise in the capacity, production and capacity utilisation in the fruit processing units. The processing capacity had gone up from 0.9 mn tonnes in 1990-91 to 2.1 mn tonnes in 1999-00. The capacity utilisation

improved from 31% to 51%, with the production in 1999-00 estimated to have increased to 980,000 tonnes. The production in 2000-01 exceeded 110,000 tonnes.

There is no general acceptance of the product forms in the fruit drinks market. The consumer is basically concerned that it is a fruit juice and not a synthetically constituted product. Accordingly, the first segmentation is between real fruit drinks and synthetic drinks. The former are based on natural fruit pulp or juice. The others are synthetic products containing fruit flavours. Among the fruit juice beverages are fruit juices, nectars and fruit drinks. All these are real, reconstituted from fruit pulps or concentrates. The fruit drinks are mainly based on oranges, mangoes, pineapples, grapes, apples, guava and tomato. They only differ in pulp content : the juices have over 85%, nectars (20% to 85%) and fruit drinks (less than 20%).

There has been a steady rise in the capacity, production and capacity utilisation in the fruit processing units. The processing capacity had gone up from 0.9 mn tonnes in 1990-91 to 2.1 mn tonnes in 1999-00.

The branded fruit juices market inclusive of nectars is placed at approximately Rs. 10 bn (20% of the total market). The pure fruit juices are the preferred drink among the fruit drinks. This segment is growing fast at a 40% growth rate, while the synthetic segment grows only at 10%.

Table 3

Fruit Beverages : Market Size

Year	Rs. bn
1990-91	0.22
1991-92	0.30
1992-93	0.42
1993-94	0.63
1994-95	1.03
1995-96	1.63

1996-97	1.68
1997-98	2.11
1998-99	2.57
1999-00	2.95
2000-01	3.40
2001-02	4.10

Table 4

Fruit Beverages : Market Structure

Product Variation

Type	share (%)
RTS Beverages	47
Pulp / Concentrate	40
Fruits juices	6
Squashes	7

Table 5

Squashes & Syrups : Market Size

Year	M T
1990-91	12
1991-92	13
1992-93	20
1993-95	21
1994-95	23
1995-96	35
1996-97	40
1997-98	46
1998-99	52
1999-00	58
2000-01	65
2001-02	72

Export from India

The main fruits that enter the export market are mangoes, grapes, apples and citrus fruits. Other fruits identified for export are bananas, sapota, litchis etc. The total exports are about 50 thousand tonnes valued at Rs. 600 million. Other popular items of export are mango chutneys, pickles, fruit juices, canned & dehydrated mushrooms, frozen & canned fruits & vegetables. The main destinations being Middle East, U.K, Europe and to some extent Singapore, Malaysia etc. The target is set to increase the export to 355 thousand tonnes valued at Rs.6,940 million.

The main fruits that enter the export market are mangoes, grapes, apples and citrus fruits. Other fruits identified for export are bananas, sapota, litchis etc.

With the commercialization of reefer containers in India the exports of mangoes, grapes, processed mushroom etc have started going to U.K, Europe, Middle East, Singapore, Hongkong etc. This mode of transport is very cost effective as there is a saving of about 50% on freight when compared to air.

India is the "world's key supplier" of mango puree and concentrate, with its TOTAPURI variety being a favourite blend in juices, while the premium - priced ALPHONSO is often used as a pure fruit juice or a flavouring for ice-cream. Indian processors look mainly to Europe and the Middle East for sales. However, it is the industry's view that domestic consumption is also increasing.

The main destinations being Middle East, U.K, Europe and to some extent Singapore, Malaysia etc.

Export of Mango Pulp (including concentrate) during the current decade is furnished in **Annexure 6.**

Constraints in Exports

The Industry is largely of a seasonal nature, dependent on a very limited number of 2 or 3 fruits for processing, on account of which capacity utilisation has been very low. The industry is perennially faced with problems of availability of raw material at reasonable & uniform prices.

The vagaries of weather & the mango-bearing cycle create uncertainties in supplies & prices, which are accentuated by speculation in trade. Established exporters have articulated the need for improving the quality of our products & simultaneously building up a quality image in Overseas markets, to counter the effective competition from competing sources like countries of Latin America & Mexico.

The overseas demand for Mango Pulp has led to unhealthy competition among exporting interests in India, causing quoted prices to be lowered to unremunerative levels. New entrants to the trade have accentuated the problem, with established exporters, traditionally committed to the trade, suffering in the process.

India is the "world's key supplier" of mango puree and concentrate.

Overall Export Strategy adopted

Central bodies like APEDA has already initiated steps to raise the quality standards in this industry. As a first step, processing units are being encouraged, by proactive exercise of APEDA, to introduce HACCP in their manufacturing process. Such exercise is expected to create awareness among other processors and provide a stimulus for a wider acceptance of HACCP.

APEDA is operating a Financial Assistance Scheme, as approved by the Government. These schemes relate to :

1 Feasibility Study, Surveys, Consultancy & Database Upgradation.

2 Infrastructure Development

3 Export Promotion & Market Development

4 Packaging Development

5 Quality Control

6 Organisation Building & HRD

These schemes cover all registered manufacturers/ exporters of APEDA. In addition, for the common benefit of trade & Industry, APEDA aims at generating relevant research & development through research institutions.

Display of product samples at specialized food fairs abroad is a standard feature of APEDA's export promotion efforts. With participation in at least 10 international exhibitions annually APEDA aims at effective impact on prospective buyers.

3

Vegetable Industry

The vegetable growing sector comprises the production of trade in fresh and refrigerated vegetable varieties of underground (roots, tubers) and above ground parts of herbaceious plants (fruits, stems and leaves etc.) The sector can be divided into products originating from protected vegetable-growing and from out door cultivation.

Global Demand

Only approximate figures can be given for the world's consumption of vegetables. The 9 main countries have a consumption of 64 million tonnes.

In the wealthier countries which are mainly concentrated in Europe and North America, consumption rose by 12% between 1995 and 2000. Western Europe accounts for half of the vegetable consumption in the countries with a commercial vegetable-growing industry.

Partly because of the lower production costs, consumption increases as the weather becomes warmer, for in warmer climates fresh vegetables are eaten several times a day. Per capita consumption varies from 50 kg in the north to 200 kg in the south. In the South-East Asian countries with a high level of self-sufficiency and low international involvement such as China, India and Korea with low income and Japan with a relatively high income-vegetable consumption also depends on the latitude and

prosperity of the people, Vegetables consumption is also relatively high in the CIS, Turkey and Egypt. The major part of the range of vegetables can be described by including twenty species. The ten main ones have a share of around 65%. In the United States, tomatoes and iceberg lettuce alone account for 43% of the total turnover. An expansion of the range can give a fresh stimulus to sales here which already has a very wide range.

Pointing to a well developed market, the influence of chain stores in the sales of vegetables (potatoes and fruit) is constantly increasing. The developments vary from country to country.

The per capita consumption of fresh vegetables in the U.K. and France has risen by 10% in the last ten years and in the Netherlands by 15% while the strongest growth was in the Western Germany : between 25 and 30%.

Chain stores have a business policy in which the development of private labels is an important factor, particularly in the U.K. and Australia. This has a strong influence on the sales policy of the vegetable-growing sector. The per capita consumption of fresh vegetables in the U.K. and France has risen by 10% in the last ten years and in the Netherlands by 15% while the strongest growth was in the Western Germany : between 25 and 30%.

There is scarcely any increase in preserved vegetable consumption in the above countries. Instead, a slight downward trend turn has even been observed in recent years.

Frozen vegetables are still showing some growth, but this is also decreasing in relative terms. Developments are strongly affected by the changes in the size of households which are becoming smaller. Purchase per person then increase (no adjustment of units purchased). Smaller families are also eating less home-grown vegetables.

Convenience in use and the health aspects of various species of vegetables are playing an increasingly important role now.

Global Trade

The world's vegetable production is strongly concentrated in Asia, where the crops are grown for local consumption. There is scarcely any international trade in these regions. Cultivation in Europe and United States is much more commercially based and there is therefore also substantial trading at international level. More intensive industrialisation and specialisation in the division of work in society means an intensification of trade. The EC's share of fresh vegetables went up from 31% to 37%. The largest importer is West Germany with a 17% share in followed by France and the United Kingdom with 7%. In 1990, the import values of the non-EC countries include temporarily stabilized vegetables. The largest exporter is the Netherlands with 15% followed by Spain with 6%. The share of the nine countries mentioned is 42%. Here, too the dollar's fall had a great influence on the development of the export value.

The world's vegetable production is strongly concentrated in Asia.

Indian Scenario

India is the second largest producer of Vegetables in the world (after China) with an average production of 50.99 million tonnes. India also produces 18.3 million tonnes of tubers and root crops annually.

It is estimated that requirements of vegetable in the country would be about two to three times more than present

India is the second largest producer of Vegetables in the world (after China) with an average production of 50.99 million tonnes.

production. Both area and productivity have to be increased to meet the national requirement of vegetables.

The important vegetables grown are potatoes, onions, green peas, cauliflower, okra, cabbage, tomatoes, eggplant, carrots, green chillies. The estimated production is of 67.0 million tonnes grown over about 6.25 million hectare. India, again ranks second in the world production after China.

In a recent development many technically qualified professionals have adapted to modern methods of cultivation and mechanized farming.

Many exotics and luxury vegetables like gourds, pumpkins, leeks, mushrooms, asparagus, cucumbers are also grown. In a small way some organically grown vegetables are also available. In a recent development many technically qualified professionals have adapted to modern methods of cultivation and mechanized farming. Some glass and polyhouses to grow flowers and vegetables are also coming up.

Production of vegetables is estimated at 67.0 million tonnes. It exports about 400 thousand tonnes of vegetables valued at Rs. 2200 million.

Export of Vegetables

The important vegetables exported are potatoes (28%), onions (7.1%), cauliflower and cabbage (4%), okra (3%), others (50%).

The important vegetables exported are potatoes (28%), onions (7.1%), cauliflower and cabbage (4%), okra (3%), others (50%). The exports are limited to Middle East, Europe, U.K. and Singapore etc.

Amongst the vegetable items identified as having good export potential are :

1. Onion
2. Potato

3 Green vegetables:

(a) Traditional: Okra, Bitter Gourd, Chilli and other seasonal Vegetables.

(b) Non-traditional: Asparagus, Celery, Bell Pepper, Sweet Corn and Baby Corn; Green and Lima Beans.

4 Organically grown vegetables.

5 Hybrid seeds

In vegetable exports, we shall have to concentrate on neighbouring countries such as Bangladesh, Sri Lanka and Mauritius which have been the traditional outlets from our onion and potato exports. Green vegetables are also being sold in West Asian countries where the market could be further developed. Malaysia and Singapore also offer good potential. Non-traditional vegetables offer good scope for exports to European markets. Developed countries of Western Europe & South Asia offer good scope for export of non-traditional vegetables in both fresh and preserved form.

Amongst the vegetable items identified as having good export potential are:

1. *Onion*
2. *Potato*
3. *Green vegetables*
4. *Organically grown vegetables.*
5. *Hybrid seeds*

4

Food Laws & Regulations in Fruits & Vegetable Sector

European Union

In addition to national legislation of individual European Union member countries, the production and marketing of fruit products are regulated by EU Council Directives. The Directives define the products and stipulate authorized processing and treatment, authorized addition of sugars, authorized food additives, etc.

The Soft Drinks International (a part of the British Soft Drinks Association) have published a Code of Practice and a technical manual for production and marketing of fruit juices. This code is accepted by the National Fruit Associations within the EU and is understood to have the support of the European Commission. Fruit processors and traders in most parts of the world also follow it. It contains information on the various EC directives & regulations and has separate sections for 18 different juice varieties. It also contains a guide for good hygiene practice for the fruit juice industry.

United States of America

According to the International Trade Centre (UNCTAD/WTO), the US Food & Drug Administration (USFDA) applies the same regulations to imported processed food stuffs, including food products, as applied to domestic products. These regulations

are known as "Standards of Identity, Quality and Fill". The standards relate to the precise description of the product, the definition of optional ingredients, labelling and the standard fill of the container. The United States Department of Agriculture (USDA) has issued a number of official standards for grades of processed fruits and vegetables and related products, for designating different levels of quality. These standards provide quality control programmes and official grading of such commodities, thereby helping the consumer to understand the product better. They are formulated on a voluntary basis by producers and buyers. It is said that exporters, whose products conform to these standards, will therefore, find market access simplified and avoid the risk of costly delays at the port of entry.

There is a growing world interest in harmonising food standards for the protection of consumer's health with the facilitation of international trade.

For those products for which official standards have not been established, such as tropical fruit products end-users impose their own specifications. These usually refer to the physical and chemical characteristics of the product, e.g., colour, flavour, variety of fruit, brix level, acidity/sugar ratio & pulp content.

Exporters must, therefore, ensure that detailed specifications are received from their buyers and that the product they ship complies exactly with these specifications. ITC recommends verification by an independent analyst at the time of shipment for acceptance by the buyer.

Codex Standards

There is a growing world interest in harmonising food standards for the protection of consumer's health with the facilitation of international trade. The Urguay Round

Agreements on the application of Sanitary and Phyto-Sanitary Measures (SPS) and Technical Barriers to Trade (TBT), both encourage the international harmonisation of food standards. The worldwide interest in codex activities, therefore, indicates the global acceptance of the codex philosophy. Despite difficulties in adopting the Codex Standards, the process of harmonisation is gaining impetus. An increasing number of countries are aligning their food standards with those of the Codex Alimentarius. Acceptance of Codex Standards has enabled many countries to gain acceptance of their products in international markets. Under WTO the Codex Standards are the basic standards with reference to which settlements of disputes on quality are made.

Acceptance of Codex Standards has enabled many countries to gain acceptance of their products in international markets. Under WTO the Codex Standards are the basic standards with reference to which settlements of disputes on quality are made.

Quality Control

With increasing concerns for food safety in major consuming countries & after the last WTO agreement countries are free to lay down stringent food laws which developing countries like India need to take serious note of. HACCP has become mandatory in most developed countries like USA & E.U. & it is a matter of compulsion for developing countries like India to meet the mandatory requirements of the major consuming countries.

In India APEDA took due cognizance of the above international developments & embarked on a programme to financially extend assistance to processing unit to implement HACCP, which is an internationally recognised quality assurance system for manufacturing units engaged in the food industry. APEDA's strategy in the first instance

was to select geographical regions where there is a maximum concentration of processing units engaged in tropical fruits like Mango pulp. The cluster approach that APEDA has adopted for example in the Chittoor District of Andhra Pradesh , is expected to not only benefit the local units directly, but also provide a stimulus to other such units to initiate such quality assurance systems.

In the Chittoor belt, 12 processing units were taken up for financial assistance and active help, implementation & certification of all 12 units for HACCP is expected to be completed shortly.

A similar programme in the KRISHNAGIRI DISTRICT of Tamil Nadu, where also Mango processing units are clustered is under implementation. 12 units have been identified in this region for HACCP implementation. With this it is expected to cover most of the processing units that base their manufacturing activity on local availability of Totapuri mangoes.

Hazard Analysis and Critical Central Point (HACCP) is a process control system designed to identify and prevent microbial and other hazards in food production.

This leaves processing units centred in Gujarat & Maharashtra, which base their manufacturing on the Alphonso and Kesar Mango varieties. These units would next be the focus of APEDA's pro-active programme to ensure implementation of HACCP.

Hazard Analysis and Critical Central Point

Hazard Analysis and Critical Central Point (HACCP) is a process control system designed to identify and prevent microbial and other hazards in food production. It includes steps designed to prevent problems before they occur and

to correct deviations as soon as they are detected. Such preventive control systems with documentation and verification are widely recognized by scientific authorities and international organizations as the most effective approach available for producing safe food. HACCP involves a system approach to identification of hazard, assessment of chances to occurence of hazard during each phase, raw material procurement, manufacturing, distribution, usage of food products, and in defining the measures for hazard control. In doing so, the many drawbacks prevalent in the inspection approach are avoided and HACCP overcomes shortcomings of reliance only on microbial testing. HACCP enables the producers, processors, distributors, exporters, etc, of food products to utilize technical resources efficiently and in a cost effective manner in assuring food safety. Food inspection too, would be more systematic and therefore hassle-free. It would no doubt involve deployment of some additional finance initially, but this would be more than compensated in the long run through consistently better quality consistently and hence better prices and returns.

HACCP involves a system approach to identification of hazard, assessment of chances to occurence of hazard during each phase, raw material procurement, manufacturing, distribution, usage of food products, and in defining the measures for hazard control.

The details of HACCP is given for further information in **Annexure 21.**

Indian Policies

Fruits & Vegetables

Though no industrial license is required for setting up Fruits & Vegetable Processing industries, setting-up 100% EOUs require specific Govt. approvals.

This sector is regulated by the Fruit Products Order, 1955 (FPO), issued under the Essential Commodities Act. The Department of Food Processing Industries administers this order. The order lays down product specifications and quality control requirements on production-hygeine, re-labelling and marketing of processed fruits and vegetables.

All processing units are required to obtain a license under this order. Periodic inspection of units is also carried out.

In addition, consignments of fruit & vegetable products intended for export are subject to pre-shipment inspection under the FPO. Recognised Export Houses and Star Trading Houses are however exempted from this inspection.

Some items like: pickles & chutneys, tapioca sago and tapioca flour are reserved for exclusive manufacture in the small scale sector.

Export of fruit & vegetable products is freely allowed.

Many fruit and vegetable processing industries are eligible for automatic approval of foreign technology agreement and upto 51% foreign equity participation. These include: tomatoes, mushrooms and other frozen vegetables, fruit, nuts, fruit-peel, fruit jellies, marmalades, fruit juices and vegetable juices etc.

Rice & Cereals

The Rice Milling Industry (Regulation) Act 1958 & Rice Milling Industry (Regulation & Licensing) Rules 1959 have been repealed w.e.f 28th May, 1997. Further, Rice milling and pulse milling sectors, which were earlier reserved for the small scale sector, have now been dereserved. As such,

no license/permission is now required for setting up a rice mill/pulse mill.

Since liberalisation, there is no license requirement for setting up or capacity expansion of roller flour mills. The mills can obtain their wheat supply from any source. Also there is no license requirement or price/distribution controls on manufacture of wheat products.