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MANGO OVERVIEW

1. Background Information

India is blessed with vast agricultural resources on account of its fertile land, well irrigated plains, extremes of weather, and centuries old tradition of farming. It is because of its central importance in the economy that the Government has identified agriculture as one of the four major drivers of growth. According to an estimate, the total value of agriculture crops at current factor cost is estimated at Rs.550.268 billion, divided into major crops Rs.407.623 billion and minor crops including horticulture Rs.142.645 billion. The horticulture crops (fruits, vegetables & condiments) alone contribute Rs.116.645 billion, equivalent to US\$ 2 billion, which is 26% of the total value of all crops and 81.8% of the total value of minor crops. India annually produces about 12.0 million tons of fruits and vegetables. Citrus fruit is leading in term of production followed by mango, dates and guava. Potato and onion are leading among vegetables and condiments. Fruit and vegetable export trade in India amounts to US\$ 134 million (2003/04), of which fruits account for US\$ 102.7 million (76.6%), vegetables US\$ 25.7 million (19.2%) and fruit & vegetable preparations (mostly juices) US\$ 5.6 million (4.2%). Their share in India's total exports is slightly over one percent. India has unique but unsophisticated network of up to six or seven intermediaries between the primary source (producer and growers) and the end user. Because of the presence of so many layers and the lack of adequate marketing infrastructure facilities, 30 to 40% of the perishable produce gets spoiled before reaching the ultimate consumer.

Today, India is the world's largest **mango producer**, growing nearly 1000 varieties of mango and contributing over 50 per cent of the world's total mango production of approximately 23 million metric tons. Hence the Mango, *Mangifera indica* L., is the most economically important fruit.

Mango is one of the tropical fruits, which has experienced tremendous development in recent years. One of the main reasons is shift from air to sea freight with bulk deliveries at competitive prices. Its soil and climatic conditions enable production and market supplies of good quality fresh mango over a period of about 5 to 6 months. Indian mangoes therefore enjoy a prominent position in the international market.

2. Mango Production in India

Mango (*Mangifera indica*), commonly called as 'king of fruits', is native to Southern Asia, especially Burma and Eastern India. Mango is considered as the fruit of excellence and thus has a prominent position among the commercial fruits grown in India. Production of mangoes in India has exhibited an overall increasing trend over the years.

Production area

The Indian states with abundant growth of various varieties of mangoes are Andhra Pradesh, Bihar, Goa, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Tamil Nadu, Uttar Pradesh and West Bengal.

Growth promotional activities

Mango is grown in an area of 1.23 million ha with an annual production of 10.99 million tonnes, which accounts for 57.18 per cent of the total world production. Since liberalization several policy measures have been taken with regard to regulation & control, fiscal policy, export & import, taxation, exchange & interest rate control, export promotion and incentives to high priority industries. This sector is regulated by the Fruit Products Order, 1955 (FPO), issued under the Essential Commodities Act. All processing units are required to obtain a license under this order. Periodic inspection of units is also carried out and consignments of fruit & vegetable products intended for export are subject to pre-shipment inspection under the FPO. However, recognized Export Houses and Star Trading Houses are exempt from this inspection.

Types

The cultivated mango is probably a natural hybrid between *M. indica* and *M. sylvatica* occurring in southeastern Asia to India. The varieties grown in India are Alphonso, Bangalora, Banganpalli, Bombai, Bombay Green, Dashehari, Fajli, Fernnadin, Himsagar, Kesar, Kishen Bhog, Langra, Mankurad, Mulgoa, Neelum, Chausa, Suvarnarekha, Vanraj, Zardalu Hybrid Varieties produced in India are Amarapali, Mallika, Arka Aruna, Arka Puneet, Arka Anmol, Arka Neelkiran, Ratna, Sindhu, Au Rumani, Manjeera. Other hybrid varieties released are Alfazali, Sundar Langra, Sabri, Jawahar, Neelphonso, Neeleshan, Neeleshwari and PKM2.

3. Harvest Season

India produces quite a few mango varieties. They differ in harvesting time and also in their physiological characteristics especially shape, size, colour, sugar level, acidity etc. Only a few varieties offer volumes and are thus important from export point of view. The indicative harvest periods for selected varieties are given in table 1

Mango Maturity Days/Indicative Harvest Periods

Variety	Day of full bloom	Earliest date for harvest	Days to harvest
Sindhri	Mid-February	Early June	110
Langra	Mid-February	Early June	110
Doshehri	Mid-January	Late May	118
Bombay Green	Mid-January	Mid May	113
Chaunsa	Early February	Late June	150
Kali Seroli	Early February	Mid June	135
Bagan pali	Mid February	Early July	130
Swarnarika	Mid March	Mid July	122
Neelum	Mid February	Early September	201

Table 1: Harvesting Season

Accordingly it matures in 3 stages, from early June to late June. Indian mango harvest season overlaps with many other countries. The challenge is to offer quality fruit at competitive prices before making inroad and for customers to accept them. Moreover, with a mango glut in India from June-July, to stabilize prices means exporting more volume.

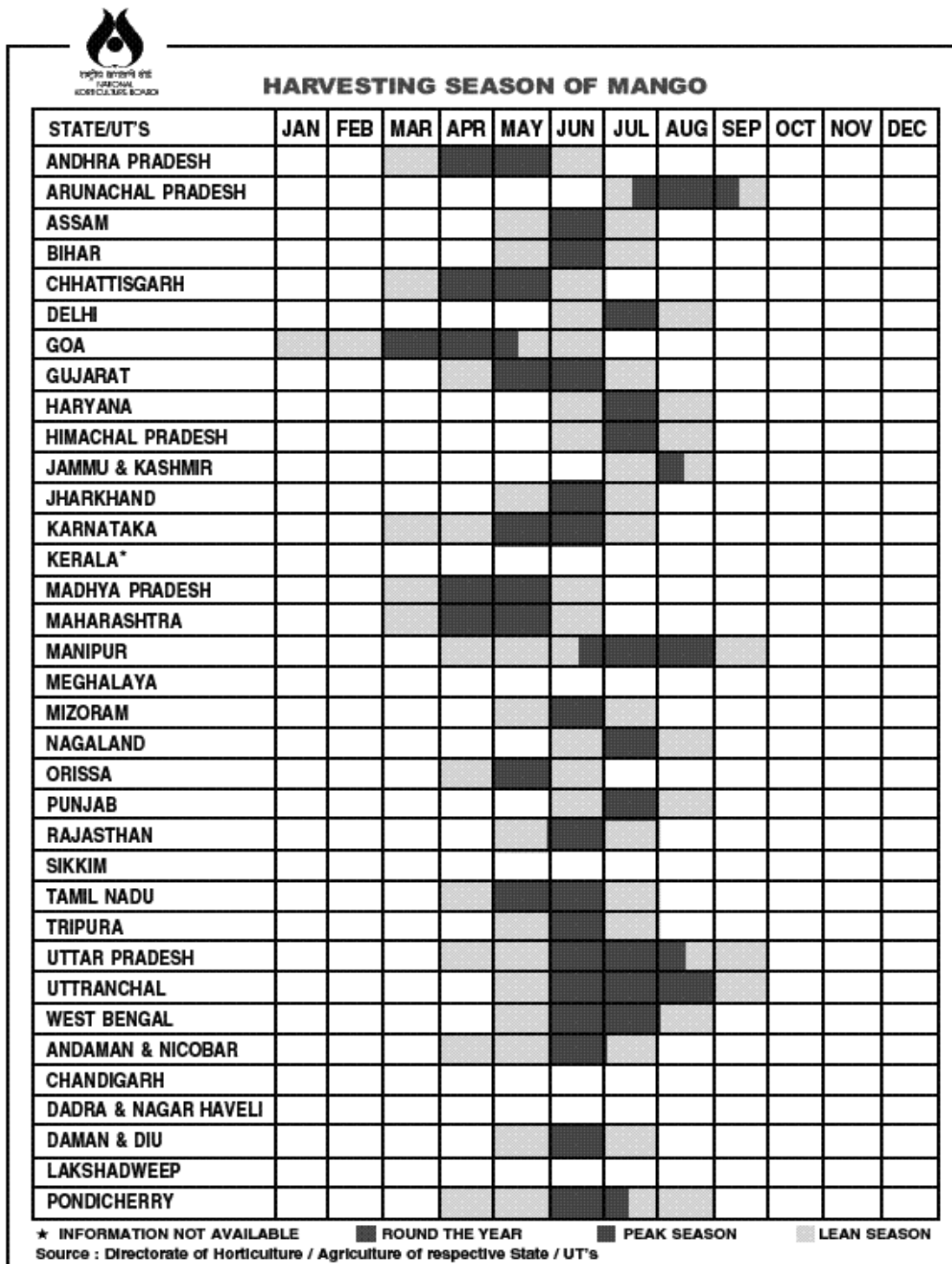


Table 2: The harvest season of mangoes state wise

The harvest calendar of mangoes for main producing countries around the World is portrayed in Table 3:

Marketing Plan

mango harvest seasons in main mango Producing Countries

Country	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pakistan					√	√	√	√	√			
Philippines				√	√	√	√	√				
Mexico			√	√	√	√	√	√	√			
Madagascar	√	√										
Malaysia				√	√	√	√					
Kenya				√	√	√						
Jamaica					√	√						
Indonesia	√											√
India				√	√	√	√					
Guatemala				√	√	√	√					
Egypt									√	√	√	
Chile	√										√	√
Brazil	√										√	√
Australia	√										√	√
Peru	√	√	√									√
Venezuela				√	√	√	√					
South Africa	√	√	√									
Rest of Africa			√	√	√	√	√					
St. Lucia						√	√	√	√			
Thailand				√	√	√	√	√	√	√	√	
USA						√	√	√	√			

Source: Courtesy Trade & Transport Facilitation Project, UNCTAD

Table 3: Mango harvesting season

India can extend its mango season as some new varieties of mangoes can ripen as early as mid-April and late by October. India could have a better marketing position on the international market if adequate volumes could be supplied over extended periods. There are thousands of varieties of mango grown in the world. The leading varieties grown in various countries are listed in Table 4.

Leading Mango Varieties in the World

Countries	Varieties
Pakistan	Sindhri & Chaunsa
India	Alphonso
Mexico	Tommy Atkins
Mali	Amelie
Kenya	Carabao
Philippines	Pico
West Indies	Julie
South Africa	Kent

Source: Courtesy Trade & Transport Facilitation Project, UNCTAD

Table 4: Mango varieties of the world

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Sindhri like many mango varieties suffers from anthracnose, a fungal disease that produces dark sunken spots on fruit, stems, and leaves and stem end rot. Both spoil its cosmetic appeal. Similarly Chaunsa has a problem of soft nose.

4. Mango Export

Mango is the 4th most rapidly growing trade after taro, single strength citrus juice and cassava tapioca. The world trade in mangoes including re-exports grew almost three times during the past decade. Current mango trade is estimated around 650,000 tons per annum. The prominent mango exporting countries include Mexico, Brazil, Pakistan, India, Philippines, Ecuador, Peru, South Africa & Thailand. Similarly, the prominent mango importing countries include UAE, Saudi Arabia, Malaysia, USA, UK, Netherlands, United Kingdom, France, Germany and Japan. Mango is the leading exportable fruit from India after citrus. The country produces over one million tons of mangoes of which about 60 to 70 thousand tons are being exported. Export statistics for the past 5 years are contained in Table 5:

Country	QTY(2005-2006)	Value(2005-2006)	QTY(2006-2007)	Value(2006-2007)	QTY(2007-2008)	Value(2007-2008)
U ARAB EMTS	26,533.76	7,304.40	22,045.51	6,581.02	22,469.62	6,320.93
UK	839.97	537.93	1,883.19	1,141.28	2,575.37	1,981.66
BANGLADESH	32,770.90	2,766.36	42,887.52	3,994.83	17,063.60	1,595.46
NEPAL	4,116.01	322.98	8,055.73	707.26	7,550.89	636.30
SAUDI ARABIA	1,564.15	442.20	1,323.56	422.32	1,488.95	459.77
KUWAIT	104.59	107.32	428.04	244.89	460.84	306.18

Table 5: Export of Mango during the past 3 Years

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Exports during the past 3 years vary from 5% to 7% of the total production of mangoes in India. Gulf and Saudi Arabia are traditional import markets and thus consume the major volume. England is the main market in Europe. Germany, France, Norway, Denmark.

CULTURAL ANALYSIS:

On Dec. 2, 1971 at the Dubai Guest House Palace, 4 other emirates agreed to join and enter into a union of 6 emirates called the United Arab Emirates (UAE). This federation of 7 independent states is located in the south-eastern corner of the Arabian Peninsula. The topography consists mainly of sandy deserts. Family is the most important institution in the Arab society. Family consists of extended as well as immediate nuclear family unit. The political system is a unique combination of traditional as well as modern administrative structure. Arab society is making amendments in its political structure and reforming it, however, keeping its traditions alive. The legal system is complex, with dual courts-Sharia courts and civil courts which operate in parallel. The structure is parallel; however it covers the different areas of the law. High power distance and Uncertainty avoidance is the predominant characteristic of UAE. The religion is Islam, which follows a caste system that does not allow significant upward mobility of its citizens. The chief language followed is Arabic and English with English used as a medium of communication in the majority of trade and commerce activities.

ECONOMIC ANALYSIS:

There is a vast difference in the population proportion in the UAE. The population consists of 70% male and 30% female. About 80% of the UAE's population originates from outside its borders. South Asians account for the majority of its population of around 50%. The currency of UAE is Dirham. 1 Dirham (AED)=100 Fils. The growth rate was 7.4% in the previous year. However, the growth rate is predicted to decline to 7.2% in the current year. The average per capita income of the individuals is \$16,471, which makes UAE world's 3rd richest country. Oil production is UAE's major activity. UAE is the 4th largest oil producer in the world and accounts for 2.5 million barrels per day. UAE's major export is oil and gas. The average household income is Dhs 36,438 which accounts for around \$9,927 per month. The average spending of the individuals is 53.6% on housing and food. At present Foreign Investors may choose to participate with up to 49% in a company. UAE has the least rate of unemployment which accounts for around 3% only. This is the lowest rate recorded so far. UAE's inflation rate accounts for 12%.

Mango Export Plan

1. Market Access

Departmental stores of Middle East Asia, Europe and South East Asian countries can display the 'king of fruit' (mangoes) in a traditional Indian style. The promotional strategies can be framed by taking a helping hand from Agriculture and Processed Foods Export Development Authority (Apeda) for improving the image of mangoes. Though India is the leading country in the world with an estimated production of about 12 million tonnes of mangoes, the total export volume is just 0.37 per cent of the total production. Despite having a number of varieties, exports are focussed on Alphonso and there is a need to increase the export basket of many other varieties available in the country. Andhra Pradesh ranks first in the country with 252.1 thousand hectares producing 2269.6 thousand tonnes of mangoes.

An action plan is worked out for improving the image of mangoes by initiating an extensive market promotion exercise in the targeted markets. The total expenditure envisaged is to the tune of Rs 2 crore for this season. Now more private companies are venturing into the business as the amendment to the Agriculture Produce Marketing Council (APMC) Act now allows corporates to produce and market mangoes. Reliance, with its mega retail plans, has planted one lakh mango saplings in Jamnagar, Gujarat. Out of the total Rs 1,000-crore mango market, Rs 700 crore comprises only the domestic revenue.

The key objectives for the promotional exercise include:

- To promote quality of mangoes to ensure freshness of the produce exported;
- To create consumer awareness;
- To improve the image of Indian mangoes; and
- To target 'new purchasers or consumers' in addition to the ethnic community.

The in-store promotion would cater to the demands of the native population for improving the brand building in select departmental stores and supermarkets. One-to-one meetings between the

Marketing Plan

buyers and sellers, leaflets, brochures in local languages, advertisements, etc, are also part of the promotional activities.

2. Marketing Plan

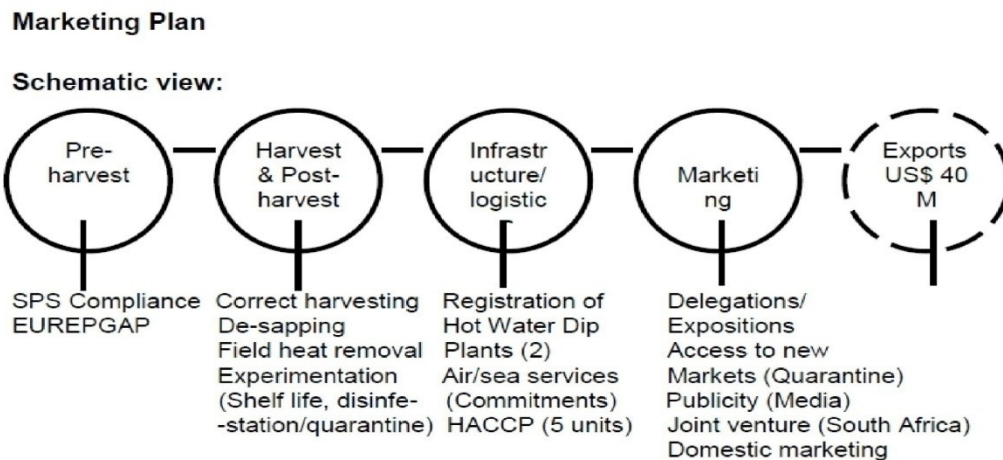


Diagram 1: Marketing Plan

1) Field Demonstrations

- Improved harvesting
- Field heat removal (Hydro-cooling)

2) Good Agriculture Practices (GAP)

- Awareness seminars on meeting quality standards
- Training of trainers

3) Export Facilitation

- Farmers/Exporters contacts
- Logistics (air/sea)
- Institutional support (Plant Quarantine)

4) Market Promotion

- Delegation
- Expositions
- Publicity

3. U.A.E.

Gulf and U.A.E. are the major markets for Indian mangoes. Located in the proximity of Pakistan, with huge Asian population this market possesses comparative advantage for Indian exporters to increase volumes and price. This could be attained through certain interventions:

- Contact major importers and distributors who are supplying to chain stores through the Indian embassy, and impart with the information on preshipment inspection system so that there is confidence building.
- Advertise in the local newspapers
- Mango festival at the embassy
- Send mango samples

Also NMB can be involved in the promotional and marketing activities .The National Mango Board (NMB) continues to build a strong digital foundation to increase its online presence. By making constant updates to the mango.org Web site, delving further into social media platforms and embracing viral elements, the NMB has made it even easier for consumers, retailers, and food service, media and industry members to have access to the latest mango information.

Distribution Plan

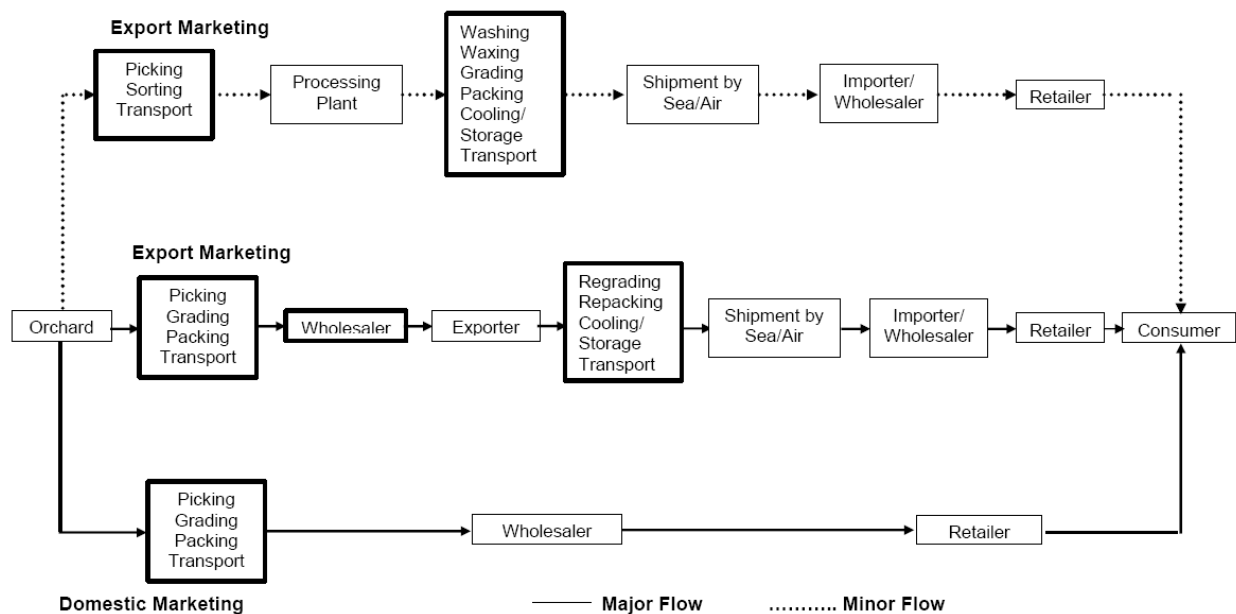


Diagram 2: Distribution Plan

Marketing of mangoes is in private hands. The role of public sector is confined to creating an enabling environment which may include provision of physical infrastructure, regulatory measures, market intelligence and market promotion. The flow of mangoes for export and domestic marketing is illustrated in above diagram.

Commission agents are the linchpin in the supply chain. They finance the operations of the contractors, and through them, the operations of growers, especially smaller growers. A small

Marketing Plan

grower is paid in advance for his crop at fruit set. He lives off this advance until next season, but many run out of cash before the next season starts. At this point the commission agent again finances them in advance for the purchase of crop inputs, effectively binding them to the agent for another season. Rates charged by commission agents for their services were reported as ranging from 6 to 10 per cent, although the total margin captured by them was reported as between 20 and 30 per cent. Commission agents control the product and the information in the supply chain more than any other participant. Commission agents usually operate from wholesale markets, where their product is auctioned to wholesalers, who may then sort and regrade fruit before selling it (in the wholesale market) to buyers, especially street vendors.

Commission agent practices and activities that can affect mango quality

- Commission agents are the powerbrokers in the chains, requiring growers to

Over pack crates which should weigh 10kg, but typically weigh 12-15kg.

- They also request overloading of trucks so they minimize the cost of transport and

Market levies (charged on a per truck basis).

Retailers:

Domestic retail is dominated by street vendors who compete on price, have no capacity to cool store fruit and manage their daily-acquired inventory by price discounting. Specialist higher quality retail outlets are very rare. Retailers try to maintain fruit quality by purchasing only one day's supply at a time, keeping fruit shaded, and regrading fruit to customer requirements. The last fruit to be sold each day may achieve prices as low as Rs5-10/kg.

Marketing Plan

Exporters:

Less than 10 per cent of total production is exported and almost none of the crop is grown specifically for export. Most fruit for export is sourced from commission agents, and most is graded and packed by hand with no other postharvest treatment.

Many exporters are also commission agents and many commission agents are also exporters. Most exports are of low value product to Middle Eastern markets, notably Dubai.

Transport practices and activities that can affect mango quality:

- Overloading of trucks – often pack 1,000 crates on a truck instead of 500 (truck capacity) causing crushing of lower crates.
- Long times taken for loading and unloading – takes around two hours and one and a half hours respectively, leading to shorter shelf life.
- 40% of roads in India (particularly in rural areas) are unsealed and in poor repair. Trucks have basic suspension systems leading to impact injury of fruit.
- Loads are unrefrigerated and often uncovered, leading to shorter shelf life as top layer boxes easily overheat.

Exporting by Sea routes:

Marketing Plan

The majority of mango exports from India are sent via Mumbai or Cochin, either by air or sea. All exports to Europe and the eastern Asian markets are by air although in 2008 three trial container shipments were sent to Singapore by sea with mixed results.

Sea shipments use standard 40 foot refrigerated containers, dry containers or open containers (with sides but no roof). Vessels range from large container ships owned by global shippers such as Maersk, to locally owned small barges. Significant changes to the Dubai trade are being made after the 2006 season when open containers will no longer be allowed. This may mean that open containers are diverted through ports such as Oman. Improvement in sea cargo handling has encouraged export by sea. Therefore, export to import markets in close proximity like Gulf and Saudi Arabia has almost shifted from air to sea. Efforts are underway to extend this facility to distant markets as well. However, so far exports to distant markets including Europe & Far East are preferred by air. The estimated export distribution by mode of shipment is as follows:

Sectors	Air	Sea	
		Reefer	Non-Reefer
Middle East	40%	30%	30%
Far East	100%	-	-
Europe	100%	-	-
Others	100%	-	-

The problems encountered by the exporters on account of shipment by air and sea are reported as follows:

By Sea

Marketing Plan

- Non-availability of reefers especially 20 feet containers
- Non-adherence to notified transit time
- Unilateral increase in freight amidst export season
- Off-loading cargo during transit
- Hidden charges (fuel adjustment, plug-in charges, container washing charges, handling charges at port of discharge etc).
- Non-entertainment of claims on account of cargo loss/damage caused by operational inefficiencies of the carriers like malfunctioning of reefer containers, unreasonably extended transit time etc.

By Air

- Off-loading cargo at port of loading or other ports
- Space blocked for cargo to be loaded from other ports
- Non-performance of commitments to accommodate non-regular/other shippers.
- Misuse/misinterpretation of indemnity bond leading to rejection of genuine claims.
- No/limited service for emerging markets

Packaging:

Mangoes must be packed in such a way as to protect the produce properly. The materials used inside the package must be new, clean of a quality such as not to cause any external or internal damage to the produce. The use of materials and particularly paper or stamps bearing trade specifications is allowed provided the printing or labeling has been done with non-toxic ink or glue. Each carton must have holes on two sides for proper ventilation. Individual fruit wrapping with tissue paper or foam padding is encouraged. Packages must be free from all foreign matter. Most of the exports to the Middle East are in the locally made, roughly nailed wooden crates

Marketing Plan

which are designed to hold about 10kg, but are overloaded to 13-15kg as it is believed that this minimizes the chance of fruit moving in the crate during transport.

Fibreboard cartons are used for other export markets and some Middle Eastern markets, their sizes ranging from 1.5kg gift packs to 9kg bulk boxes. Each exporter appears to have a preferred packaging system. Some were importing cartons from the UAE. No waxed or water resistant cartons were mentioned or observed. Design of cartons for adequate airflow was poor and carton strength was mostly inadequate.

Issues with packaging

- Lack of consistency among exporters.
- Exports to the Middle East were mostly in rough wooden crates.
- Carton design strength and airflow is inadequate for sea freight.
- No moisture resistant cartons appear to be available.
- Carton collapse is a common complaint along the export supply chain.

Provision concerning marking or labeling:

Each package must bear the following particulars, in letters grouped on the same side, legibly and indelibly marked, and visible from the outside.

a) Identification

Packer } Name and address or

Marketing Plan

And/or } officially issued or

Dispatcher } accepted code / trade mark

b) Nature of the Produce

“Mangoes” if the contents are not visible from the outside

Name of the variety

c) Origin of the produce

Country of origin and optionally, district where grown or national, regional

or local place/farm name.

d) Commercial Specifications

Class

Size expressed as minimum and maximum weight

Size code (optional)

Number of fruit

Weight of fruits

e) Official control mark

Official mark of the national official quality certifying agency

Additional information if desired by importer

Supply chain for sea freighted mangoes:

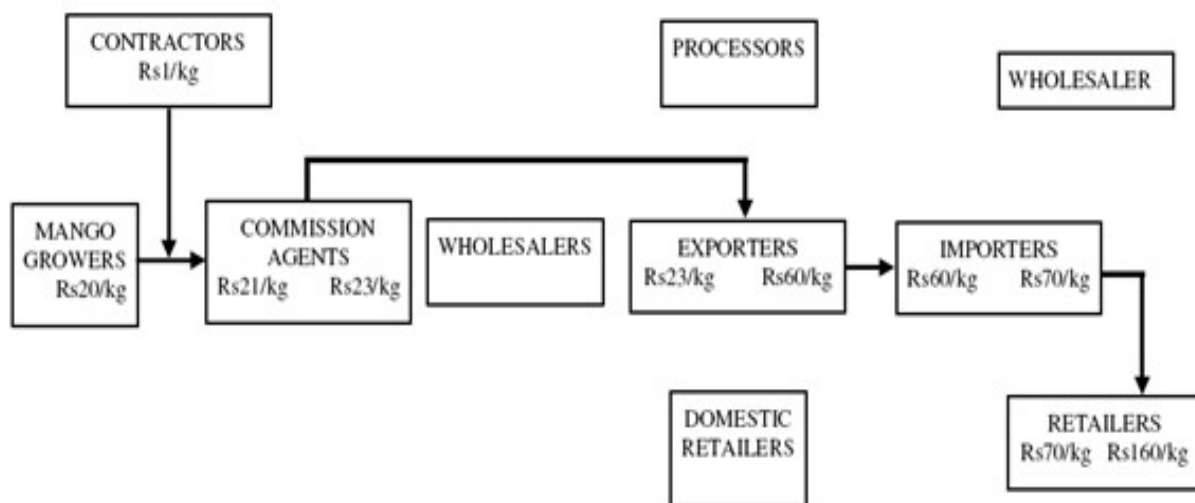


Diagram 3: Supply Chain

Approximately 80 per cent of mangoes for export are sourced from commission agents in wholesale markets, with the remainder directly purchased from the larger farms through their agents. The values (Rs/kg) in above figure show the value of the fruit as it moves along the chain. Note that these are gross values, out of which each participant pays their operating costs. All values were verified by participants.

Export Specification:

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		Middle East	Netherlands / Germany	U.K.	Japan	USA
Variety	Alphonso	Wt: 200-250 gm	Wt: 250-300 gm	Wt: 250-300 gm	Wt : 250-300 gm	Wt : 250-300 gm
	Kesar	Wt: 200-250 gm	Wt: 225-250 gm	Wt: 225-250 gm	Wt : 250-300 gm	Wt : 250-300 gm
Packing		1 Doz/2.5 kg	1 Doz/2.5 kg	1Doz/2.5 kg	1 doz / 3.5 kg	1 Doz / 3.5 kg
Storage Temperature		13°C	13°C	13°C	13°C	13°C
Export		By Sea	By Air	By Air	By Air	By Air

Table 6: Export Specifications

Import procedure in UAE:

All equipment will require pre-registration based on an Advance Shipment Notice (ASN) or similar document. Goods will only be accepted if the following documents are provided:

- ASN & PO, or documentation from the stock owner
- Bill of Lading or MAWB if international delivery
- Packing List
- Invoice or Gift Certificate
- Certificate of Origin (a must for sea freight shipments)
- Certificate of Insurance (if applicable)

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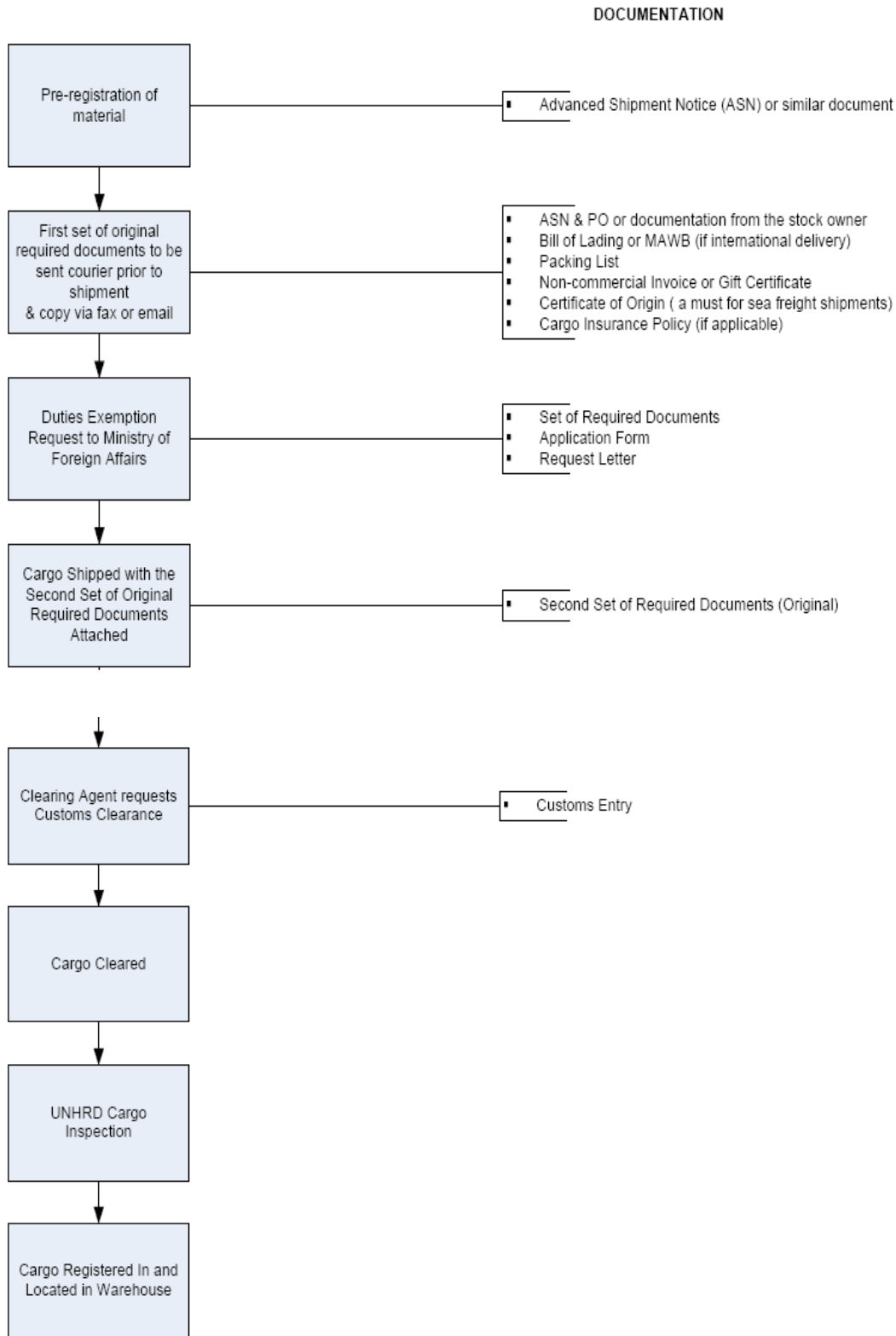


Diagram 4: Import Procedure

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One set of original shipping documents is to be sent along with the cargo and a second set by courier to WFP-Dubai. A copy by fax or email prior to the departure of the shipment is able to begin the customs processing. Upon receipt of above shipping documents, a request for duty exemption is prepared by the Dubai office (the process can be started with copies prior to receipt of original shipping documents).

The Import Duty Exemption Certificate has to be issued by the Ministry of Foreign Affairs. The original is sent to Customs, a second and a third for the Ministry of Foreign Affairs, and a fourth for the agency. Customs will not accept any change to approved duty exemption. In case of any change, a new request must be sent to the Ministry of Foreign Affairs.

Quality and Standards

Codex Standard for Mangoes
Codex Stan 184-1993

1. Definition of Produce

This standard applies to commercial varieties of mangoes grown from *Mangifera indica* L. of the *Anacardiaceae* family, is to be supplied fresh to the consumer, after preparation and packaging. Mangoes for industrial processing are excluded.

2. Provisions Concerning Quality

2.1 Minimum Requirements

In all classes, subject to the special provisions for each class and the tolerances allowed, the mangoes must be:

- whole;
- firm;
- fresh in appearance;
- sound, produce affected by rotting or deterioration such as to make it unfit for consumption is excluded;
- clean, practically free of any visible foreign matter;
- free of black necrotic stains or trails;
- free of marked bruising;
- practically free of damage caused by pests;
- free of damage caused by low temperature;
- free of abnormal external moisture, excluding condensation following removal from cold storage;
- free of any foreign smell and/or taste;
- sufficiently developed and display satisfactory ripeness.

When a peduncle is present, it shall be no longer than 1.0 cm.

The development and condition of the mangoes must be such as to enable them:

Marketing Plan

Governments, when indicating the acceptance of the Codex Standard for Mangoes, should notify the Commission which provisions of the Standard would be accepted for application at the point of import, and which provisions would be accepted for application at the point of export.

(CODEX STAN 184 Page 2 of 6)

- to ensure a continuation of the maturation process until they reach the appropriate degree of maturity corresponding to the varietal characteristics,
- to withstand transport and handling, and
- to arrive in satisfactory condition at the place of destination.

In relation to the evolution of maturing, the color may vary according to variety.

2.2 Classification

Mangoes are classified in three classes defined below:

2.2.1 “Extra” Class

Mangoes in this class must be of superior quality. They must be characteristic of the variety. They must be free of defects, with the exception of very slight superficial defects, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package.

2.2.2 Class I

Mangoes in this class must be of good quality. They must be characteristic of the variety. The following slight defects, however, may be allowed, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package:

- slight defects in shape;
- slight skin defects due to rubbing or sunburn, suberized stains due to resin exudation (elongated trails included) and healed bruises not exceeding 3, 4, 5 cm² for size groups A, B, C respectively.

2.2.3 Class II

This class includes mangoes which do not qualify for inclusion in the higher classes, but satisfy the minimum requirements specified in Section 2.1 above. The following defects may be allowed, provided the mangoes retain their essential characteristics as regards the quality, the keeping quality and presentation:

- defects in shape;

Marketing Plan

- skin defects due to rubbing or sunburn, suberized stains due to resin exudation (elongated trails included) and healed bruises not exceeding 5, 6, 7 cm² for size groups A, B, C respectively. (*CODEX STAN 184 Page 3 of 6*)

In Classes I and II, scattered suberized rusty lenticels, as well as yellowing of green varieties due to exposure to direct sunlight, not exceeding 40 per cent of the surface and not showing any signs of necrosis are allowed.

3. Provisions Concerning Sizing

Size is determined by the weight of the fruit, in accordance with the following table:

Size Code Weight (in grams)

A 200-350

B 351-550

C 551-800

The maximum permissible difference between fruit in the same package belonging to one of the above mentioned size groups shall be 75, 100 and 125 g respectively. The minimum weight of mangoes must not be less than 200 g.

4. Provisions Concerning Tolerances

Tolerances in respect of quality and size shall be allowed in each package for produce not satisfying the requirements of the class indicated.

4.1 Quality Tolerances

4.1.1 “Extra” Class

Five per cent by number or weight of mangoes not satisfying the requirements of the class, but meeting those of Class I or, exceptionally, coming within the tolerances of that class.

4.1.2 Class I

Ten per cent by number or weight of mangoes not satisfying the requirements of the class, but meeting those of Class II or, exceptionally, coming within the tolerances of that class.

4.1.3 Class II

Ten per cent by number or weight of mangoes satisfying neither the requirements of the class nor the minimum requirements, with the exception of produce affected by rotting, marked bruising or any other deterioration rendering in unfit for consumption. (*CODEX STAN 184 Page 4 of 6*)

4.2 Size Tolerances

For all classes, 10 per cent by number or weight of mangoes in each package are permitted to be outside (above or below) the group size range by 50 per cent of the maximum permissible difference for the group. In the smallest size range, mangoes must not be less than 180 g and for those in the largest size range a maximum of 925 g applies, as follows:

Size Code

Normal Size Range Permissible Size Range

(< 10% of fruit/package exceeding the normal size range)

Max. Permissible Difference between fruit in each package

A 200 – 350 180 – 425 112.5

B 351 – 550 251 – 650 150

C 551 – 800 426 – 925 187.5

5. Provisions Concerning Presentation

5.1 Uniformity

The contents of each package must be uniform and contain only mangoes of the same origin, variety, quality and size. The visible part of the contents of the package must be representative of the entire contents.

5.2 Packaging

Mangoes must be packed in such a way as to protect the produce properly. The materials used inside the package must be new,2 clean, and of a quality such as to avoid causing any external or internal damage to the produce. The use of materials, particularly of paper or stamps bearing trade specifications is allowed, provided the printing or labelling has been done with non-toxic ink or glue. Mangoes shall be packed in each container in compliance with the Recommended International Code of Practice for Packaging and Transport of Tropical Fresh Fruit and Vegetables (CAC/RCP 44-1995).

5.2.1 Description of Containers

The containers shall meet the quality, hygiene, ventilation and resistance characteristics to ensure suitable handling, shipping and preserving of the mangoes. Packages (or lot for produce

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presented in bulk) must be free of all foreign matter and smell. For the purposes of this Standard, this includes recycled material of food-grade quality.

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6. Marking or Labelling

6.1 Consumer Packages

In addition to the requirements of the Codex General Standard for the Labelling of Pre-packaged Foods (CODEX STAN 1-1985, Rev. 2-1999), the following specific provisions apply:

6.1.1 Nature of Produce

If the produce is not visible from the outside, each package shall be labelled as to the name of the produce and may be labelled as to the name of the variety.

6.2 NON-RETAIL CONTAINERS

Each package must bear the following particulars, in letters grouped on the same side and legibly marked, and visible from the outside, or in the documents accompanying the shipment. For produce transported in bulk these particulars must appear on a document accompanying the goods.

6.2.1 Identification

Name and address of Exporter, Packer and/or Dispatcher. Identification code (optional).

6.2.2 Nature of Produce

Name of product if the contents are not visible from the outside. Name of variety and/or commercial type (optional).

6.2.3 Origin of Produce

Country of origin and, optionally, district where grown or national, regional or local place name. Governments, when indicating their acceptance of this Standard, should notify the Commission as to which provisions of this Section apply. The national legislation of a number of countries requires the explicit declaration of the name and address. However, in the case where a code mark is used, the reference “packer and/or dispatcher (or equivalent abbreviations)” has to be indicated in close connection with the code mark.

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6.2.4 Commercial Identification

- Class;

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- Size (size code or weight range in grams);
- Number of units (optional);
- Net weight (optional).

6.2.5 Official Inspection Mark (optional)

7. Contaminants

7.1 Heavy Metals

Mangoes shall comply with those maximum levels for heavy metals established by the Codex Alimentarius Commission for this commodity.

7.2 Pesticide Residues

Mangoes shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

8. Hygiene

8.1 It is recommended that the produce covered by the provisions of this Standard be prepared and handled in accordance with the appropriate sections of the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 3-1997), and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.

8.2 The produce should comply with any microbiological criteria established in accordance with the Principles for the Establishment and Application of Microbiological Criteria for Foods (CAC/GL 21-1997).

Consumer Acceptance of Mango in International Markets

a) Size

The world trend today is towards export of mangoes weighing 400/600 grams. In the export market 350-600g mangoes are marketed but gradually the weight can be increased to 450/600 gm. Mangoes of 300 g are also exported but fetch a lower price. Mangoes of more than 650 grams to 2000 grams are also available but their demand is very small. India lacks suitable varieties, with langda weighing 300 g and 60% in that size. Chausa is the best 300g. Our two best varieties are going to have tough competition from Florida red blush mangoes from western hemisphere and African the United Kingdom and Europe.

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Today good quality mangoes within the acceptable sizes are available from new selections and, with excellent taste and high pulp to seed ratio. In many varieties, the seed is less than 10% of the pulp as skin with seed does not exceed 20-25%.

CONCLUSION

An increasing trend has been observed in world mango production averaging 22 million metric tonnes per year. Worldwide production is mostly concentrated in Asia, accounting for 75% followed by South and Northern America with about 10% share.

Area under cultivation and production trends of mangoes in India during 1997-98 to 2001-02 are depicted in graphs 1 & 2. Major producing States are Andhra Pradesh, Bihar, Gujarat, Karnataka, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal. Other States where mangoes are grown include Madhya Pradesh, Kerala, Haryana, Punjab etc.

The fruit is very popular with the masses due to its wide range of adaptability, high nutritive value, richness in variety, delicious taste and excellent flavour. It is a rich source of vitamin A and C. The fruit is consumed raw or ripe. Good mango varieties contain 20% of total soluble sugars. The acid content of ripe desert fruit varies from 0.2 to 0.5 % and protein content is about 1 %.

Raw fruits of local varieties of mango trees are used for preparing various traditional products like raw slices in brine, amchur, pickle, murabba, chutney, panhe (sharabat) etc. Presently, the raw fruit of local varieties of mango are used for preparing pickle and raw slices in brine on commercial scale while fruits of Alphonso variety are used for squash in coastal western zone.

The wood is used as timber, and dried twigs are used for religious purposes. The mango kernel also contains about 8-10% good quality fat which can be used for saponification. Its starch is used in confectionery industry.

Mango also has medicinal uses. The ripe fruit has fattening, diuretic and laxative properties. It helps to increase digestive capacity.

Among internationally traded tropical fruits, mango ranks only second to pineapple in quantity and value. Major markets for fresh and dried mangoes in 1998 were: Malaysia, Japan, Singapore,

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Hong Kong and the Netherlands, while for canned mango were: Netherlands, Australia, United Kingdom, Germany, France and USA.

Southeast Asian buyers consume mangoes all year round. Their supplies come mainly from India, Pakistan, Indonesia, Thailand, Malaysia, Philippines, Australia and most recently South Africa.

Each exporting country has its own varieties, which differ in shape, colour and flavour. Prices are very low for Indonesian and Thailand fruit and are on the higher side for Indian fruit. In the United States of America, the prices vary with the season, higher prices found during February and March, when mango availability is lowest.

Most international trade in fresh mangoes takes place within short distances. Mexico, Haiti and Brazil account for the majority of North America's imports. India is the predominant suppliers to the West Asian market. Southeast Asian countries get most of their supplies from the Philippines and Thailand. European Union buyers source mangoes from South America and Asia. Although Asia accounts for 75 percent of world production, its dominance does not translate into international trade.

International Markets for Indian Mango

Asian producers find it easier to expand sales to the European Union. Europe's acceptance of different varieties is greater, because of a large demand from Asian immigrant groups. Phytosanitary restrictions are less stringent. Transportation costs are not as big a factor in exporting mangoes to the European Union as in exporting to the United States market: for example, India and Pakistan are able to compete with non-Asian suppliers to the European Union, whereas proximity gives Mexico and Haiti a clear advantage in supplying to the United States market.

Fifty-four percent of European Union imports enter during the periods May to July and November to December, with peak imports in June. French imports reach peak in April and May, whereas United Kingdom imports are concentrated during the May to July. German imports are spread more evenly throughout the year. Of the top suppliers, Brazil provided chiefly during the period November to December, the United States during June to October, South Africa during January to April and Venezuela during April to July. Pakistan supplies the majority of its exports

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to the European Union during June and July; Indian exports take place mainly during the month of May.

Although a lion's share of Indian mango goes to the Gulf countries, efforts are being made to exploit European, American and Asian markets. About 13,000 MT of Alphonso variety is exported to Middle East, UK and Netherlands every year.

The different products of mango which are exported include mango chutney, pickles, jam, squash, pulp, juice, nectar and slices. These are being exported to U.K., U.S.A., Kuwait and Russia. Besides these, the fresh mangoes are being exported to Bangladesh, Bahrain, France, Kuwait, Malaysia, Nepal, Singapore and U.K.

The varieties in demand at the international market include Kent, Tomy Atkin, Alphonso and Kesar. Varieties such as Alphonso, Dashehari, Kesar, Banganapalli and several other varieties that are currently in demand in the international markets are produced and exported from India.

'Mahamango', a co-operative society was established in 1991 with the support of Maharashtra State Agricultural & Marketing Board (Pune). This was mainly formed to boost the export of Alphonso mangoes as well as for domestic marketing. Facilities like pre-cooling, cold storages, pack house, grading packing line etc. have been made available at the facility centre of Mahamango for which the financial assistance was given by APEDA, New Delhi and Maharashtra State Agricultural & Marketing Board (Pune).

There is need for developing processing industries in the southern region of the country where post harvest losses in handling and marketing are higher.

There is scope to establish mango preservation factories in cooperative sector. Mango grower's cooperatives on the lines of Mahamango need to encourage coming up in major mango producing States. This will add to their income through processing and create additional employment opportunities for the rural people.