

1. Introduction

Banana is an important fruit crop of many tropical and subtropical regions of India. It is cultivated in India in an area of 830.5 thousand ha and total production is around 29,779.91 thousand tons. Main banana growing states are Tamil Nadu, Maharashtra, Gujarat, Andhra Pradesh and Karnataka.

World scenario

The global production of banana is around 102028.17 thousand tons of which India contributes 29.19%. Besides India, other major banana producing countries are China, Philippines, Ecuador, Brazil and Indonesia. The table given below shows the major banana producing countries in the world

Major producing countries of Banana in the world (2010)

COUNTRY	AREA (000'ha)	PRODUCTION (000' MT)	PRODUCTIVITY (MT/ha)	%age SHARE IN WORLD TOTAL PRODUCTION
India	830	29780	35.88	29.19
China	373.45	9848.9	26.37	9.65
Philippines	449.61	9101.34	20.24	8.92
Ecuador	215.65	7931.06	36.78	7.77
Brazil	486.99	6962.79	14.3	6.82
Indonesia	101.28	5755.07	56.83	5.64
United Republic of Tanzania	420	2924.7	6.96	2.87
Guatemala	63.53	2637.57	41.52	2.59
Mexico	76.93	2103.36	27.34	2.06
Colombia	80.52	2034.34	25.27	1.99
Other Countries	1916.11	22949.05	11.98	22.49
World Total	5014.06	102028.17	20.35	100

Source: FAO

India Scenario

It is revealed in the table below that the production of Banana is rapidly increasing year by year, it has been increased by 1477 percent in 2010-11 from 2005-06.

Showing the area production and productivity of Banana in India

YEAR	AREA(000' ha)	PRODUCTION (000'MT)	PRODUCTIVITY (MT/HA)
2005-06	569.5	1887.8	33.2
2006-07	604	20998	34.8
2007-08	658	23823	36.2
2008-09	709	26217	37
2009-10	770.3	26469.5	34.4
2010-11	830	29780	35.9

Source: National Horticulture Board, India

2. Major Producing States with Production of Last Three Years

Largest area under banana cultivation is in Tamil Nadu state followed by Maharashtra, Gujarat, Andhra Pradesh and Karnataka states. The details are given below in table.

State-wise Area, Production and Productivity of Banana in India

State	Area (000' HA), Production (000' MT), Productivity (HA/MT)								
	2008-09			2009-10			2010-11		
	Area	Production	Pdy	Area	Production	Pdy	Area	Production	Pdy
Tamilnadu	124.4	6667	53.6	113.7	4980.9	43.8	125.4	8253	65.8
Maharashtra	80	4960	62	85	5200	61.17	82	4303	52.5
Gujarat	60.9	3571.6	58.7	61.9	3779.8	61	64.7	3978	61.5
Andhra Pradesh	80.1	2804	35	80.6	2819.6	35	79.3	2774.8	35
Karnataka	75.4	1918.8	25.4	104.4	2132.3	20.4	111.8	2281.6	20.4
Madhya Pradesh	28.8	1498	51.9	33	1459.8	44.2	38.1	1719.6	45.2
Bihar	31.3	1373.6	43.9	31.5	1435.3	45.62	31.9	1517.1	47.6
Uttar Pradesh	N/A	82.73	N/A	30.4	1138.6	37.4	32.4	1346.1	41.5
West Bengal	39.8	954.1	23.9	41	982.2	23.9	42	1010.1	24
Assam	47.9	852.6	17.8	53.4	805.2	15	47.6	723.6	15.2
Other States	140.2	1617.4	11.5	135.5	1735.8	12.8	175.3	1873.1	10.7
Total	708.8	26217.2	37	770.3	26469.5	34.3	830.5	29779.9	35.8

Source: National Horticulture Board, India

3. Description of Commercial Banana Varieties

The varietal characteristics of commercially grown Banana varieties is given below:

Variety	Characteristics
Grand Naine	It is most accepted international variety. It is a tall statured plant and a heavy yielder with long cylindrical bunch. On an average it produces a bunch weighing 25 kg and may go up to 32-35 kg, with 8-10 hands with 200-220 fruits/bunch. The length of the fruit is 15-21 cm and girth is 12-13 cm.
Robusta	It is normal statured with black brown blotches on the stem, bunches weigh around 20 kg having 8-10 hands/bunch. The length of the fruit is 15-20 cm and girth is 12 cm with thick fruit skin
Dwarf Cavendish	The plant stature is dwarf. Dark black brown blotches appear all along the stem. Bunches are large with compactly arranged 8-10 hands weighing about 20kg. Length of fruit is 13-14 cm and girth 8-10 cm. Skin is thick and the fruit tapers gradually towards the tip. It is not fit for export.
Red Banana	The plant is tall and robust statured. The colour of the fruit, pseudostem, petiole and midrib is purplish red. The bunch weight is 20-25 kg with 6-7 hands and 80 fruits/bunch. The length of the fruit is 16-18 cm.
Nendran	There is considerable diversity in plant stature. Bunch has 5-6 hands weighing about 6-12 kg. Fruits have a distinct neck with thick green skin turning buff yellow on ripening. Fruits remain starchy even on ripening.

4. Good Agricultural Practices (GAP)

- Replacement of low yielding cultivars like Dwarf Cavendish with high yielding cultivar like Grand Naine.
- Use of disease free planting material, preferably material raised through tissue culture
- High density planting along with drip irrigation and fertigation.
- Timely sucker and weed management.
- Bunch management by appropriate covering.
- Adoption of IPM practices for controlling rhizome weevil, nematodes and leaf spot diseases.

5. Harvesting season of Crop in Leading States

Harvest season of Banana is depicted below (in 12 months).

	-Lean Period		-Peak Period		- Throughout Year
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STATES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Tamil Nadu												
Maharashtra												
Andhra Pradesh												
Karnataka												
Bihar												
Assam												

STATES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Gujarat												
Madhya Pradesh												
West Bengal												

*The above graph showing harvest pattern in Leading Banana growing states.

6. Arrival pattern in market

Banana is available in India round the year. However, arrivals of banana start increasing from April and arrivals are at peak during August to October period.

7. (a) Concentrated Pockets

The details of concentrated pockets of banana in different states are given below in table.

Showing Concentrated Pockets of Banana in India

State	Districts
Maharashtra	Jaigaon, Dhule, Buldhana
Tamil Nadu	Thiruchirapalli, Coimbatore, Pudukottai, North Arcot, Ambedkar, Theni, Periyar, Karur, Dindigul Anna, Thanjavur, Nammakal, Madurai
Gujarat	Surat, Anand, Bharuch, Narmada, Vadodara
Madhya	Khandwa, Badwani, Khargone, Dhar

Pradesh	
Andhra Pradesh	Cudappa, Guntur, East Godavari, West Godavari, Vijayanagram, Vishakhapatnam, Karnool, Krishna, Prakasham.
Karnataka	Shimoga, Dakshin Kannada, Tumkur, Bangalore, Udupi, Uttara Kannada, Belgaum, Chickmangalur, Hassan, Mandya
Assam	Barpeta, Kamrup, Nalbari. Nagaon, Sonitpur.

(b) Catchment Areas of Market

Showing the details of catchment areas of markets of Banana in leading states

States	Districts (Market)	Blocks
Maharashtra	Jalgaon	Chopda, Yaval, Raver, Edalbad, Bhusawal, Jamner, Pachora, Bhadgaon, Chalisgaon, Parola, Amainer, Boradi
	Dhule	Shirpur, Sindhkheda, Sakri, Nardana, Boradi, Sangvi
	Buldhana	Malkapur, Khamgaon, Mehekar, Chikhli
Tamil Nadu	Thiruchirapalli	Turaiyur, Thottiyam, Musiri, Manachanallur, Lalgudi, Srirangam
	Coimbatore	Muttuppalaiyam, Avinashi, Tiruppur, Palladam, Udumallaip pettai, Pollachi, Valparai.
	Theni	Periyakulam, Andipatti, Uttamapalayam, Bodimayakkanur, Kamban, Megamali, Vadugapatti,
Madhya Pradesh	Khandwa	Harsud, Pandhana, Nepanagar, Burhanpur
	Dhar	Badnawar, Sardarpur, Gandhqwani, Manaawr, Kukshi, Dharmapuri
	Badwani	Thikri, Rajpur, Newali, Pansemal, Sendwa
Andhra Pradesh	Guntur	Tangeda, Dachepalle, Piduguralla, Sattenapalie, Vinkoda, Ponnuru, Bapatia, Narasaraopet, Purti, Prattipadu, Pallapatla.
	Vijayanagram	Parvatipuram, Bobblli, Gajapatinagaram, Chipurupalla, Salu
	Prakasham	Erragondapalem, Markopur, Giddalur, Tarlupadu, Podile, Darsai, Baulipali, Chundi
Gujarat	Surat	Mangrol, Umarwada, Mandvi, Vyara, Valod, Mahuva, Palsan, Kamrej, Olpad, Nizer, Vadoli, Unal.
	Anand	Sojitra, Sarsa, Sunav, Undel, Lunej, Ras, Kantha, Morai, Vadtal, Bochasan, Dhuwaeen, Khambhat, Rohoni, Wadgam.

Karnataka	Uttar Kannad	Maliyal, Mundgod, Yellapur, Sirsi, Siddapur, Bhatkal, Ankol
	Udupi	Kundapura, Kokkaroni, Karkal, Goligudelej, Chittur, Harmanu, Kokkaroni, Shivapura, Kodlamale, Yermal

8. Criteria and Description of Grades

According to Agmark standards Banana is classified into following classes:

Showing grade designation of banana as per AGMARK standards

Grade designation	Grade requirements	Grade tolerances
1	2	3
Extra class	Bananas shall be of superior quality. They must be characteristics of the variety and/or commercial type. The fingers must be free of defects, with the exception of very slight superficial defects, provided these do not affect the general appearance of the produce, quality, the keeping quality and presentation in the package.	5% by number or weight of bananas not satisfying the requirements of the grade, but meeting those of for Class I grade or, exceptionally, coming within the tolerances for that class.
Class I	Bananas shall be of good quality. They must be characteristics of the variety and/or commercial type. The following slight defects of the fingers, however, may be allowed, provided these do not affect the general appearance of the produce, quality, the keeping quality and presentation in the package. - slight defects in shape and colour; - slight defects due to rubbing and other superficial defects not exceeding 2 sq.cm. of the total surface area The defects must not affect the flesh of the fruit.	10% number or weight of bananas not satisfying the requirements of the grade but meeting those of Class II or, exceptionally, coming within the tolerances of that grade.
Class II	This includes bananas which do not qualify for inclusion in the higher classes, but satisfy the minimum requirements. The following defects may be there, provided the bananas retain their essential characteristics as regards the quality, the keeping quality and presentation. - defects in shape and colour provided the product remains the normal characteristics of bananas; - skin defects due to scarring. scabs.	10% by number or weight of bananas not satisfying the requirements of the grade, but meeting the minimum requirements.

	rubbing, blemishes or other causes not exceeding 4 sq.cm. of the total surface area; The defects must not affect the flesh of the fruit.	
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PROVISION CONCERNING SIZE

(i). For the purposes of sizing bananas, the length of the fingers is determined along the outside curve from the blossom end to the base of the pedicel where the edible pulp ends and the diameter is defined as the thickness of a transverse section between the lateral faces. The reference fruit for measurement of the length and grade is:

- For hands, the median finger on the outer row of the hand,
- For clusters, the finger next to the cut section of the hand, on the outer row of the cluster.

(ii). The minimum length should not be less than 14.0 cm and the minimum grade not less than 2.7 cm.

(iii). For all classes, 10% by number or weight of bananas not satisfying the sizing characteristics, up to a limit of 1 cm for the minimum length of 14 cm.

9. Packaging & its details

(a) **For Export** : For packaging bananas, telescopic boxes of 5 ply strength and of the following dimensions need to be used- Telescopic card board fibre boxes and other materials-

- Top = 48.25cm X 31.75cm X 20.25cm -5 ply
- Bottom= 47.50 X 31.25cm X 19.75cm -5ply
- Gap plate= 3 ply
- Foam sheet or foam pad= 20mm thick, 38cm X 25cm size with 10 mm holes Weight of final packed box is approximately 13.0 Kg

Source: Kay Bee Exports, Mumbai and Mahabanana, Jalgaon.

(B) For Domestic Market

Bananas are transported as full bunches in trucks and are ripened at the destination and then cut into hands and transported in plastic crates.

10. Distribution of produce from primary to Terminal Market

- Banana produced in Southern states namely Andhra Pradesh, Kerala, Karnataka, and Tamil Nadu reaches major markets of Bangalore, Mysore, Chennai, Madurai, Hyderabad, Vishakhapatnam and Thiruvananthapuram, and is consumed within southern region.

- Banana grown in the states of Maharashtra, Madhya Pradesh and Gujarat reaches North India in the markets of Bhopal, Jaipur, Lucknow and Delhi from where it is distributed in northern states like Himachal Pradesh, Uttarakhand, Jammu & Kashmir, Punjab and Haryana.
- Bananas produced in West Bengal and Orissa is distributed in markets of Patna, Ranchi, Raipur, Kolkata, Bhubaneswar etc. and is consumed in these states.
- The banana grown in North- Eastern states is consumed in this region itself.

11. Export and export potential

A. Domestic strength for exports

Details of domestic strength of banana are as follows

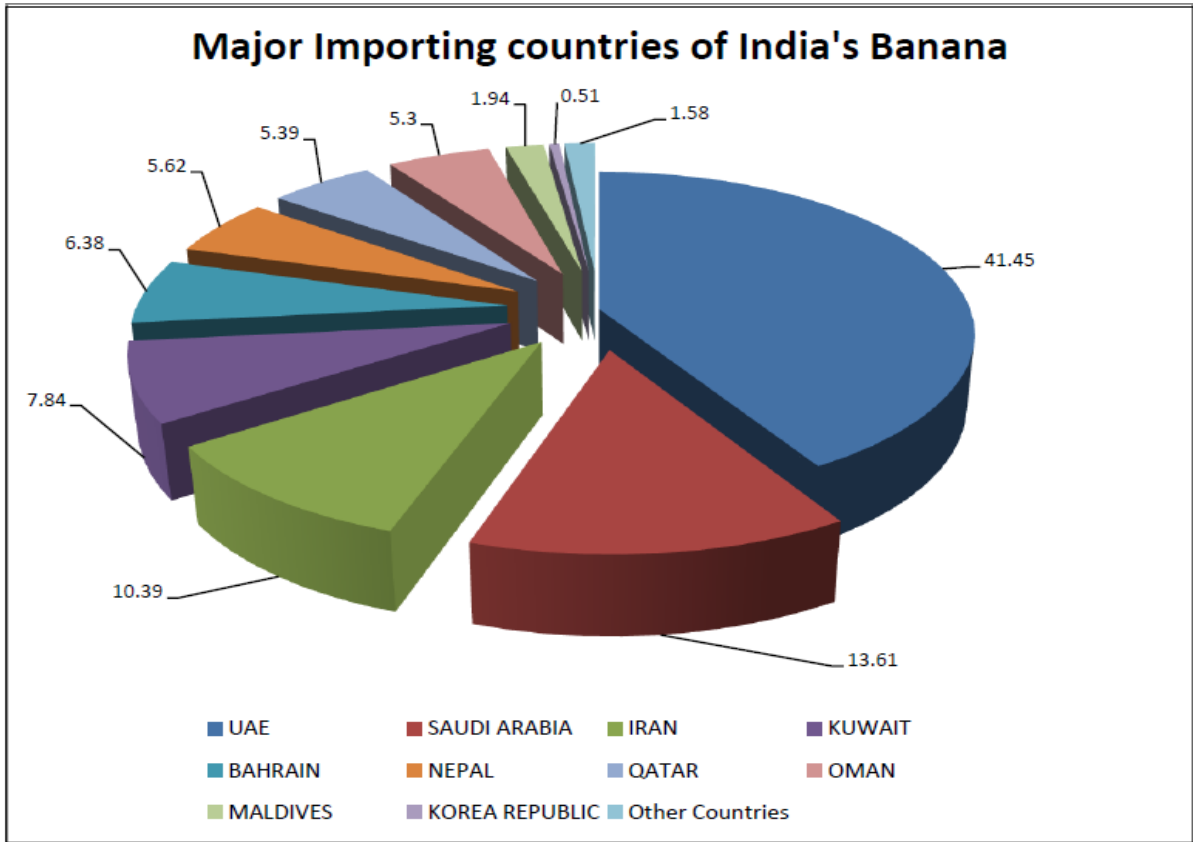
- India is the largest producer of banana in the world.
- More than 27% of total banana production takes place in Maharashtra and Gujarat states.
- Rainfall and humidity are quite less particularly in Maharashtra and also to some extent in Gujarat state, resulting in lesser incidence of insects, pests and diseases compared to Central and South America and South East Asian countries.
- A superior cultivar namely Grand Naine, well accepted in international market is being cultivated in sizeable area in Maharashtra and Gujarat states.
- Red banana cultivar which is preferred in some countries can create a market for itself with support of display, campaign etc.
- Banana is cultivated in sufficient acreage and in different agro-climatic conditions and thus is in a position to meet the large demands from importing countries on a continuous basis, provided planting and cultivation is well planned.
- Transfer of technology is easy as growers have organized themselves by forming cooperatives/ associations and have branded their product as “Mahabanana”.
- Agri Export Zone for promoting exports of banana has been established in Maharashtra in Jalgaon area.
- Post harvest handling facilities are available at a small scale at Navsari and Borsad in Gujarat state.
- Banana Export Facility Center with mechanical handling system has been set up at Saavada in Jalgaon and Basmantnagar in district Hingoli in Maharashtra state
- Geographically, India is better placed compared to South East Asian, Central and South American countries for exports to Gulf countries.
- Special training programmes need to be conducted to give knowledge to farmers about production of export quality banana in Maharashtra.

B. Exports

India is the major exporter of Banana in the world, the country has exported 45,573.24 MT of Banana worth Rs. 9,154.22 Lacs during the year 2011-12. The major destinations of India's

Total	54319.24	13025.47	57539.31	10232.23	45573.23	9154.22	100.00
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Source: DGCIA



Region-wise Export of India's Banana						
Quantity in MT; Value in Rs.Lacs						
Region Name	2009-10		2010-11		2011-12	
	Quantity	Value	Quantity	Value	Quantity	Value
WANA	46412.16	12403.08	49964.43	9577.42	34251.85	8284.98
South Asia	7302.00	488.27	6954.80	472.72	10718.23	700.79
NE Asia	20.37	5.72	1.72	0.80	148.45	47.02
EU_27	329.30	48.84	195.37	56.30	159.79	38.77
CIS Countries	0.00	0.00	102.59	23.86	95.23	27.59
Southern Africa	34.03	15.72	60.07	32.41	61.37	21.79
East Asia	41.56	16.11	65.69	10.62	90.30	14.77
ASEAN	64.55	14.30	7.01	0.92	23.48	11.96
Other Regions	115.29	33.42	187.58	57.17	24.54	6.53
Total	54319.26	13025.46	57539.26	10232.22	45573.24	9154.2

D. Measures for Enhancing Competitiveness for Exports

Countries like Philippines in South East Asia and Ecuador and Costa Rica in Central America are better organized and have large sized banana plantations owned by International companies. Therefore, to enhance competitiveness, following measures need to be taken for making available quality banana of international standard:

- Production technology on modern lines needs to be demonstrated to the growers on a massive scale.
- Farmers need to be educated about export requirements and international quality standards.
- Protocol for post harvest handling of Grand Naine, Nendran and Red banana need to be perfected/ standardized for shipping to Gulf countries by sea.
- Most modern packhouse facilities need to be created, to begin with in Jalgaon area in Maharashtra and also in Gujarat.
- Banana holdings in India are very small and it is not possible to install cable ways for transporting bunches from field to packhouses to avoid bruises. Under these circumstances, groups of farmers need to be encouraged to have system of make shift packhouses, to cut hands from bunches in the field itself and send these hands to central packhouse for further processing /treatment and packing.
- It will be advisable to have some working arrangements for ripening of our banana arrivals in importing countries on a regular basis. In the long run, India need to have its own ripening facilities in one or two countries to begin with.
- It is suggested that training to packhouse workers about post harvest handling technology and also about international quality standards must be imparted.

12. Storage

Temperature:	13.3-14.4°C
Relative Humidity:.	90-95%.
Storage Period:.	4-6 weeks

13. Documents required for exports

a). Documents related to goods

- Invoice
- Packing List
- Certificate of origin

b). Documents related to shipment

- Mate Receipt

- Shipping Bill
- Bill of handing
- Airway Bill

c). Documents related to Payment

- Letter of Credit (L/C)
- Bill of Exchange

d). Documents related to quality of goods

- Phytosanitary Certificate
- GLOBALGAP Certification
- Health Certificate

e). Organic Certification

- Certificate indicating material produce is based on organic farming.

f). Documents related to Foreign Exchange Regulations

- GR Form: Documents required by RBI which assures to RBI that the exporter will realize the proceeds of goods within 180 days from the date of Shipment.

g). Other Document

- Bank Realization Certification (BRC): This is the advice given by Foreign Exchange Bank after the realization of money from Importer.

14. Chain of events (from packhouse upto shipment)

- Receipt at Packhouse
- Cleaning in chlorine water (tank no. I)
- Rinsing in clean water, trimming of crowns, selection of hands and delatexing (tank no. II)
- Delatexing continued (tank no. III)
- Fungicide and Alum treatment (tank no. IV)
- Spraying of hand crowns with fungicide
- Grading
- Labelling fruits with brand name
- Packing and strapping
- Marking and labeling the cardboard boxes
- Cold store
- Loading the container

15. Charges for Treatment, Packing, Transport, etc.(below in table):

Particulars	Qty/Nos.	Rate	Amount/Qtl.
Commission to society	2 %		9 = 00
Carrying of bunches from plant to weighment place (5bunches/Qtl.)		0.50/bunch	2 = 50
Dehanding of bunches and crate filling 6 labour/4 mt.	1.5 labour/ Tonn	50.00/ labour	7 = 50
Weight loss of dehanding.	7kg./Qtl.		31 = 50
Loading of crate in truck.	2 labour/ 4mt.	50 /labour	2 = 50
Transportation up to packing house.	600/ Trip		15 = 50
Washing with water + fungicidal treatment (150gm/100 litre water per 1 tonn banana).	15 labour/ 4mt.	50 / labour	18 = 75
Cost of chemicals per treatment	Bavistin Rs. 450/kg +		2 = 50
Cost of packing material. Rs. 39/box for 13 kg 7.7 box x 39 = 300. 8 pvc bags x 4 = 32 Foam 7.7 x 1.5 x 13 = 150	For 1 Qtl. Banana packing	Rs. 39/ box for 13 kg. Rs. 4 for pvc bags. Foam for Rs.13/ meter	482 = 50
75 % material only used for export and 25 % rejected material for local market cost reduction 50 % including processing losses	25 kg / Qtl. Rejection.	Selling rate of rejected material Rs. 225/ Qtl.	56 = 25
Costing of skirting bags and one spray.	For Rs.5/ plants.	Rs. 4/ bags.	22 = 50
Cost of precooling	For 1 Qtl.	100 = 00	100 = 00
Administrative cost		5 % / Qtl.	60 = 00
Transport to port JNPT		Rs. 3/kg	300=00
Total			1110 = 00/ Qtl. or 11.10 /Kg

Source: MAHABANANA, Jalgaon

Sea freight charges*:

Freight rates for reefer container are as follows:

Reefer containers (Rates in US dollars)		
	20'	40'
Dubai/Doha	1100	1600
Kuala Lumpur/Singapore	600	900
UK/Amsterdam	1700	2700

* It varies from year to year /season to season, capacity of container and distance covered.