



BANANA



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PREFACE

With a robust agro potential the Country has, the Government of India has launched the One District One Focus Product Scheme (ODOFP) for agriculture sector by the Ministry of Food Processing Industries. Among its primary objectives, the ODOFP initiative aims to enhance the value of the products which is eventually expected to boost employment and income levels of the farmers. The identified products across the country is available at <https://www.nfsm.gov.in/odopstatecropsreport.aspx>

Karnataka has identified its product mix with high demand and export potential across all the districts. The implementing agency for this initiative is the Karnataka State Agricultural Produce Processing and Export Corporation Limited (KAPPEC), the nodal agency in the State.

VTPC being the nodal agency for promotion of exports from the State has made an attempt to draw the action plan district wise, to capture the potential, present status and future prospects in domestic and international markets. Besides, detailed insights have been provided into the biological description of the product, their local, national and international varieties, export-import analysis, HS codes. For a holistic perspective for those concerned, each report also provides SPS standards, processing technologies available, export grading and packing specifications, and suggested pivotal roles and responsibilities among the government departments, boards, corporations and Universities.

Presenting the Action Plan/Report for Banana, a ODOFP product mapped to Mysore district of Karnataka, formulated by VTPC. I sincerely hope that this ready reckoner with first-hand information regarding the farming sector would help all those concerned, especially the FPOs and food processing entrepreneurs who have a desire to focus on exporting this product.

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Banana: Demand and prospects

Introduction

A banana is an elongated, edible fruit – botanically a berry – produced by several kinds of large herbaceous flowering plants in the genus *Musa*. In some countries, bananas used for cooking may be called "plantains", distinguishing them from dessert bananas. The fruit is variable in size, colour, and firmness, but is usually elongated and curved, with soft flesh rich in starch covered with a rind, which may be green, yellow, red, purple, or brown when ripe. The fruits grow upward in clusters near the top of the plant. Almost all modern edible seedless (parthenocarp) bananas come from two wild species – *Musa acuminata* and *Musa balbisiana*. The most cultivated species is *Musa paradisiaca* which is the hybrid of *Musa acuminata* & *M. balbisiana*.

Musa species are native to tropical Indomalaya and Australia, and are likely to have been first domesticated in Papua New Guinea. They are grown in 135 countries, primarily for their fruit, and to a lesser extent to make fibre, banana wine, and banana beer and as ornamental plants.

Popular Banana varieties across the world



Cavendish Banana The Cavendish banana is your "typical" banana found at the local grocery store or farmer's market. They are slightly sweet and have a creamy texture. They have various stages of ripening, from green to yellow, to yellow with brown spots. They're grown all across Central America, and their production is essential to the economies in these areas.

Pisang Raja Pisang Raja bananas are popular in Indonesia. Featuring a yellow to orange color, they taste like honey-flavored custard with a smooth and creamy consistency. They're slightly smaller than Cavendish Bananas, averaging four to six inches in length.



Red Banana As their name suggests, red bananas have a reddish-purple skin. They have light pink coloured flesh and are much sweeter and softer than Cavendish bananas. They also have a slight raspberry flavour that makes them absolutely irresistible.



Lady Finger Banana Lady Finger bananas, also known as baby bananas, are sweeter and smaller than Cavendish bananas. They're usually around three inches in length and feature a creamy texture and sweet flavor with notes of honey.

Blue Java Banana Blue Java bananas are also known as the ice cream banana due to their sweet vanilla flavor and extreme creaminess. They feature a beautiful blue peel and a white flesh. They're actually pretty hardy and can grow in colder regions.



Plantain Plantains are a subgroup of bananas that are referred to as cooking bananas. They have a high starch content and are typically used in savoury dishes. They aren't typically consumed raw. They're a food staple in West and Central Africa, the Caribbean islands, and Central America.

Manzano Banana The Manzano Banana is sweeter than Cavendish bananas with a hint of crunchy apple-strawberry flavour. They're grown in Central and South America, the Caribbean, and Mexico. They're short and chubby with thick yellow skins that turn black when fully ripe.



Burro Banana Burro bananas have a lemony and tangy taste, which makes them one of the most unique types of bananas. They have a flatter, smaller and square in shape than Cavendish bananas. The flesh is creamy white or yellow and is soft with some firmness in the centre.



Barangan Banana Yellow with small black dots, the Barangan banana has a sweet, mild taste. The flesh is white with no seeds. It's a popular variety and is eaten as a dessert in many regions across the tropics.

Gold-finger Banana The Gold-finger banana was first grown in Honduras by a team of scientists as a pest-resistant banana. It can be cooked when green and eaten raw once fully ripe. It's similar to the Cavendish banana, with its eventual aim to replace the more susceptible-to-disease variety.



Varieties of commercially grown bananas in India

Grand Naine (G9) It is the most accepted international variety. It is a tall statured plant and a heavy yielder with a long cylindrical bunch. On 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 its 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 its 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. The length of the fruit is 13-14 cm and with a girth of 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 stature. 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.

Source: APEDA Agri exchange.

State	Varieties grown
Andhra Pradesh	Dwarf Cavendish, Robusta, Rasthali, Amritpant, Thellachakrakeli, Karpooora Poovan, Chakrakeli, Monthan and Yenagu Bontha
Assam	Jahaji (Dwarf Cavendish), Chini Champa, Malbhog, Borjahaji (Robusta), Honda, Manjahaji, Chinia (Manohar), Kanchkol, Bhimkol, Jatikol, Digjowa, Kulpait, Bharat Moni
Bihar	Jahaji (Dwarf Cavendish), Chini Champa, Malbhog, Borjahaji (Robusta), Honda, Manjahaji, Chinia (Manohar), Kanchkol, Bhimkol, Jatikol, Digjowa, Kulpait, Bharat Moni
Gujarat	Dwarf Cavendish, Alpon, Chinia , Chini Champa, Malbhig, Muthia, Kothia , Gauria
Jharkhand	Basrai, Singapuri
Karnataka	Dwarf Cavendish, Robusta, Rasthali, Poovan, Monthan, Elakkibale
Kerala	Nendran (Plantain), Palayankodan (Poovan), Rasthali, Monthan, Red Banana, Robusta
Madhya Pradesh	Basrai
Maharashtra	Dwarf Cavendish, Basrai, Robusta, Lal Velchi, Safed Velchi, Rajeli Nendran, Grand Naine, Shreemanti, Red Banana
Orissa	Dwarf Cavendish, Robusta, Champa, Patkapura (Rasthali)
Tamil Nadu	Virupakshi, Robusta, Rad Banana, Poovan, Rasthali, Nendran, Monthan, Karpuravalli, Sakkai, Peyan, Matti
West Bengal	Champa, Mortman , Dwarf Cavendish, Giant Governor, Kanthali, Singapuri

GI tagged bananas of Karnataka



Nanjanagud Rasbale The Nanjangud banana, natively called Nanjan-gud rasabalehannu, is a variety of bananas grown in and around the area Mysore district and Chamarajanagar district of Karnataka, India. It was found that the black clay alluvial saline soil found in and around Nanjangud drastically changed the taste and aroma, giving it a particular geographical identity.



Kamalapur Red Banana It is a special variety of Red banana which is exclusively grown in the valley of Kamalapur village and its surrounding areas in Kalaburagi district of Karnataka, India. It is known as a "rich man's fruit" as it is marketed at a higher price compared to other varieties of banana due to greater inputs in farming with fertilizer (compost, in particular in large quantity), water, and workforce.

Production data of Banana

As of 2020, banana production in India was 31.5 million tonnes which accounts for 26.23% of the world's banana production. The top 5 countries (others are China, Indonesia, Brazil, and Ecuador) account for 53.47% of it. The world's total banana production was estimated at 120 million tonnes in 2020. In 2019-20, India exported 1.96 lakh MT, almost 50 per cent more than the previous year's 1.34 lakh MT.

India emerged as the largest producer of bananas in the world during 20-21, with a production of 297 lakh MT on 8.4 lakh hectares of land. According to an estimate, 290 lakh MT (97 per cent) is consumed domestically, while another 5 lakh MT or so is lost due to banana's perishability. The majority of banana exports from India are to West Asian and North African countries like UAE, Bahrain, Egypt, Saudi Arabia, Qatar and Iran.

State-wise production data of bananas (2021-22)

No.	State	Production	% Share
1	Andhra Pradesh	5,838.88	17.99
2	Maharashtra	4,628.04	14.26
3	Gujarat	3,907.21	12.04
4	Tamil Nadu	3,895.64	12.00
5	Karnataka	3,713.79	11.44
6	Uttar Pradesh	3,391.01	10.45
7	Bihar	1,968.21	6.06
8	West Bengal	1,147.79	3.54
9	Assam	1,108.00	3.41
10	Chhattisgarh	585.52	1.80
	Page Total	30,184.09	

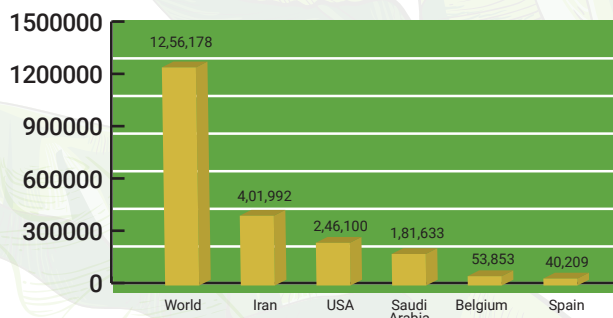
Source: APEDA Agri exchange.

World Export and Imports

080310: Fresh or dried plantains

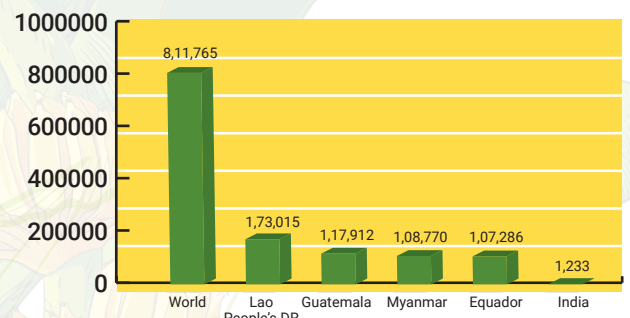
2021 Global Imports 1,256,178 USD.

No.	Country	Value USD
1.	Iran	401,992
2.	USA	246,100
3.	Saudi Arabia	181,633
4.	Belgium	53,853
5.	Spain	40,209



2021 Global Exports 811,765 USD.

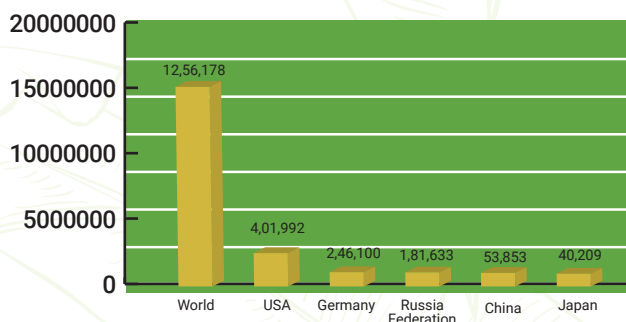
No.	Country	Value USD
1.	Lao People's DR	173,015
2.	Guatemala	117,912
3.	Myanmar	108,770
4.	Ecuador	107,286
30.	India	1,233



080390: Fresh or dried bananas (excluding plantains)

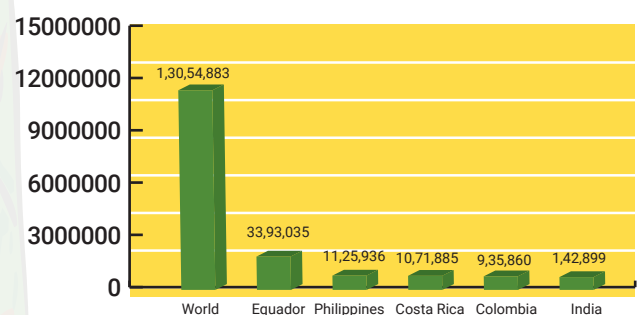
2021 Global Imports 15,325,666 USD.

No.	Country	Value USD
1.	USA	2,556,883
2.	Germany	1,095,211
3.	Russian Federation	1,079,563
4.	China	1,039,675
5.	Japan	980,587



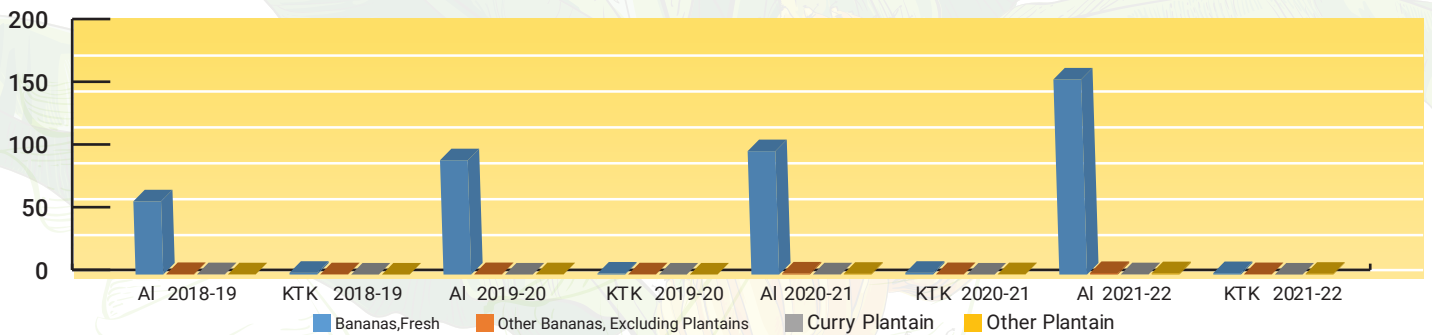
2021 Global Exports 13,054,883 USD.

No.	Country	Value USD
1.	Ecuador	3,393,035
2.	Philippines	1,125,936
3.	Costa Rica	1,071,885
4.	Colombia	935,860
19.	India	142,899



Export performance of Banana in the last four years: All India and Karnataka

Value in Mn USD											
No	HS Code	Description	2018-19		2019-20		2020-21		2021-22		Major Importing Countries
			AI	KTK	AI	KTK	AI	KTK	AI	KTK	
1	08039010	Bananas, Fresh	59.25	1.41	92.52	0.79	99.86	1.40	157.90	1.16	Iran, UAE, Iraq etc.,
2	08039090	Other Bananas, Excluding Plantains.	0.43	0.21	0.33	0.18	0.85	0.35	1.24	0.33	Germany, USA, Nepal, Belgium etc.,
3	08031010	Curry Plantain	0.28	0.01	0.03	0.00	0.15	0.01	0.24	0.00	Nepal, UAE, Maldives etc.,
4	08031090	Other Plantain	0.17	0.00	0.23	0.05	0.60	0.27	1.08	0.61	USA, Germany, Nepal etc.,

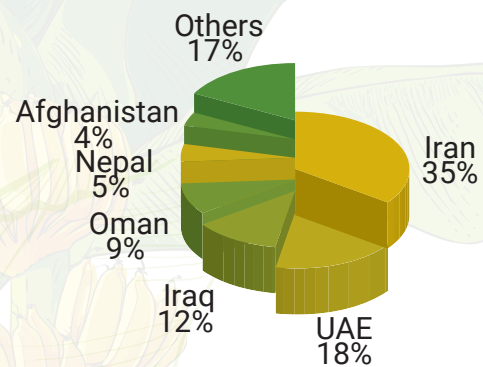
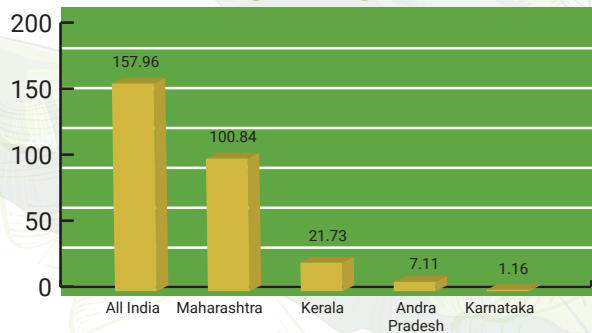


Export Analysis of Bananas: 2021-22

08039010: Bananas, Fresh.

No.	State	Value USD Mn	Destination
	All India	157.96	Iran, UAE, Iraq (+36)
1.	Maharashtra	100.84	Iran, Iraq, UAE(+23)
2.	Kerala	21.73	UAE, Qatar, Kuwait (+21)
3.	Andhra Pradesh	7.11	Iran, Saudi Arabia, UAE (+6)
11.	Karnataka	1.16	UAE, Qatar, Oman (+7)

Exporting states

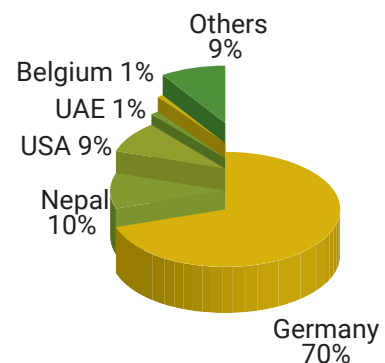
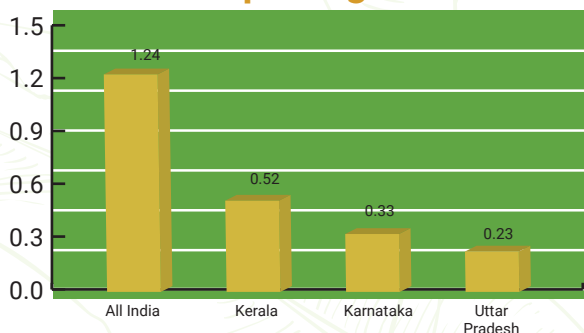


Importing Countries

08039090: Other Bananas, excluding plantains

No.	State	Value USD Mn	Destination
	All India	1.24	Germany, Nepal, USA (+21)
1.	Kerala	0.52	Germany, UAE, Qatar (+12)
2.	Karnataka	0.33	USA, Germany, Belgium (+5)
3.	Uttar Pradesh	0.23	Nepal and Saudi Arabia.

Exporting states

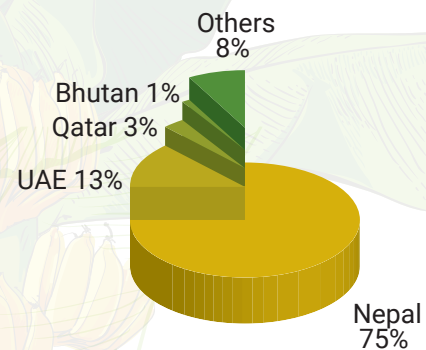
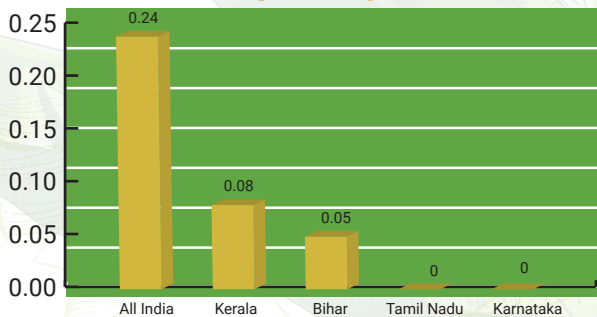


Importing Countries

08031010: Curry plantain

No.	State	Value USD Mn	Destination
	All India	0.24	Nepal, UAE, Qatar (+5)
1.	Kerala	0.08	UAE, Qatar, Saudi Arabia (+2)
2.	Bihar	0.05	Nepal
3.	Tamil Nadu	0.0	Nepal, Bhutan
11.	Karnataka	0.0	Qatar

Exporting states

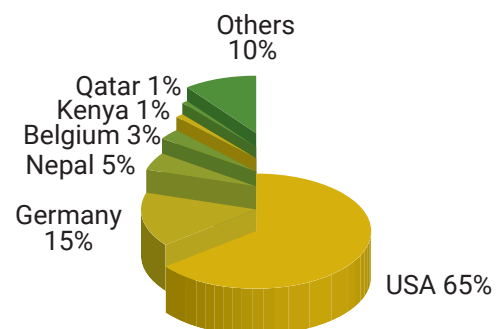
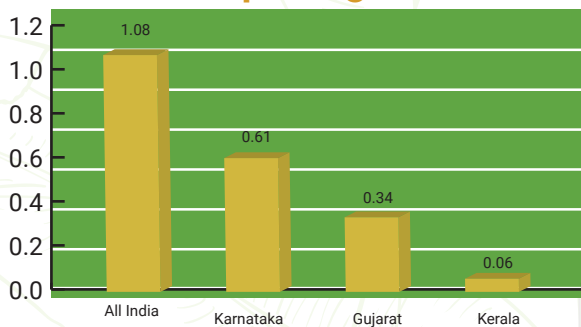


Importing Countries

08031090: Other plantains

No.	State	Value USD Mn	Destination
	All India	1.08	USA, Germany, Nepal (+11)
1.	Karnataka	0.61	USA and Germany
2.	Gujarat	0.34	USA, Belgium, Germany (+3)
3.	Kerala	0.06	Germany, Maldives, New Zealand (+3)

Exporting states



Importing Countries

SPS -TBT Standards for Banana

1. Banana should be plucked at appropriate maturity, keeping in view the time span of the market.
2. Banana should be sorted and graded as per accepted quality standards, before packing. Only sound fruits should be packed.
3. Before packing, post-harvest treatment with wax and fungicides should be resorted to as a prophylactic measure against pathogenic invasion in transit.
4. For prevention of bruising/abrasion injuries, paper liners, pads, trays or tissue wraps may be used. As an alternative, cushioning with easily available paddy straw keeps the packing cost minimum. It will maintain a level of R.H. because of the moisture-absorbing tendency of the paddy straw and keep the temperature down.
5. Careful placement of bananas in the cartons is necessary to avoid bruising. The use of telescopic boxes can overcome this problem very well.
6. For securing packages, use of adhesive tape (3 to 4 cm) may be used. The packages can also be secured with a thin rope of coconut fibre, or polythene sutli, as alternatives.

During packing do not:

- Mix stale fruit with fresh glossy fruit on the cluster.
- Pack curly hands with straight hands.
- Mix grades in the same carton.
- Mix fruit of different maturity in the same carton market.
- Mix fruit of different ages in the same carton.

The principal pre-harvest strategy and post-harvest technology for reducing the post-harvest losses are as under :

- i) Pre-harvest treatment;
- ii) Correct stage of harvesting;
- iii) Proper harvesting method;
- iv) Proper curing;
- v) Washing, cleaning and grading;
- vi) Scientific packing ;
- vii) Pre-cooling;
- viii) Cold storage ;
- ix) Suitable means of transport and
- x) Efficient marketing.



FPO's registered and working on Banana in Karnataka

- Kamalapur FPO, Kalburgi – Tissue culture plants, G9, Elakki, Red Banana.
- Sangamath - Afzalpur FPO, Kalburgi – G9 and Elakki.

Processing technologies available

- Banana Pseudo Stem Juice - <https://cftri.res.in/technologies/BVP/bps.pdf>
- Banana var Dwarf Cavend (export by Ship) - <https://cftri.res.in/technologies/FVP/bvd.pdf>
- Banana bar - <https://cftri.res.in/technologies/FVP/bbar.pdf>
- Raw banana powder (unripe) - <https://cftri.res.in/technologies/FVP/rbp.pdf>
- Banana by tissue culture technique - <https://cftri.res.in/technologies/MFP/btc.pdf>

Proposed processed products of Banana

Flour and Powder, Jam and Jelly, Chips (Crisps), Banana figs, Banana Slice, Banana purée and Banana beverages. Apart from being a very important food product, banana products and by-products have other many different uses and applications:

- Banana fiber: It is used for handicraft and art in baskets, carpets and so on. The fiber is also used for the manufacturing of banana paper.
- Animal feeding: Bananas which do not arrive to fulfill quality requirements for export and banana waste may be used for animal feeding.
- Banana leaves: They are used for wrapping food when cooking in many countries.
- Intercropping: In some cases, banana cultivation is used to give shade to other crops that need it, such are coffee or cocoa.
- Medicinal use: Bananas are considered to be good for the treatment of gastric ulcer and diarrhea. Vitamin A in bananas and plantains aids in digestion. Their high content of B6 vitamin helps to reduce stress and anxiety. Also beneficial for cancer prevention and heart diseases. The high content of carbohydrates makes of them a very good source of energy, for example, for people practicing sports. Potassium helps in better brain functioning.

Source: <http://agmarknet.gov.in/Others/CPBANANA.pdf>



Action plan

Measures for Enhancing Competitiveness for Exports

Countries like the 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, the following measures need to be taken for making available quality bananas of international standards:

- 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 pack house facilities need to be created, to begin within the Mysuru area in South Karnataka and Kamalapur in the Northern part of Karnataka.
- Banana holdings in India are very small and it is not possible to install cableways for transporting bunches from field to packhouses to avoid bruises. Under these circumstances, groups of farmers need to be encouraged to have a system of makeshift packhouses, to cut hands from bunches in the field itself and send these hands to a central packhouse for further processing / treatment and packing.
- It will be advisable to have some working arrangements for the ripening of our banana arrivals in importing countries on a regular basis. In the long run, India needs 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.



Responsibility Matrix

Sl.no.	Actions	Responsibility
1.	Research on best global varieties	Agricultural and Horticultural Universities, Karnataka
2.	Delegation of progressive farmers to Mexico, Spain and Netherlands	Horticulture department, Govt. of Karnataka
3.	Farmer Sensitization program on available opportunities	Agriculture and Horticulture departments, Karnataka
4.	Inviting Exporters/entrepreneurs to Investors meet for contract farming and processing industries	Horticulture Department and DIC Districts
5.	Farmer database and aggregation of the produce	Horticulture department and related FPOs
6.	Processing technology and Value Addition Handholding.	Horticulture department through CFTRI, Mysore and IIFPT, Thanjavur
7.	Export training, orientation and Market Intelligence	VTPC Karnataka

