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A STUDY ON GROWTH AND INSTABILITY IN INDIA'S BANANA CULTIVATION AND EXPORT

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ABSTRACT

Agriculture is considered as one of the oldest and most important of all the economic activities of human beings since Stone Age. Horticulture is one of the branches of agriculture. It includes the cultivation of fruits, vegetables, nuts, seeds, herbs, mushrooms, flowers, ornamental trees and plants. Production of fruits is a significant entity with the overall horticulture industry. Banana is one among the very popular fruit grown in about 120 countries. At the global perspective India is the largest banana producing country in the world followed by China and Philippines. In this context an attempt is made in this paper to study the growth and instability in India's banana cultivation and export during the post-WTO period i.e., from 1995 to 2012. It is concluded that the growth rates of area and yield of banana is much low in India. To improve the growth, area under irrigation must be increased and watershed development programmes must also be improved. Farmers should be encouraged to use appropriate amounts of inputs like chemical fertilizers, pesticides and water. Banana is quite perishable in nature. So that refrigerated storage facilities must be provided all over the country. The instability in banana cultivation and export is much high in India. Varieties resistant to insects, pests and climate stress are the major factors for reducing variability in area, production, yield and export. The share of banana export in total exports and total banana production is quite small. Since India is largest producer of banana in the world, she has a huge potential in banana exports. Producers and exporters should reap these opportunities.

KEYWORDS

banana, export, horticulture crops, compound growth rate, instability index.

INTRODUCTION

Agriculture is considered as one of the oldest and most important of all the economic activities of human beings since Stone Age. It is a foundation of all social, cultural and economic condition of mankind. In ancient times the farming was not only a process of food production or a source of income, but it was essentially a way of life. Now-a-days agriculture has become the world's most important industry. It promotes economic development of the country. The economic history of many developed countries of the world like the United Kingdom, the United States of America, Germany, Egypt, Japan, etc., demonstrates that agricultural development helped and smoothen the process of industrial development. At the global perspective India is the largest banana producing country in the world followed by China and Philippines.

Horticulture is one of the branches of agriculture. It includes the cultivation of fruits, vegetables, nuts, seeds, herbs, mushrooms, flowers, ornamental trees and plants. Production of fruits is a significant entity with the overall horticulture industry. Banana is one among the very popular fruit grown in about 120 countries. It is well known for its low price and high nutritive value. It is consumed in fresh or cooked form both as ripe and raw fruit. Banana is a rich source of carbohydrate and is rich in vitamins particularly vitamin B. It is also a good source of potassium, phosphorus, calcium and magnesium. The fruit is easy to digest, free from fat and cholesterol. Banana powder is used as the first baby food. It helps in reducing risk of heart diseases when used regularly and is recommended for patients suffering from high blood pressure, arthritis, ulcer, gastroenteritis and kidney disorders.

Processed products, such as chips, banana puree, jam, jelly, juice, wine and halwa can be made from the fruit. The tender stem, which bears the inflorescence is extracted by removing the leaf sheaths of the harvested pseudostem and used as vegetable. Plantains or cooking bananas are rich in starch and have a chemical composition similar to that of potato.

Banana fibre is used to make items like bags, pots and wall hangers. Rope and good quality paper can be prepared from banana waste. Banana leaves are used as healthy and hygienic eating plates.

BANANA PRODUCTION IN THE WORLD

Banana is being cultivated throughout the warm tropical regions of the world. Banana and plantains are grown in about 120 countries. The following table shows the major Banana producing countries in the world during 2012-13.

TABLE 1: MAJOR BANANA PRODUCING COUNTRIES IN THE WORLD DURING 2012-13

Countries	Area (in '000 Ha)	Production (in '000 Tones)	Productivity (in Tones/Ha)	% age share in World Production
India	776.0	26509.5	34.16	24.38
China	400.0	10550.0	26.38	10.34
Philippines	454.2	9226.0	20.31	9.05
Ecuador	210.9	7012.2	33.25	6.88
Brazil	481.1	6902.2	14.35	6.77
Indonesia	105.0	6189.1	58.94	6.07
Angola	115.7	2991.5	25.84	2.93
Guatemala	66.0	2700.0	40.91	2.65
Tanzania	442.2	2524.7	5.71	2.48
Mexico	72.6	2203.9	30.35	2.16
Costa Rica	41.4	2136.4	51.57	2.09
Colombia	79.3	1982.7	25.00	1.94
Others	1763.1	22704.6	12.88	22.26
World Total	5007.5	103632.7	20.70	100.0

Source: Food and Agriculture Organization of the United Nations, <http://faostat.fao.org>.

At the global perspective India is the largest banana producing country in the world followed by China and Philippines. India's share in the world banana production is about 24 per cent followed by China at 10 per cent and Philippines at 9 per cent. Besides these three countries, the other major banana producing countries are Ecuador, Brazil, Indonesia, Angola, Guatemala, Tanzania, Mexico, Costa Rica and Colombia. Even though banana is grown in about 120 countries, the above stated 12 countries contributed more than 75 per cent of the world banana production.

HORTICULTURE CROPS IN INDIA

Agriculture is the largest and most important sector in India. It provides food to huge population, raw materials to agro-based industries, employment opportunities to a very large proportion of rural population, capital for its own development and surplus for national economic development. Agriculture sector in India employs about 50 per cent of the work force, contributes nearly 15 per cent of GDP. India is the second largest producer of agricultural products in the world: more than 215 million tonnes of foodgrains, 74.87 million tonnes of fruits, 121 million tonnes of milk, 63029 million nos. of eggs, 417 million livestock, and 8.29 million tonnes of fish and fish products.

Horticulture is one of the main agricultural practices in India. The Horticulture (fruits including nuts, vegetables including potato, tuber crops, mushroom, ornamental plants including cut flowers, spices, plantation crops and medicinal and aromatic plants) has become key drivers for economic development in many of the states in the country and it contributes 30.4 per cent to GDP of agriculture. The country has been bestowed with wide range of climate and physio-geographical conditions and as such is most suitable for growing various kinds of horticultural crops. India's horticulture production has increased by 25.4 per cent in the last five years. This has placed India among the foremost countries in horticulture production, just behind China. During 2012-13, its contribution in the world production of fruits & vegetables was 11 % & 10% respectively. Vegetables, fruits, plantation crops and spices contributed to 60.3 per cent, 30.2 per cent, 6.3 per cent and 2.1 per cent of total horticulture production, respectively, in 2012-13. India is the largest producer, consumer and exporter of spices.

India is also the largest producer of fruits and nuts like mango, banana, papaya, coconut, areca nut and cashew nut in the world. Among fruits, banana and mango accounted for more than half (55 per cent) of total fruit production during 2012-13, with production of banana being almost double of that of mangoes.

BANANA PRODUCTION IN INDIA

Banana is the most important fruit crop in India, throughout the year. It is one of the oldest fruits known to mankind and is one of the first cultivated plants. Banana is considered as 4th important food crop. India produces large quantities of banana and there is very good demand for both fruits and processed banana in the world market.

POPULAR BANANA VARIETIES IN INDIA

Since different languages are spoken in different regions, more synonyms and local names are prevalent for banana in India. According to Indian Council of Agricultural Research about 200 varieties of banana are grown in India. The important varieties cultivated by the farmers Robusta, Red banana, Poovan, Rasthali, Nendran, Monthan, Karpuravalli, Sakkai, Peyan, Matti, Moris, and Mysore are among the important ones grown in India and it includes 14 varieties of tissue culture of banana cultivation.

BANANA PRODUCING STATES IN INDIA

India's total production of banana comes largely from few states. The following table shows the state wise area, production and productivity of banana in India during 2012-13 and the percentage share of states in total area and production of banana.

TABLE 2: STATE-WISE AREA, PRODUCTION AND PRODUCTIVITY OF BANANA IN INDIA DURING 2012-13

States	Area (in '000 Ha)	Production (in '000 Tones)	Productivity (in Tones/Ha)	% age share in Area	% age share in Production
Tamil Nadu	111.36	5136.20	46.12	14.35	19.38
Gujarat	70.58	4523.49	64.09	9.10	17.06
Maharashtra	82.00	3600.00	43.90	10.57	13.58
Andhra Pradesh	92.65	3242.80	35.00	11.94	12.23
Karnataka	97.40	2529.60	25.97	12.55	9.54
Bihar	33.06	1702.41	51.49	4.26	6.42
Madhya Pradesh	25.76	1701.00	66.03	3.32	6.42
West Bengal	44.70	1077.80	24.11	5.76	4.07
Assam	51.51	837.02	16.25	6.64	3.16
Odisha	27.49	521.31	18.96	3.54	1.97
Others	139.49	1637.47	11.74	17.98	6.18
Total	776.0	26509.5	34.16	100.0	100.0

Source: Ministry of Agriculture, Government of India.

In India, the top 10 states contributing 93 per cent of the total banana production and around 82 per cent of total area under cultivation of banana. Tamil Nadu led in Banana production (19.38 per cent), followed by Gujarat (17.06 per cent), Maharashtra (13.58 per cent), Andhra Pradesh (12.23 per cent) and Karnataka (9.54 per cent). There is a wide variation in the yield of the crop across states. Gujarat and Madhya Pradesh have yield in excess of 60 tones per hectare whereas Maharashtra, Tamil Nadu and Bihar have yield rate between 40 and 60 tones per hectare.

In this context an attempt is made in this paper to study the production and export performance of Banana at all India level during the post-WTO period i.e., from 1995 to 2012.

OBJECTIVES

- To estimate the growth rate of area, production, yield and export of Banana cultivated in India.
- To measure instability in area, production, yield and Export of Banana cultivated in India.
- To know the major importing countries of Indian Banana.
- To suggest some policy measures to improve the growth and control the instability in banana production and export.

METHODOLOGY

The methodology used in the paper is discussed in the following parts of this section. It includes sources of data, period of study and analytical techniques used in this paper.

SOURCES OF DATA

The present analysis was based on secondary data relating to the area, production, yield and export of Banana cultivated in India. The data was obtained from the websites of Agricultural & Processed Food Products Export Development Authority, New Delhi, Ministry of Agriculture, Ministry of Commerce & Industry, Govt. of India and Food and Agriculture Organization of the United Nations. The collected secondary data were formatted by using electronic spreadsheets (MS-Excel 2007). SPSS-16 (Statistical Package for Social Sciences) software was used for the data analysis.

PERIOD OF THE STUDY

The study utilizes time series data with respect to area, production, yield and export of Banana cultivated in India from the year 1995 to 2012.

ANALYTICAL TECHNIQUES

The collected data were systematically analyzed through the following techniques.

COMPOUND GROWTH RATE

To study the growth performance of area, production, yield and export of Banana cultivated in India for the period 1995 to 2012, the following semi log transformation model was used:

$$y = \beta_0(1+g)^t e^u \tag{1}$$

Where,
 y = Area (or) Production (or) Yield (or) Export of Banana cultivated in India,
 t = Time period (years)
 β_0 = a parameter,
 g = a parameter that is the compound rate of the growth of y
 u = the disturbance term

If we now take the logs of both sides of (1), we have

$$\log y = \log \beta_0 + t \log (1+g) + u$$

If we let $y^* = \log y$

$\beta_0^* = \log \beta_0$

$\beta_1^* = \log (1+g)$

we obtain $y^* = \beta_0^* + \beta_1^* t + u_t$

This tells us that a compound rate of growth implies a linear relationship, not between y and t, but rather between log y and t.

$CGR = [\text{Antilog } \beta_1^* - 1] \times 100$

INSTABILITY

To measure the instability in area, production, yield and export of Banana cultivated in India, the coefficient of variations (CV) was worked out. CV which is defined as

$$CV = \frac{\text{Standard deviation}}{\text{Mean}} \times 100$$

Apart from these two techniques simple percentage was also calculated to know the share of different states and countries.

ANALYSIS AND DISCUSSION

Area, production, yield and export of Banana cultivated in India during 1995 to 2012 are given in the following table. The compound growth rate and instability index are also computed and presented in this Table.

TABLE 3: AREA, PRODUCTION, YIELD AND EXPORT OF BANANA IN INDIA (1995 to 2012)

Year	Area Harvested (in '000 Ha)	Production (in '000 tonnes)	Yield (in tonnes/Ha)	Export Quantity (tonnes)
1995	428	10182	23.79	1744
1996	438	10299	23.51	303
1997	447	13340	29.84	7018
1998	460	15100	32.83	8111
1999	490	16810	34.31	6290
2000	469.7	14137.3	30.10	8629
2001	466.2	14209.9	30.48	8100
2002	475.3	13304.4	27.99	8656
2003	498.6	13856.6	27.79	10877
2004	589.6	16744.5	28.40	12572
2005	569.5	18887.8	33.17	14411
2006	604.2	20997.8	34.75	11476
2007	658	23823	36.21	16662
2008	709	26217	36.98	30402
2009	770.3	26469.5	34.36	54273
2010	830	29780	35.88	60813
2011	796.5	28455.1	35.73	45582
2012	721.79	24869.49	34.46	50004
CGR	3.71	6.00	2.20	24.36
CV	24.09	36.65	15.07	107.29

Source: Food and Agriculture Organization of the United Nations, <http://faostat.fao.org>

It is clear from the data presented in the above table that there has been a steady increase in area from 2005 till 2010-11 by about 30-60 thousand hectares per year. In 2011 the area under banana cultivation shrink by more than 30 thousand hectares and the same was further reduced by more than 70 thousand hectares in 2012. India produces 10182 thousand tones of banana in 1995 and 29780 thousand tones in 2010. India’s banana production decreased to 24869.49 thousand tones in 2012. The average yield in the country is about 33 tones, which is very good and much higher than the world standard. It is also clear that the banana exports touched a peak level of 60813 tonnes in the 2010.

During the study period, the area under banana cultivation in India is growing at compound growth rate of 3.71 per cent and the banana production is witnessed a growth of 6.00 per cent. The growth rate of yield is much slower than area and production, which registered as 2.20 per cent. Even though the share of banana exports in total exports and total banana production is quite small in India, the growth rate was much high (24.36 per cent) during the study period.

Considering the values of coefficient of variation, the export instability was much higher (107.29 per cent), followed by production (36.65 per cent) and area (24.09 per cent). The coefficient of variation of yield was 15.07 per cent which is comparably more stable than the other indicators.

EXPORT OF BANANA FROM INDIA

Banana is exported from India mainly to Middle East Asian countries. The direction of banana export from India during 2011 and 2012 is presented in the following table.

TABLE 4: EXPORT OF BANANA FROM INDIA DURING 2011 AND 2012

Country	2011		2012	
	(in Tonnes)	% age Share	(in Tonnes)	% age Share
UAE	15133.61	33.20	14801.70	29.60
Nepal	9765.99	21.43	11206.14	22.41
Pakistan	-	-	5202.35	10.40
Saudi Arabia	5013.96	11.00	4403.46	8.81
Oman	2228.15	4.89	3924.69	7.85
Qatar	2053.14	4.50	2809.15	5.62
Bahrain	2436.68	5.35	2566.36	5.13
Kuwait	3195.59	7.01	2219.51	4.44
Iran	4126.12	9.05	790.36	1.58
Maldives	912.55	2.00	644.59	1.29
Others	716.05	1.57	1435.30	2.87
Total	45581.84	100.00	50003.61	100.00

Source: APEDA, New Delhi, www.apeda.gov.in

The total banana exports from India have gone up from 45581 tones in 2011 to 50003 tones in 2012. In 2011, five main importers of Indian banana are UAE (33.2 per cent), Nepal (21.43 per cent), Saudi Arabia (11 per cent), Iran (9.05 per cent) and Kuwait (7.01 per cent). In 2012-13, the share of UAE, Saudi Arabia, Kuwait and Iran declined to 29.6 per cent, 8.81 per cent, 4.44 per cent and 1.58 per cent respectively. Banana exports to Nepal, Oman and Qatar have considerably increased in 2012. A major portion of banana (10.4 per cent) has exported to Pakistan in 2012.

CONCLUSION AND POLICY IMPLICATIONS

It is concluded from the analysis that the growth rates of area and yield of banana is much low in India. To improve the growth, area under irrigation must be increased and watershed development programmes must also be improved. Farmers should be encouraged to use appropriate amounts of inputs like chemical fertilizers, pesticides and water. Banana is quite perishable in nature. So that refrigerated storage facilities must be provided all over the country.

The instability in banana cultivation and export is much high in India. Varieties resistant to insects, pests and climate stress are the major factors for reducing variability in area, production, yield and export. The share of banana export in total exports and total banana production is quite small. Since India is largest producer of banana in the world, she has a huge potential in banana exports. Producers and exporters should reap these opportunities.

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