

Analysis of Production and Productivity of Banana in Tamil Nadu

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Abstract

In this paper analyze the area, production and productivity of banana in Tamil Nadu between 2007-08 and 2016-17. Results of the analysis reveal that, the production of banana in the world level, India got first rank (29.82 Million Tons) with the 30.21 per cent. In India level, insignificant compound rate of 2.33 per cent (CAGR = 2.33, $t = 4.52$, $p < 0.01$) and 2.07 per cent (CAGR = 2.07, $t = 3.70$, $p < 0.01$) with crisscross movements respectively. In absolute value, the rate of growth is 17.56 area (LGR = 17.56, $t = 4.67$, $p < 0.01$) and 557.33 production (LGR = 557.33, $t = 3.72$, $p < 0.01$) on an average every year for area and production of banana respectively. The value of decline both in compounded term (CAGR = -0.49, $t = -1.54$, $p < 0.10$) and absolute term (LGR = -0.18, $t = -1.53$, $p < 0.10$) are marginally significant at 10 per cent level. In Tamil Nadu level, However productivity of banana with an average of 49.02 in million tons, increased significantly to reach at 38.33 million tons in 2016-17 from 53.60 million tons in 2007-08 at CAGR of negative 3.11 percent, $t = -2.17$, $p < 0.05$ productivity of banana is not a satisfactory level throughout the period and even exhibits a significantly declining growth and trend over the period. (CAGR = -3.11, $t = -2.36$, $p < 0.05$ & LGR = -1.53, $t = -2.17$, $p < 0.05$).

Key Words: Banana, Area, Production Productivity, Coefficient of Variation (CV), and Compound Growth Rate (CAGR)

Introduction

Agriculture plays a vital role in India's economy. Over 58 per cent of the rural households depend on agriculture as their principal means of livelihood. The share of primary sectors (including agriculture, livestock, forestry and fishery) is estimated to be 20.4 per cent of the Gross Value Added (GVA) during 2016-17 at current prices. . GVA from the sector is estimated to have grown at 3 per cent in Financial Year 2018. The country ranks 141st in per capita GDP (nominal) with \$1723 and 123rd in per capita GDP (PPP) with \$6,616 as of 2016. After 1991 economic liberalization, India achieved 6-7% average GDP growth annually. In FY 2015 and 2017 India's economy became the world's fastest growing major economy surpassing China. Bananas represent one of the world's most important fresh fruit commodities, at least when measured by volume and trade.

Banana (*Musa* sp.) is the second most important fruit crop in India next to mango. Its year round availability, affordability, varietal range, taste, nutritive and medicinal value makes it the favourite fruit among all classes of people. It has also good export potential. Hi-tech cultivation of the crop is an economically viable enterprise leading to increase in productivity, improvement in produce quality and early crop maturity with the produce commanding premium price.

Review of Literature

Raman, M.S. and Umanath, M. (2016), this study is on the production and marketing of banana crop in the Tiruchirappalli district of Tamil Nadu. It is based on the data collected from 120 bananas – producers in the blocks of Andanallur and Musiri during 2010-2011. The study has revealed that banana cultivation in Tamil Nadu is

profitable enterprise as the net returns have been found to be Rs.32793.96 and Rs.37339.70 for Karpooravalli and Poovan banana, respectively. The total cost of cultivation was Rs.140691.04 for Karpooravalli and Rs.123220.30 for Poovan banana farms. Cost of production per bunch for Karpoovalli farms was higher (Rs.61.23) when compared to Poovan (Rs.51.73) farms. Gross income per hectare was the highest for karpooravalli farms (Rs.173485) when compared to Poovan farms (Rs.160560). The banana – producers have been found to be follow three channels for the marketing of banana; channel I: Producer → Pre harvest contractor → Commission agent →Retailer → Consumer; Channel II; Producer → Wholesaler → Retailer → Consumer; Channel III: Producer → Commission → agent →Retailer → Consumer. The marketing cost has been found to be higher channel II when banana was sold through channel I due to commission charges, transport charges and loading and unloading charges were contributed major proportion. The producer share has been computed as 59.06 per cent in the channel II. The study has suggested that measures need to be adopted to increase access of farmers to market information and they should be educated to sell their produce in the regulated markets which fetch higher returns as compared to village level marketing.

Mrs.V.Vincy (2016), in the study area majority of the farmers are not able to get cheap loan facilities to finance the expenditure involved in banana cultivation. One of the most ruthlessly exploited segments of Indian community is that of the farmers. As the small farmers are hard pressed for cash to meet postponed consumption needs and to pay off debts, they have to sell their produce soon after the harvest, when the price is low. Banana production is seasonal in nature while its demand is inelastic. This also affects the price fixation. There is a large variation in the quality of banana which makes their grading and standardization somewhat difficult. More than 60 per cent of the population in the selected area of vilavancode taluk of Kanyakumari District depends on agriculture. Hence a lot of marketing activities are going on in this area. This taluk is solely dependent on agriculture. So a survey has been undertaken to study the process of socio demographic profile, production and marketing of banana and problems in cultivation and marketing.

Statement of the Problem

Banana is a perishable product. The present study covering the problems such as; inadequate water facilities, lack of transport facilities, unfavourable climate conditions, different types of diseases, flood, cyclone etc., may affect the production of banana. However, financial constraints and lack of adequate knowledge about the production of bananas are the problems of this study.

Objectives of the Study

The present research work is carried out with objective of finding out the trend of area, production and productivity of banana in Tamil Nadu.

Research Methodology

Descriptive research design is used in this study. The data for present study is Area, Production and Productivity of banana in Tamil Nadu. The required data were collected from Indian Horticulture Database, Horticulture Statistics at a Glance 2017 and other reports. The period of the study is 10 years from 2007-08 to 2016-17. The convenient sampling technique has been adopted.

Statistical Tool

Various statistical measures have been used. The mean, standard deviation, coefficient of variation, range and compound annual growth rate are calculated to evaluate central tendency and volatility in the trend and growth position over the time.

Statistical Techniques

To analyze the collected data, various statistical techniques like descriptive, time series analysis are used. That is, as the data are of time series in nature, trend and growth both in compounded terms and linear terms are calculated in addition to general descriptive statistics like mean, standard deviation and coefficient of variation. The statistical significance of compound growth and linear trend is ascertained using student t-test.

The procedures for calculating descriptive statistics such as mean, standard deviation, and also for Compounded annualized growth rate (CAGR) and Linear growth rate (CAGR) are given hereunder:

Mean (\bar{X})

$$\bar{X} = \frac{\sum X_i}{n}$$

Where, X_i is ratio of year 'i' and 'n' is number of years.

Standard Deviation (σ)

$$\sigma = \sqrt{\frac{\sum X_i^2}{n} - (\bar{X})^2}$$

Where, X_i is ratio of year 'i', 'n' is number of years and \bar{X} is mean score.

Coefficient of Variation (CV)

$$CV = \left(\frac{\sigma}{\bar{X}}\right) \times 100$$

Compounded Annualized Growth Rate (CAGR)

Consider the non-linear relationship between a study variable (Y) and time variable (X) as

$$Y = a b^x \dots\dots\dots (1)$$

By taking logarithms on both sides, it may be written as

$$\log Y = \log a + \log b X$$

Or simply say $Y = A + BX$

The least square estimates of A and B are given by

$$\hat{\beta} = \left(\frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}} \right)$$

$$\hat{A} = \bar{Y} - \hat{B}\bar{X}$$

Where, $\bar{Y} = \frac{\sum y}{n}$ and $\bar{X} = \frac{\sum x}{n}$

Here, n is number of time periods (years), an estimate of 'b' is given by $\hat{b} = \text{Anti log}(\hat{B})$

Now, an estimate of Compounded Annualized Growth Rate (CAGR) = $[\hat{b} - 1] \times 100$

Linear Growth Rate (LGR)

Consider a linear relationship between a study variable (Y) and time variable (X) as

$$Y = a + b X$$

The Linear Growth Rate (\hat{b}) is given by

$$\hat{b} = \left(\frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}} \right)$$

The statistical significance of the growth and trend are ascertained using Student t-test.

Results and Discussion

Today, India is the first and foremost country in the world in Banana Production.

Table – 1

Rank wise Banana producing country in the World during the year 2018

Rank.	Country	Production (in MT).
1.	India	29.82
2.	China (Mainland)	11.64
3.	Uganda	11.23
4.	Philippines	9.45
5.	Ecuador	8.24
6.	Brazil	7.65
7.	Indonesia	6.34
8.	Colombia	5.27
9.	Cameroon	4.94
10.	Tanzania	4.08
Total		98.66

Source: <https://www.worldblaze.in/banana-producing-countries-in-the-world/>

From the above table, it is understood that production of banana in the world, India got first rank (29.82 Million Tons) with the 30.21 per cent. The above scenario is presented in bar diagram under figure-1.

Figure - 1

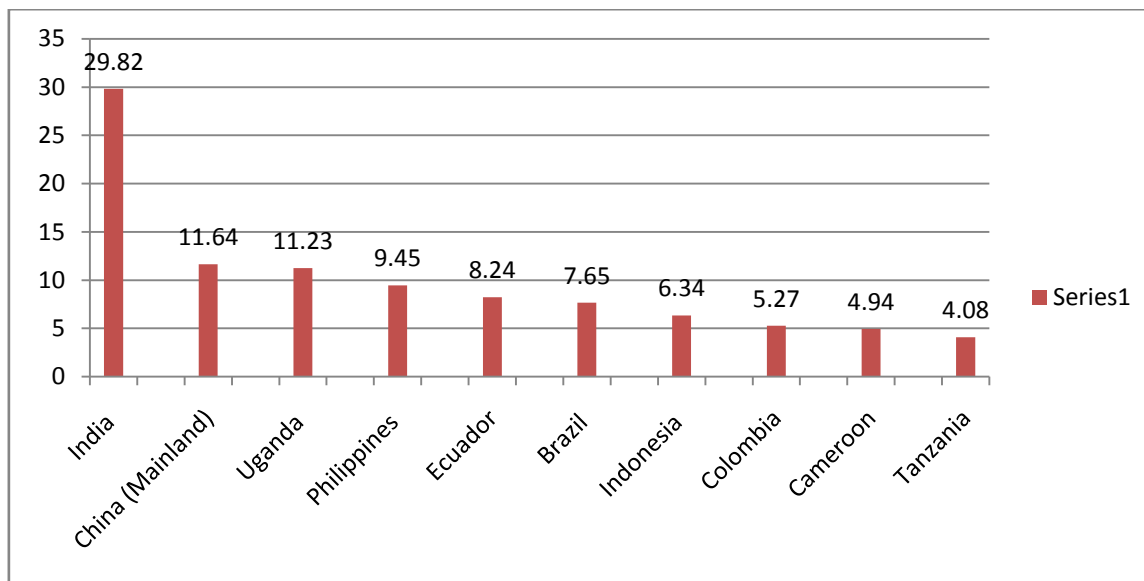


Table -2

Area, Production and Productivity of Banana in India during the year from 2007-08 to 2016-17

Year	Area (in'000Ha)	Production ('000MT)	(in MT/Ha)	Productivity (in MT/Ha)
2007-08	658.00	23823.00	36.20	
2008-09	709.00	26217.00	37.00	
2009-10	770.30	26469.50	34.40	
2010-11	830.00	29780.00	35.90	
2011-12	796.50	28455.10	35.70	
2012-13	776.00	26509.10	34.20	
2013-14	802.60	29724.60	37.00	
2014-15	821.80	29221.40	35.50	
2015-16	841.20	29134.80	34.60	
2016-17	860.00	30477.00	33.98	
Mean	786.54	27981.17	35.46	
SD	62.17	2120.10	1.11	
CV	7.90	7.58	3.14	
CAGR (t-value)	***2.33(4.52)	***2.07(3.70)	*-0.49(-1.54)	
LGR (t-value)	***17.56(4.67)	***557.33(3.72)	*-0.18(-1.53)	

t – Table value for 8 d.f @10% = 1.85, @5% = 2.30, @1% = 3.35

*Significant at 10% level, **Significant at 5% level, *** Significant at 1% level

Source: DAC & FW and Horticulture Statistics at a Glance 2017.

The trend and growth in Area, Production and Productivity for Banana are analyzed and the results of the analysis are reported in table - 2. It is understood from

the table that the area and production of the Banana with the average of 786.54 in thousand hectares and 27981.17 in million tons have reached 841.20 in thousand hectares and 29135.00 in million tons after testing at as high as 860.00 in thousand hectares and 30477.00 in million tons in 2015-16 from 658.00 in thousand hectares and 23823.00 in million tons in 2007-08 at insignificant compound rate of 2.33 per cent (CAGR = 2.33, t = 4.52, p < 0.01 and 2.07 per cent (CAGR = 2.07, t = 3.70, p < 0.01) with crisscross movements respectively. In absolute value, the rate of growth is 17.56 area (LGR = 17.56, t = 4.67, p < 0.01) and 557.33 production (LGR = 557.33, t = 3.72, p < 0.01) on an average every year for area and production of banana respectively.

The value of decline both in compounded term (CAGR = -0.49, t = -1.54, p < 0.10) and absolute term (LGR = -0.18, t = -1.53, p < 0.10) are marginally significant at 10 per cent level. From inferences of these results, it is found that area and production of the growth of banana is moderate level but not significant level. On the other hand, the productivity of banana in India, the CAGR and LGR reveals the negative trend throughout the study period.

Table - 3

Area, Production and Productivity of Banana in Tamil Nadu during the year from 2007-08 to 2016-17

Year	Area (in'000Ha)	Production (in '000MT)	Productivity (in MT/Ha)
2007-08	114.10	6116.50	53.60
2008-09	124.40	6667.00	53.60
2009-10	113.70	4980.90	43.80
2010-11	125.40	8253.00	65.80
2011-12	130.40	6736.40	51.70
2012-13	111.36	5136.20	46.10
2013-14	118.04	5650.00	47.90
2014-15	95.24	4147.18	43.55
2015-16	94.61	4331.65	45.78
2016-17	94.99	3640.73	38.33
Mean	112.22	5565.96	49.02
SD	13.28	1409.60	7.62
CV	11.84	2532.52	1554.37
CAGR (t - value)	** -2.86 (-2.99)	* -5.89 (-3.00)	** -3.11 (-2.36)
LGR (t - value)	** -3.11 (-2.85)	** -316.41 (-2.62)	** -1.53 (-2.17)

t – Table value for 8 d.f @10% = 1.85, @5% = 2.30, @1% = 3.35

*Significant at 10% level, **Significant at 5% level, *** Significant at 1% level

Source: 2007-08 to 2013-14, data compiled from Indian Horticulture Database; 2014-15 to 2015-16 and Horticulture Statistics at a Glance 2017.

From the observation of the table, it is understood that area and production of the banana in Tamil Nadu with the averages of 112.22 area in thousand hectares and 5565.96 production in thousand million tons and 3640.73 thousand million tons in 2016-17 with negative CAGR of 2.86 per cent and 5.89 per cent respectively. However, the above rates of decline are not at mentionable level for area and production of Banana. However productivity of banana with an average of 49.02 in million tons, increased significantly to reach at 38.33 million tons in 2016-17 from 53.60 million tons in 2007-08 at CAGR of negative 3.11 percent, t = -2.17, p < 0.05 productivity of banana

is not a satisfactory level throughout the period and even exhibits a significantly declining growth and trend over the period. (CAGR = -3.11, $t = -2.36$, $p < 0.05$ & LGR = -1.53, $t = -2.17$, $p < 0.05$) on the whole, from the inferences of the results, it is found that area, production and productivity of banana in Tamil Nadu reveals that slightly increase the growth level but not highly satisfactory level during the study period.

Findings of the Study

1. In the World level, it is understood that production of banana in the world, India got first rank (29.82 Million Tons) with the 30.21 per cent.
2. In India level, it is found that area and production of the growth of banana is moderate level but not significant level. On the other hand, the productivity of banana in India, the CAGR and LGR reveals the negative trend throughout the study period.
3. In Tamil Nadu level, it is found that area, production and productivity of banana in Tamil Nadu reveals that slightly increase the growth level but not highly satisfactory level during the study period.

Conclusion

Natural calamities such as flood, cyclone we cannot stop it; but predict it, and take preventive measure to control such calamities, i.e., “Prevention is better than Cure”. The financial problem will be solved by the Co-Operative and Nationalized Banks by way of providing loan with lesser rate of interest to the farmers. “Agriculture in India is the gambling of Monsoon”. Rain is very essential to the Agriculture Sector. Most of the Indians are directly or indirectly depending on the agriculture. Some are directly attached with the farming and some other people are involved in doing business with these goods. To achieve targeted mark by the government it needs to provide support in case of land and other machineries to the small farmers along with the big farmers with this we can expect some improvement in Indian economy.

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