International Journal of Research and Review
www.ijrrjournal.com E-ISSN: 2349-9788; P-ISSN: 2454-2237

Research Paper

Trade Performance of Banana in India

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ABSTRACT

The banana sector in India is quite different from that of the other major producing countries like China, Indonesia, Brazil, Philippines and Ecuador who mainly export banana. Apart from being the major producer India is also the major consumer of banana. Demand for banana is most evenly distributed over the years because of high production, suitable environment for the growth of banana. Hence, the present study explores the trade performance of banana in India (from 1995-96 to 2014-15) using by compound growth rate and Cuddy Della instability index and also workout the NPC for competitiveness.

The import of banana has been decreasing as compared to banana export with the growth rate of 8.35 per cent level in the overall study period. It is due to the effective and large production of banana. The growth rate of banana export from India in quantity was found significantly positive with 20.37 per cent for the second period (2005-06 to 2014-15) while significantly positive growth of 16.10 per cent was seen during the overall period (1994-95 to 2014-15) under the study. The growth rate of banana in; area, production and productivity were found to be increasing. The growth rate in area and production of banana was 3.70 and 5.01 per cent respectively. The growth in productivity was found to be non-significant with 2.00 per cent over the study period. The productivity of banana showed negative growth rate with -0.15 per cent in the first period (1994-95 to 2014-15) while positive growth rate of 1.60 per cent was found during the overall study period (1994-95 to 2014-15).The growth rate of area under banana in major banana producing states was estimated highest in Gujarat with 5.70 per cent followed by other banana producing states, Karnataka, Tamil Nadu, Maharashtra with the CGR of 4.67, 3.92, 3.13 and 1.99 respectively. The Compound Growth rate of production under banana was estimated higher in Gujarat with 10.23 per cent followed by other states, Karnataka, Maharashtra and Tamil Nadu with growth rate of 5.00 per cent, 2.52 per cent, 2.3 per cent and 1.94 per cent respectively. The growth rate of productivity of major banana producing state is higher in other non-listed states with 6.20 per cent followed by Gujarat, Maharashtra and Tamil Nadu with 4.48 per cent, 3.88 per cent and 1.12 per cent respectively. The negatively growth rate in the state of Karnataka with growth rate of -1.60 per cent. The growth rate of banana import was found to be high and positively significant during all the periods. The high growth rate in import was found during the first period with 8.76 per cent under the study. It is concluded from the NPC analysis that the export competitiveness of banana has been increasing over the years i.e. there is an export advantage.

Keyword: Growth rate, Instability Index, Competitiveness

INTRODUCTION

India's share in the area, production, export has increased over the years and the country is now one of the largest exporter and second largest producer of banana in the World market. Hence, the present study explores the growth performance of banana in India as well as major producing states in India. Also the production, productivity, export and import of banana is concentrated

in the Saudi Arabia and Ghana region alone accounts for 87 per cent of the Worlds export in 2013. India accounted for 90 per cent of incremental global import trade flow between 2004 and 2013, are anticipated to capture a similar share of incremental imports in the period up to 2017. Hence the study is attempts to assess the real growth on area, production, import and export of banana in India.

The banana sector in India is quite different from that of the other major producing countries like China, Indonesia, Brazil, Philippines and Ecuador who mainly export banana. Apart from being the major producer India is also the major consumer of banana. Demand for banana is most evenly distributed over the years because of high production, suitable environment for the growth of banana.

There are some disruption also occur during the production and growth of banana because of sudden change in environment, rainfall etc. From which the production of banana should be less and the quality also reduced its directly effect on export and market of banana. Consequently prices would rise at that time, unless there is an acute economic depression or similar negative factors. India stands first in production of banana throughout the world. The banana is subjected to wide price fluctuations in the domestic as well as international markets. The current study will help the scientists, producers and policy makers to devise appropriate policies like imposition of high custom duties on banana export of banana gives profit from it. Import to stabilize the domestic market price at the time of less arrivals of Indian banana. Hence the study aims to analyze the growth performance of the banana in India with the following specific objectives:

1. To study the growth and instability in area, production, import, and export of banana in India.
2. To study the export competitiveness of banana in India.

LITERATURE REVIEW

Ashalatha (2000) analyzed the growth rate of area, production, productivity and export of cashew kernel, cashew nut shell liquid, imports of raw cashew nuts and unit value of exports of cashew. The study covered the period of 1956-57 to 1998-99. The growth rate was studied in two periods period-I, covering 1956-57 to 1970-71 and period-II, covering 1971-72 to 1998-99. It was observed that the growth rate of area, production, productivity kernel export, raw cashew import, cashew nut shell liquid value and cashew nut shell liquid-unit value of export were showing positive trend but the cashew nut shell liquid quantity exported showed negative growth and non-significant.

Cuddy and Della (1978) the research in the area of commodity price fluctuations has centred our attention on a fundamental question underlying any examination of time series data: namely, what do we mean by price instability, and how do we measure and compare the price instability of several commodities through time? Conceptually, everyone has a general feeling of what is meant by stable or unstable prices. However, when queried to define that feeling in a universally acceptable way, we find ourselves somewhat in the position of St. Augustine, who when asked about his conception of rime is reported to have replied, that he knew what time was until he tried to explain it to someone.

Sakamma and Ananth (2011) evaluated the growth and instability of major spices. For the present study five major spices of India namely chilli, pepper, cumin, turmeric and coriander were chosen purposively because these five spices, account for 77.9 per cent of area and 64 per cent of production of total spices. The data on the selected spices were collected for the period 1985-86 to 2006-2007 and this period was divided in to two sub-periods. The first period is from 1985-86 to 1996-97 (Pre-WTO) and second period is from 1997-98 to 2006-07 (Post-WTO). Export of Indian spices during Pre-WTO (1985-86 to

1996-97) and Post-WTO (1997-98 to 2006-07) periods indicated positive compound growth rates in both export quantity and value during both the periods, except for pepper which showed decreased and negative growth rate both in export quantity and value terms. Instability was high in terms of export value than the export quantity and these instability values were high in Pre-WTO period compared to Post-WTO period for the spices such as, chilli, turmeric, and coriander. However, in case of pepper and cumin are verse trend was found.

METHODOLOGY

This section analyses the impact of new economic policy on the growth and instability in total area, tapped area, production, productivity, consumption, import and export quantity and its value of Banana in India and the data were collected from various publications, official records and web sources such as Hand Book of Statistics on the Indian Economy Indiastat, India budget, Apeda.gov.in, statistical News, Food and Agricultural Organization (FAO) of the United Nations, National Horticulture Database etc. for the year 1994-95 to 2014-15. For the purpose of comparison, the period of study has been sub-divided into two periods, first period be (1994-95 to 2004-05) and second period be (2005-06 to 2014-15).

Statistical Analysis

To arrive at normal years, a simple average of estimates for twenty years from 1995-96 to 2014-15 have been taken. The normal year was considered as base year for estimating growth rates. By taking time as the independent variables and the area, production, productivity, consumption, import and export volume and their respective values of the Banana as the dependent variables, the compound growth rates were estimated by using following regression equation.

$Y=ab^t$

Taking logarithms on both sides

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

Where,

Y= Area/ production/ productivity/ export/ import of Banana in India

a & b= parameters to be estimated

t= time period

Then compound growth rate were worked out by using following formula,

CGR= [Antilog (log b) – 1] * 100

Instability analysis

Instability index was used to examine the extent of variation and risk involved in the parameter such as domestic and international prices, area, production, productivity, import and export of Banana. In order to study variability in import and export trade of Banana an instability index was used as a measure of variability. The coefficient of variation (CV) was calculated by using the following formula:

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

The trend coefficient was tested for its significance. Whenever, the trend coefficient was found to be significant, the variation around the trend rather than variation around mean was used as an index of instability. The formula suggested by Cuddy and Della (1978) was used to complete the degree of variation around the trend.

Instability index (%) = CV x $\sqrt{(1-R^2)}$

or

$$I_X = \frac{SD}{\bar{Y}}\sqrt{1-R^2} * 100$$

Where,

Ix= Instability index,

$\bar{Y}$ = Average value of the time series data

R^2 = Coefficient of multiple determination obtained from the time series

SD= Standard Deviation

The Instability Index refers to an average year-to-year per cent variation for a constant percentage trend.

NPC is the simplest of indices and measures the divergence of domestic price from international price and determines the

degree of export and import competitiveness of the commodity in question by measuring following formula.

NPC=Pd/Pb

Where,

NPC - Nominal protection co-efficient of the commodity.

pd - Domestic price of commodity.

pb - World reference price (border price) of commodity, adjusted for transportation, handling and marketing expenses.

NPC greater than unity indicates effective incentives to producers compared to free trade scenario and NPC lower than 1 indicates that the commodity is not protected. Similarly, NPC<1 indicates that the commodity is exportable and possesses export competitiveness. NPC>1 indicates commodity is importable and the commodity is not export competitive. The expression 1-NPC reveals price wedge for exports, depending upon the sign. For example, if NPC = 0.75, it indicates, export enjoys price advantage to the tune of 25 per cent, (given 1- NPC multiplied by 100). On the other hand NPC= 1.20, it indicates export disadvantage to the tune of 20 per cent.

RESULT AND DISCUSSION

Share of Horticultural exports to total export in India with share in Banana export

Total export from India has been studied with relation to banana export horticultural exports and figures for India's total export, horticultural export and banana export are presented in Table 1.

Table 1 Share of Horticultural exports to total export in India with share in Banana export
(Rs. in crore)

Year	Total Export	Total Horticultural Export	Banana Export	% share of Horticultural Export to Total Exports	% Share of Banana Export to Horticultural Export
2000-01	201356	71032	809	35.27	1.13
2001-02	209018	64931	866	31.07	1.33
2002-03	255137	93662	1087	36.71	1.16
2003-04	293367	86426	1281	29.46	3.41
2004-05	375340	75704	1441	20.17	1.48
2005-06	456418	84223	1147	18.45	1.36
2006-07	571779	88282	1836	15.44	2.08
2007-08	655864	114142	3351	17.40	2.93
2008-09	840755	141791	5987	16.46	4.22
2009-10	845534	150234	6362	17.76	4.22
2010-11	1142922	173462	5023	15.17	2.89
2011-12	1465959	193494	55119	13.20	2.84
2012-13	1634319	253525	39801	15.51	1.56
2013-14	1905011	272929	4750	14.33	1.74
2014-15	1896348	303756	63734	16.02	2.09
CGR	19.396***	11.75***	34.11***	-	-

Note- *,**,*** at 10, 5, and 1 per cent level of significance respectively.

It is observed from the Table 1 that, during 2000-01 to 2014-15, the total export increased from Rs. 201356 crore to Rs. 1896348 crore with a compound growth rate of 19.40 per cent. While horticultural export in 2000-01 was Rs. 71032 crore which have increased to Rs. 303756 crore in 2014-15 with a compound growth rate of 12.00 per cent per annum.

Though over the years horticultural export has increased many folds but the share of horticultural export has decreased by 16.02 per cent in 2014-15 from 35.27 per cent in 2000-01. It is not healthy sign for horticultural export, it needs attention of policy makers to promote and encourage horticultural export from country to increase horticultural share.

It is observed from Table 4.1 that, Banana export was Rs. 809 crore in 2000-01 which was increased to Rs. 63734 crore in 2014-15. The Banana export grew with a compound growth rate by 34.11 per cent per annum. The share of banana has increased to 2.09 per cent in 2014-15 from 1.33 per cent in 2000-01.

It means, there is a proper attention of policy makers to promote and encourage

the banana exports from country to increase banana export share by stabilizing the banana price.

Share of Horticultural Import to total import in India with share in Banana import

Total import of India has been studied with relation to horticultural import to banana import and figures for India's total import, horticultural import, banana import are presented in Table 2

Table 2 Share of Horticultural Import to total import in India with share in Banana import (Rs. In Crore)

Year	Total Import	Horticultural Import	Banana Import	% share of Horticultural import to total import	% share of banana import to horticultural import
2000-01	228306.64	70731	872	30.98	1.23
2001-02	245199.72	5829	431	23.77	7.39
2002-03	297205.87	51185	697	17.22	1.32
2003-04	359107.66	49946	973	13.90	1.34
2004-05	501064.54	96753	1098	19.30	1.13
2005-06	660408.90	101951	1198	15.43	1.17
2006-07	840506.31	104395	965	12.42	0.92
2007-08	1012311.70	142472	1284	14.07	0.90
2008-09	1374435.55	183621	1021	13.35	0.55
2009-10	1363736.00	229421	1123	16.82	0.48
2010-11	1605315.00	213421	1294	13.29	0.60
2011-12	2345463.24	252221	1185	10.75	0.46
2012-13	2669161.96	253491	1436	9.97	0.56
2013-14	2715434.00	27237	1765	1.00	0.64
2014-15	2737087.00	30147	2196	1.10	0.72
CGR	21.89***	8.29*	7.87*	-	-

Note- *,**,*** at 10, 5, and 1 per cent level of significance respectively.

It is observed from the Table 4.2 that, during 2000-01 to 2014-15 the total import has increased from Rs. 228306.64 crore to Rs. 2737087.00 crore with a compound growth rate of 21.89 per cent per annum. While Horticultural import in India during 2000-01 was Rs. 70731.00 crore which have decreased to Rs. 30147 crore in 2014-15 with a growth rate of 8.29 per cent per annum.

Though over the years horticultural imports has decreases many folds and share of horticultural import was decreased to 1.10 per cent in 2014-15 from 30.98 per cent in 2000-01. It is good sign for horticultural economy in India. In case of Banana the import has increased many folds with Rs. 872 crore to Rs. 2196 crore during the period of 2000-01 to 2014-15 with a compound growth rate of 7.87 per cent per annum.

Growth and Instability analysis of area, production and productivity of Banana in India

The result of growth, coefficient of variation and instability in area, production and productivity of banana during the reference period is illustrated in Table 3.

Table 3 Growth and Instability analysis of area, production and productivity of Banana in India

Periods	Parameters	Growth, coefficient of variation and instability		
		Area	Production	Productivity
Period I	CGR	1.61***	1.52*	-0.15*
	CV	50.66	51.66	41.29
	Cuddy Della Instability	24.38	45.00	41.13
Period II	CGR	4.19***	4.63***	1.50*
	CV	51.70	52.27	43.84
	Cuddy Della instability	21.92	25.82	34.44
Overall Period	CGR	3.70***	5.01***	1.60***
	CV	52.68	55.57	36.63
	Cuddy Della instability	15.84	20.45	21.57

Note- *,**,*** at 10, 5, and 1 per cent level of significance respectively.

In order to identify the significant role and the economical status of banana in Indian economy, an attempt has been made at decadal wise analysis of growth, coefficient of variation and instability during the study period.

The Table 3 depicted that, the area under banana in India grew at a compound

growth rate of 3.70 per cent per annum. The compound growth rate estimated for the second decades with 4.19 per cent per annum. Similarly, a comparatively lesser growth rate was observed in the area of banana during the first period with 1.61 per cent as compared to the growth rate in second and overall period. During the overall reference period, the coefficient of variation in area under banana was estimated at 52.68 per cent per annum.

The table 3 depicted that, the growth of production of banana in India grew at compound growth rate of 5.01 per cent at one per cent level of significance in overall study period was estimated per annum. The compound growth rate estimated for the second decades 4.63 per cent per annum. Similarly, a comparatively lesser growth was observed in the production of banana during first period with 1.52 per cent per annum in period second and overall period under the study. During the overall reference period, the coefficient of variation in production under banana was estimated at 55.57 per cent.

Further the periodic growth analysis for productivity of banana in India is inferred in Table 3 that, the productivity grew at an average annual rate of 1.60 per cent for the whole study period. In the same way a negative growth rate of -0.15 per cent was obtained in the first period 1994-95 to 2014-15, while growth rate was obtained in the second period 2005-06 to 2014-15. It is found from the Table 4.3 that, the overall estimated compound growth rate of productivity in India was registered at 1.60 per cent per annum which was lesser than the compound growth rate estimated for the area with 3.70 per cent and production 5.01 per cent.

Growth and instability analysis of export and import of banana in India

The result of growth, co-efficient of variation and instability in export and import quantity of banana in India during the reference period are illustrated in the Table 4 .

Table 4Growth and instability analysis of export and import of banana in India

Particulars	Parameters	Growth, coefficient of variation and instability		
		Period I	Period II	Overall Period
Export	CGR	9.32***	20.37***	16.10***
	CV	38.12	56.01	73.76
	Cuddy Della Instability	11.19	32.62	24.21
Import	CGR	8.76**	6.78	8.35***
	CV	48.58	39.06	58.19
	Cuddy Della Instability	37.80	23.69	27.43

Note- *,**,*** at 10, 5, and 1 per cent level of significance respectively.

The growth rate of export in the first period 1994-95 to 2004-05 was estimated at 9.32 per cent per annum. In the second period 2005-06 to 2014-15 export has been increased growth rate of 20.37 per cent per annum was obtained. It was found from the Table 4.4 that, the estimated compound growth rate of export from India registered at 16.10 per cent per annum for the overall period. The co-efficient of variation in export of banana was estimated at 73.76 per cent over the study period. It is concluded from the table that there is a high degree of variation in the parameter under the study period.

The import of banana in India recorded significantly a higher growth rate of 8.76 per cent at 5 per cent level of significance during the first period 1994-95 to 2004-05 while in second period 2005-06 to 2014-15. Import growth rate was estimated at 6.78 at 1 per cent level of significance. The total import grew at an estimated rate of 8.35 per cent which was comparatively higher than the growth rate estimated for the second period 2005-06 to 2014-15 with 6.78 per cent level but less than first period under the study. During the overall reference period of 20 years, the co-efficient of variation in import of banana was estimated at 58.19 per cent level which

is higher than both first 48.58 per cent and second 39.06 per cent decades, and the table also inferred that there is a high degree's of variation in the parameter with a high growth rate under study.

The instability of export was found higher in second period with 32.62 per cent and in first period with11.19 per cent. The instability of import was found highest in first period of study with 37.80 per cent and in second period with 23.69 per cent. In the overall study period the high degree of instability was found with 27.43 per cent.

State wise growth, coefficient of variation and instability of area under Banana in India

The growth, coefficient of variation and instability is worked out for the period of 1994-95 to 2014-15 and the periodical performance of major banana producing states were studied and the results are presented in the Table 5.

Table 5 State wise growth, coefficient of variation and instability of area under Banana in India

Years	Parameters	Growth and coefficient of variation and instability				
		Tamil Nadu	Maharashtra	Karnatak	Gujarat	Others
(Period I)	CGR	1.49	1.18	-0.05	3.69**	2.53**
	CV	48.43	47.87	46.13	43.94	50.07
	Cuddy Della Instability	46.04	46.60	46.12	29.57	39.99
(period II)	CGR	2.16**	0.98*	7.69***	3.82***	6.08***
	CV	49.30	47.97	50.87	47.53	51.93
	Cuddy Della Instability	36.15	38.64	25.79	14.24	52.36
(Overall period)	CGR	3.13***	1.99***	3.92***	5.70***	4.67***
	CV	47.56	44.69	48.25	46.62	52.72
	Cuddy Della Instability	26.12	31.84	26.38	13.61	19.36

Note- *,**,*** at 10, 5, and 1 per cent level of significance respectively.

It is found from the Table 5 that the compound growth rate of area under banana in other minor banana producing states was estimated around 4.67 per cent during overall period under the study. The estimated growth rate of area of Maharashtra was registered at 1.49 per cent, 2.16 per cent, and 3.13 per cent in the first, second and overall period. The overall compound growth rate of area at different states in India during 1994-95 to 2014-15 was estimated around 3.70 per cent, which means the area was increased annually by 3.70 per cent over the study period, this was mainly because of favorable climatic conditions and attained affordable producer's price for banana. In Gujarat highest growth rate in area under banana was found in the first period with 3.69 per cent level. Regarding Karnataka, Gujarat, Tamil Nadu, Maharashtra and other minor banana producing states. It shows high growth in the second period i.e. 7.69, 3.82, 3.12, 2.16, 0.98, 6.08 per cent respectively as compared to the first period i.e. -0.05, 3.69, 0.71, 0.35, 2.53, per cent respectively.

The growth, coefficient of variation and instability is worked out for the period of 1994-95 to 2014-15 and the periodical performance of major banana producing states were studied and the results are presented in the Table 5.

The instability analysis shows that high instability was found in Maharashtra in the first period with 46.60 per cent followed by Karnataka, Tamil Nadu, Other banana producing states and Gujarat with 46.12 per cent, 46.04 per cent and 39.99 per cent and 29.57 per cent respectively. In case of second period instability was found other banana producing state followed by Maharashtra, Tamil Nadu, Karnataka and Gujarat with 52.36 per cent, 38.64 per cent,36.15 per cent, 25.79 per cent, 14.24 per cent. It can be understood from the analytical table that there was a positive and significant growth with high instability in total area in all major producing states in India over the past 20 years.

State wise growth, coefficient of variation and instability of production of Banana in India

The results of growth and coefficient of variation on production under banana in major producing states in India is presented in the table 6 for the period of 21 years from 1994-95 to 2014-15.

Table 6 State wise growth, coefficient of variation and instability of production of Banana in India

Years	Parameters	Growth and coefficient of variation and instability				
		Tamil Nadu	Maharashtra	Karnataka	Gujarat	Other
(Period I)	CGR	-1.77	5.56***	-4.11**	4.45**	1.63
	CV	53.34	53.19	52.96	53.53	51.86
	Cuddy Della Instability	51.36	34.44	39.16	39.06	46.25
(period II)	CGR	-2.88	-2.12*	8.29***	5.85*	4.90***
	CV	53.28	51.70	53.62	56.88	52.26
	Cuddy Della Instability	48.94	40.29	8.16	47.47	20.33
(Overall period)	CGR	1.94*	2.33***	2.52***	10.23***	5.00***
	CV	54.08	52.26	53.85	69.77	55.50
	Cuddy Della Instability	48.94	39.73	44.28	28.42	20.38

Note- *,**,*** at 10, 5, and 1 per cent level of significance respectively.

From the analytical Table 6, it is observed that the compound growth rate of banana production of Gujarat states in India was estimated around 10.23 per cent per annum which is comparatively far higher to the listed states like, other non-listed states, Karnataka, Maharashtra, Tamil Nadu during overall study period. The estimated growth rate of production in 5.00 per cent, 2.52 per cent, 2.33 percent, 1.94 per cent per annum respectively during second periods of study. The overall compound growth rate of production under Banana in different states of India during 1994-95 to 2014 -15 was estimated at 5.01 per cent which means the production increased annually by 5.01 per cent over the study period. The coefficient of variation in production during the overall study period was estimated at 55.57 per cent level.

Further the instability analysis on production of banana presented in the Table 4.6 shows high degree of instability with 51.36 per cent in Tamil Nadu with a growth rate of -1.77 per cent during the first period. During the second period high instability was found in Tamil Nadu followed by Gujarat, Maharashtra, Other states and Karnataka with 48.94 per cent, 47.47 per cent, 40.29 per cent and 20.33 per cent and 8.16 per cent respectively. During the overall period high instability was found in Karnataka, Maharashtra, Gujarat and others the instability on production of banana in India shows 20.45 per cent over the study period.

State wise growth, coefficient of variation and instability of productivity of Banana in India

The results of growth and coefficient of variation on production under banana in major producing states in India is presented in the Table 7 for the period of 20 years from 1994-95 to 2014-15.

Table7: State wise growth, coefficient of variation and instability of productivity of Banana in India

Years	Parameters	Growth and coefficient of variation and instability				
		Tamil Nadu	Maharashtra	Karnataka	Gujarat	Other
(Period I)	CGR	-0.94	10.90	-3.02	0.58	4.66***
	CV	45.51	55.15	43.78	43.82	38.28
	Cuddy Della Instability	44.37	47.50	37.86	42.82	16.88
(period II)	CGR	-0.69	-2.70***	0.84	3.06	6.09***
	CV	48.79	46.98	41.58	48.67	45.50
	Cuddy Della Instability	48.49	23.26	40.65	41.47	14.82
(Overall period)	CGR	1.12	3.88**	-1.60**	4.48***	6.20***
	CV	42.82	46.54	36.76	46.60	42.98
	Cuddy Della Instability	39.86	41.38	31.09	23.45	8.66

Note- *,**,*** at 10, 5, and 1 per cent level of significance respectively.

From the analytical Table 7 it is observed that the compound growth rate of banana productivity of other non-listed Banana producing states in India was estimated around 6.20 per cent per annum which is comparatively far higher to the listed states like, Gujarat, Maharashtra, Tamil Nadu and Karnataka during overall study period. The estimated compound growth rate of productivity in Maharashtra and Tamil Nadu registered a negative growth of -2.70 per cent, -0.69 per cent per annum respectively during second periods of study. The overall compound growth rate of productivity of Banana in different states of India during 1994-95 to 2014 -15 was estimated at 1.60 per cent which means the production increased annually by 1.60 per cent over the study period. The coefficient of variation in production during the overall study period was estimated at 36.63 per cent level.

Further the instability analysis on productivity of banana presented in the Table 7 shows high degree of instability with 47.50 per cent in Maharashtra with a growth rate of 10.90 per cent per annum during the first period. During the second period high instability was found in Tamil Nadu followed by Gujarat, Karnataka, Maharashtra and Other states with 48.49 per cent, 41.47 per cent, 40.65 per cent and 23.26 per cent and 14.82 per cent respectively. During the overall period high instability was found in Maharashtra, Tamil Nadu, Karnataka, Gujarat and others the instability on productivity of banana in India shows 21.57 per cent over the study period.

Exports competitiveness of Banana in India

Trade competitiveness basically depends upon the level of domestic prices relative to international prices. If domestic price of a commodity is lower than the net export price, the commodity is export competitive otherwise it is not. We have used the simplest method, Nominal Protection Coefficient (NPC) to measure the export competitiveness of banana in India. There are lots of quality variations and there are several grade categories of banana produced in India. Similarly, India's banana export also consists of several varieties i.e. Dwarf Cavendish, Red Banana, Grand Naindra etc for domestic and international export price. The competitiveness of banana in India is presented in Table 8.

From Table 8, it can be seen that since 1995, international price of banana is higher than domestic price. Indian banana experienced export advantage of more than 88.79 per cent during the year 2011. The level of domestic price related to international price was much lesser, which facilitated export advantages with 15.57 per cent in the year of 2001-02.

Table 8 Competitiveness of banana in India

Sr. No.	Year	Domestic Price	International Price	NPC (Pd/Pb)	1-NPC	1-NPC*100
1	1995	102600	445000	0.23	0.77	76.94
2	1996	99300	435000	0.23	0.77	77.17
3	1997	89700	529000	0.17	0.83	83.04
4	1998	94300	492000	0.19	0.81	80.83
5	1999	114500	374000	0.31	0.69	69.39
6	2000	105100	422000	0.25	0.75	75.09
7	2001	100800	559000	0.18	0.82	81.97
8	2002	126500	527000	0.24	0.76	76.00
9	2003	156400	375000	0.42	0.58	58.29
10	2004	132600	525000	0.25	0.75	74.74
11	2005	159400	577000	0.28	0.72	72.37
12	2006	171800	657000	0.26	0.74	73.85
13	2007	161600	676000	0.24	0.76	76.09
14	2008	136100	850000	0.16	0.84	83.99
15	2009	150200	848000	0.18	0.82	82.29
16	2010	129500	888000	0.15	0.85	85.42
17	2011	110400	985000	0.11	0.89	88.79
18	2012	135100	981000	0.14	0.86	86.23
19	2013	159400	926000	0.17	0.83	82.79
20	2014	157400	926000	0.17	0.83	83.00

From the table 8 it can also be revealed that banana experienced a massive export advantages during the year 2002-03 to 2008-09. Nominal protection coefficient was found highest in the year 2014 at 0.17 levels i.e. international price of banana was much greater than domestic price and there is increasing trend of NPC from 2012-13 which was facilitate for export of banana in a massive quantity.

CONCLUSIONS

The following conclusions were emerged from the forgoing analysis of the present study.

- The import of banana has been decreasing as compared to banana export with the growth rate of 8.35 per cent level in the overall study period. It is due to the effective and large production of banana.
- The growth rate of banana export from India in quantity was found significantly positive with 20.37 per cent for the second period (2005-06 to 2014-15) while significantly positive growth of 16.10 per cent was seen during the overall period (1994-95 to 2014-15) under the study.
- The growth rate of banana in; area, production and productivity were found to be increasing. The growth rate in area and production of banana was 3.70 and 5.01 per cent respectively. The growth in productivity was found to be non-significant with 2.00 per cent over the study period.
- The productivity of banana showed negative growth rate with -0.15 per cent in the first period (1994-95 to 2014-15) while positive growth rate of 1.60 per cent was found during the overall study period (1994-95 to 2014-15).
- The growth rate of area under banana in major banana producing states was estimated highest in Gujarat with 5.70 per cent followed by other banana producing states, Karnataka, Tamil Nadu, Maharashtra with the CGR of 4.67, 3.92, 3.13 and 1.99 respectively.
- The Compound Growth rate of production under banana was estimated higher in Gujarat with 10.23 per cent followed by other states, Karnataka, Maharashtra and Tamil Nadu with growth rate of 5.00 per cent, 2.52 per cent, 2.3 per cent and 1.94 per cent respectively.
- The growth rate of productivity of major banana producing state is higher in other non-listed states with 6.20 per cent followed by Gujarat, Maharashtra and Tamil Nadu with 4.48 per cent, 3.88 per cent and 1.12 per cent respectively. The negatively growth rate in the state of Karnataka with growth rate of -1.60 per cent.
- The growth rate of banana import was found to be high and positively significant during all the periods. The high growth rate in import was found during the first period with 8.76 per cent under the study.
- It is concluded from the NPC analysis that, the export competitiveness of banana has been increasing over the years i.e. there is an export advantage.

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How to cite this article: Nagpure SC, Mhaske AR, Kokate SD. Trade performance of banana in India. International Journal of Research and Review. 2019; 6(5):113-123.

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