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Trends in area, production and productivity of arecanut in India

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Abstract

The present study attempts to estimate the trends in area, production and productivity of arecanut in India and Karnataka as whole. The study is based on secondary data and analyzed by using standard statistical tools like arithmetic mean and coefficient of variation, compound growth rates and graphical representations to draw the overview of trends in area, production and productivity of arecanut in India. The growth of area, production and productivity of arecanut for India was 3.80 percent, 6.56 percent and 2.66 percent respectively. The growth of area, production and productivity of arecanut for Karnataka state was 5.64 percent, 8.04 percent and -0.95 percent respectively. The area and production of arecanut in all selected districts were increasing significantly with 9.42 percent and 6.93 percent in Dakshin Kannada respectively whereas, the productivity was found to decreasing at 2.54 percent. In Chikkamagaluru district area (2.44%) and production (1.05%) and productivity was decreasing at 0.60 percent. In Shivamogga district area (7.66%) and production (6.59%) were significant and productivity was decreasing with 0.15 percent. In Davangere district area, production and productivity of arecanut were increasing significantly with 7.12 percent, 8.88 percent and 2.32 percent respectively.

Keywords: Area of arecanut, production, significant percent, mean

Introduction

The arecanut palm (*Areca catechu* L.) is a significant commercial and business crop of India. It plays an important role in the political, social and cultural functions and the economic life of people in our country. The arecanut has spreading its uses in Ayurvedic and veterinary medicines of animals. Popularly known as betel nut or supari in our traditional country and which is growing in large quantity of many countries, like India, Malaysia, Sri Lanka, Indonesia, Philippines and some of the Pacific Islands. The economic production of arecanut is called "betel nut" and is used mainly for masticator purposes by the people of India. The raw kernel is chewed by Indian population in tender, ripe or processed form. It is processed and used into panmasala, gutkha, scented supari etc. are some treated which are become more popular in the country. The cultivation of arecanut production can be traced back to Vedic periods, where we can see the use of it.

Under arecanut production India is in first position with respect to area (43.01%) followed by Bangladesh (33.00%), Indonesia (11.27%) and Myanmar (5.71%). Similarly, with respect to the production also India ranked first (50.37%) followed by Bangladesh (18.27%) Myanmar (11.31%) and Indonesia (7.37%). Further, arecanut also cultivated in small scale in some countries like Nepal, China, Srilanka and Malaysia. The average productivity of arecanut at world level stood at 14.60 q/ha. Among different arecanut growing countries, Srilanka stood first with a productivity of 35.14q/ha followed by Nepal was (33.10q/ha) and Myanmar (29.00q/ha). Although, India stands first in global production, its performance in productivity is poor with its global ranked 7th in terms of productivity with productivity level of 17.15q/ha which considered almost on par with world productivity level. (2021-22)

The states which predominately grown arecanut in India are Andhra Pradesh, Assam, Meghalaya, Tripura, Andaman and Nicobar Islands, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Mizoram, West Bengal and Pondicherry. Furthermore, Karnataka and Kerala states have the significant share which together accounts more than 80 percent of both in area and production of the arecanut in the country. With respect to the area under arecanut across different states, Karnataka ranks first with a 5,00,522 hectares with production of 10,81,840 tonnes followed Kerala with an area of 96,921 hectares with production of 92,755 tonnes, Assam with an area of 67,021 hectares with production of 50,040 tonnes, Meghalaya with an area of 17,951 hectares with production 24,467 tonnes and West Bengal with an area of 11,890

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hectares with production of 23,857 tonnes of arecanut produce during the year 2019-20. The present study attempts to examine the trends in area, production and productivity of arecanut in India and Karnataka as whole.

Material and Methods

The study is based on secondary data collected from different sources for achieving the objectives of the study. The secondary information were collected and used in the study. They are secondary data (time series data) on arecanut in area, production and productivity were collected from the records maintained by the Directorate of Ministry of Agriculture Directorate of Arecanut and Spices Development, Calicut at the national level data and Directorate of Horticulture Bangalore at the state level data. The study area is confined to Dakshina Kannada, Shivamogga, Davangere and Chikkamagaluru districts 2005-06 to 2020-21.

Analytical tool

For the purpose of evaluating the objectives of the study, based on the nature and extent of data availability, the following analytical tools was used for analyzing the data to draw meaningful results and conclusions.

Compound annual growth rate analysis

For computing compound annual growth rates of area, production and productivity of arecanut, the exponential function of the following form was used.

$$Y = a b^t e^U \quad \dots (1)$$

Where,

Y = Dependent variable (Area/Productivity/Production)

a = Intercept term

b = Regression coefficient

('a' and 'b' are the parameters to be estimated)

t = time period

e^U = Error term

The equation (1) was transformed into log linear form and written as;

$$\log Y = \log a + t \log b + Ut \quad \dots (2)$$

Equation (2) was estimated by using Ordinary Least Squares (OLS) technique.

Compound growth rate (g) was then computed

$$g = (b - 1) \times 100 \quad \dots (3)$$

Where,

g = Compound growth rate in percent per annum

b = Antilog of log b

The standard error of the growth rate was estimated and tested for its significance with 't' test statistic.

Co-efficient of variation

The coefficient of variation was used to measure the variability in area, production and productivity. The coefficient of variation or index of instability was computed by using the following formula

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

Results and discussions

Trends in area, production and productivity of arecanut in India

From the table 1 and figure 1, in India, arecanut cultivation is largely found in Karnataka, Kerala, Assam Meghalaya, west Bengal and Tamil Nadu. Area under arecanut in India has increased gradually by more than two folds from 364.30 thousand hectares in 2004-05 to 731.65 thousand hectares during 2019-20. With respect to productivity, during 2004-05 it was at 1,243 kg per hectare and shown an upward trend i.e., productivity increased to 1,849 kg per hectare in 2019-20. The compound growth rate of area under arecanut in India during 2004-05 to 2019-20 has found to be 3.80 percent which is significant at one percent probability level. The growth in production was found to 6.56 percent and significant at one percent level, which is more than the growth in area under arecanut. While the Productivity of arecanut found to be 2.66 percent. Karunakaran (2013) [4] while studying the trend, cost of production and method of sale of arecanut in Kerala also opined the same.

Table 1: Trends in area, production and productivity of arecanut in India (2004-05 to 2019-2019)

Year	Area (000ha)	Production (000T)	Productivity (kg/ha)
2004-05	364.30	452.70	1243
2005-06	381.10	483.10	1268
2006-07	382.38	473.23	1238
2007-08	386.69	478.07	1236
2008-09	387.10	481.30	1243
2009-10	400.10	478.00	1195
2010-11	400.30	478.10	1194
2011-12	463.90	680.70	1467
2012-13	446.39	608.72	1364
2013-14	451.90	622.27	1377
2014-15	450.00	747.00	1660
2015-16	474.36	713.84	1505
2016-17	454.65	722.85	1590
2017-18	496.65	832.98	1677
2018-19	718.41	1143.54	1592
2019-20	731.65	1352.84	1849
CAGR	3.80**	6.56**	2.66**
R square	0.74	0.83	0.78
CV	0.24	0.38	0.15
Standard deviation	110.06	258.30	205.75
Mean	461.87	671.83	1418.63

**Significant of 1 percent.

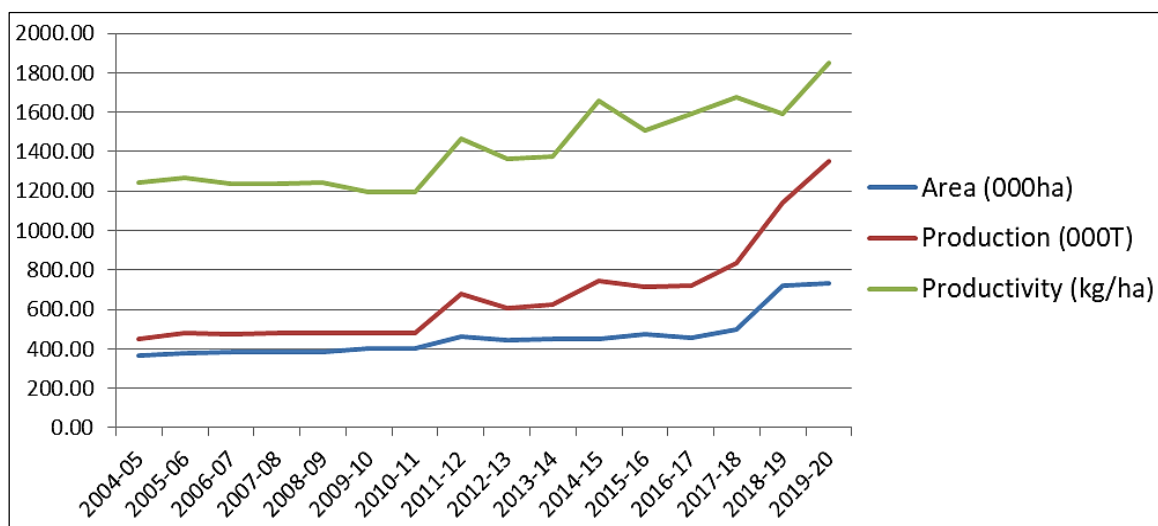


Fig 1: Trends in area, production and productivity of arecanut in India (2004-05 to 2019-20)

Table 2: State-wise area, production and productivity of arecanut in India (2019-20)

States	Area (000ha)	Percentage share	Production (000 tonn)	Percentage share	Productivity (kg/ha)
Karnataka	500.52	68.41	1081.84	79.97	2161
Kerala	96.92	13.25	92.76	6.86	957
Assam	67.02	9.16	50.04	3.70	747
Meghalaya	17.95	2.45	24.47	1.81	1363
West Bengal	11.89	1.63	23.86	1.76	2006
Tamil nadu	6.84	0.93	13.54	1.00	1979
Andra Pradesh	1.09	0.15	10.41	0.77	9505
Goa	1.97	0.27	3.70	0.27	1879
Maharashtra	2.66	0.36	5.00	0.37	1875
Mizoram	13.00	1.78	10.84	0.80	834
Nagaland	0.21	0.03	1.19	0.09	5540
Tripura	7.16	0.98	24.51	1.81	3420
Andaman and Nicobar island	4.33	0.59	10.58	0.78	2442
Pondicherry	0.05	0.01	0.07	0.01	1500
India	731.65	100.00	1352.83	100.00	1849

Table-2 shows the share of area, production, and productivity of arecanut by state in 2019-20. Arecanut plantation area in India was 731.65 thousand hectares, with Karnataka having the largest area with 500.52 thousand hectares (68.41 percent of total area), followed by Kerala with 96.92 thousand hectares (13.25 percent of total area), Assam with 67.02 thousand hectares (9.16 percent of total area), Tamil Nadu (0.93 percent of total area), and so on. In terms of output, India's overall production was discovered to be 1352.83 thousand tonnes, with Karnataka producing 1081.84 thousand tonnes (79.97%), Kerala 92.76 thousand tonnes (6.86%) and

Assam 50.04 thousand tonnes (3.70%). Arecanut productivity was determined to be 1849 kg per hectare on average in India. With a production of 9505 kg per hectare, Andhra Pradesh is in top place, about five times higher than the national average output. This could be attributed to the availability of favorable climatic conditions, soil type, land topography, and enhanced agricultural procedures. Same results found in Sathyendra Kumar and Chandrashekar (2015) ^[8] while studying the production performance of selected horticultural commodities in Karnataka.

Table 3: Trends in area, production and productivity of arecanut in Karnataka

Year	Area(000 ha)	Production (000tonnes)	Productivity (q/ha)
2005-06	186.90	293.77	15.70
2006-07	200.68	308.65	20.00
2007-08	205.22	312.94	15.20
2008-09	213.30	325.36	15.30
2009-10	215.57	319.00	14.80
2010-11	227.72	366.18	16.10
2011-12	237.66	390.23	16.40
2012-13	246.06	400.91	16.30
2013-14	251.19	367.30	14.60
2014-15	264.77	413.62	15.60
2015-16	275.50	427.33	15.50
2016-17	268.81	425.85	15.80

2017-18	288.64	452.41	15.70
2018-19	464.58	620.35	13.40
2019-20	498.98	718.96	14.40
2020-21	562.89	863.65	15.30
Mean	288.03	437.91	15.63
CAGR	6.52**	9.43**	-0.85**
CV	0.40	0.37	0.09
R square	0.81	0.41	0.23

**Significant of 1 percent.

Source: Horticultural statics at glance 2020-21, Bengaluru.

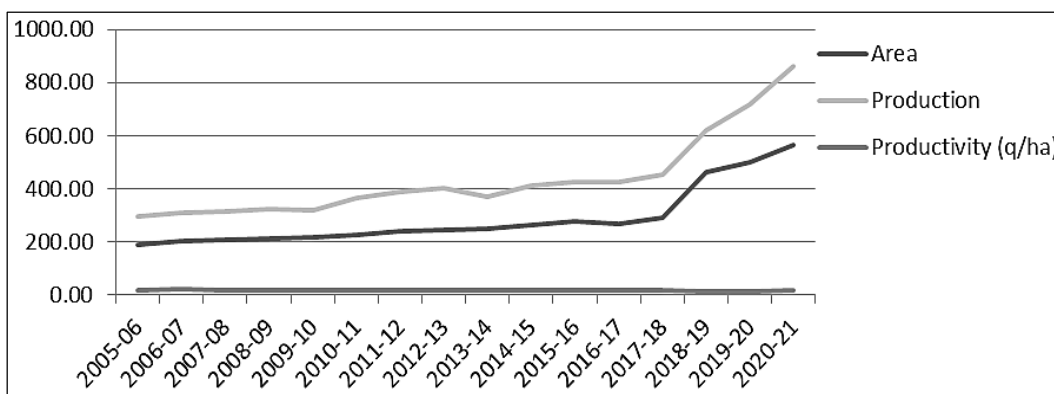


Fig 2: Trends in area production and productivity of arecanut in Karnataka

The study was carried out in Karnataka, which accounts for more over 68 percent of the total. Arecanut cultivation has continuously increased in Karnataka, from 186.90 thousand hectares in 2005-06 to 562.89 thousand hectares in 2020-21. (Table3). The state growth arte analysis showed an increase of 6.52 percent. Because of farmers are switching from field crops to arecanut because of the climate adaptability and greater knowledge of horticulture crops, particularly arecanut,

among farmers, as well as the highest profitability. Production increased by 9.43 percent, while productivity decreased by - 0.85 percent according to the growth rate analysis. Arecanut productivity in Karnataka is fluctuating due to disease and pest attack on the crop, as well as excessive rainfall during the season. Ramappa (2013) [7] while studying the Economics of Arecanut cultivation in Karnataka-A case study of Shivamogga district.

Table 4: Trends in area, production and productivity of arecanut in selected districts during (2005-06 to 2020-21)

Particulars	Area (000ha)			Production (000 tonnes)			Productivity (tonnes/ha)		
	Mean	CAGR	CV	Mean	CAGR	CV	Mean	CAGR	CV
Dakshin Kannada	44.25	9.42**	0.58	56.85	6.93**	0.51	1.36	-2.54	0.25
Chikkamagaluru	44.75	2.44*	0.23	57.08	1.05*	0.27	1.25	-0.60*	0.13
Davanagere	40.61	7.12**	0.34	70.01	8.88**	0.37	1.69	2.32*	0.19
Shivamogga	55.57	7.66**	0.39	74.72	6.59**	0.32	1.34	-0.15	0.09

**Significant of 1 percent *Significant of 5 percent

Source: Horticultural statistics at glance 2020-21, Bengaluru

The significant increase rate in Dakshin Kannada district was 9.42 percent, 2.44 percent in Chikkamagaluru, 7.12 percent in Davanagere districts, and 7.66 percent in Shivamogga district. Due to the profitability of arecanut farming and low labour costs, the area grew significantly in selected districts. With the expansion of the area, there was a considerable increase in arecanut production in selected districts. Davanagere had the greatest significant growth rate of 8.88 percent, followed by Dakshin Kannada at 6.93 percent and Shivamogga at 6.59

percent. Productivity has declined by -2.54 percent in Dakshin Kannada district, by -0.60 percent in Chikkamagaluru district, and by the same amount in Shivamogga districts. Positive growth of 2.32 percent may be noticed in the Davanagere districts. It's because the Davanagere district is free of pest and disease attacks and favorable climatic conditions. Ramappa (2013) [7] while studying the Economics of Arecanut cultivation in Karnataka-A case study of Shivamogga district.

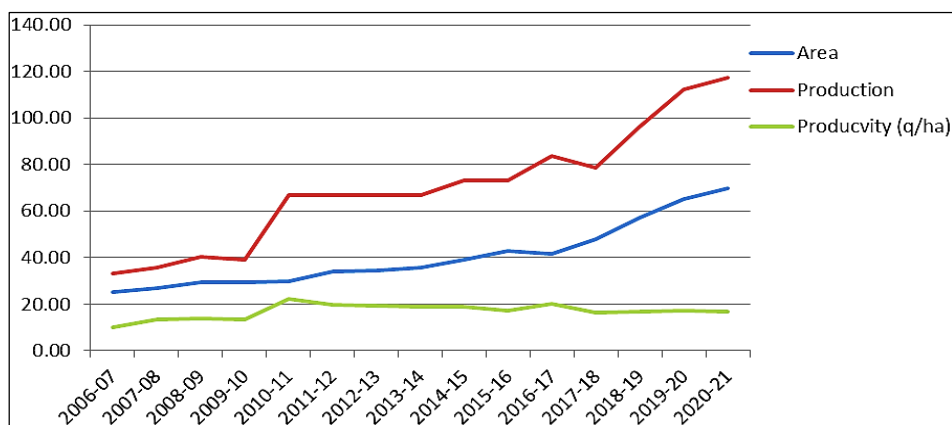


Fig 3: Trends in area, production and productivity of arecanut in Davangere district

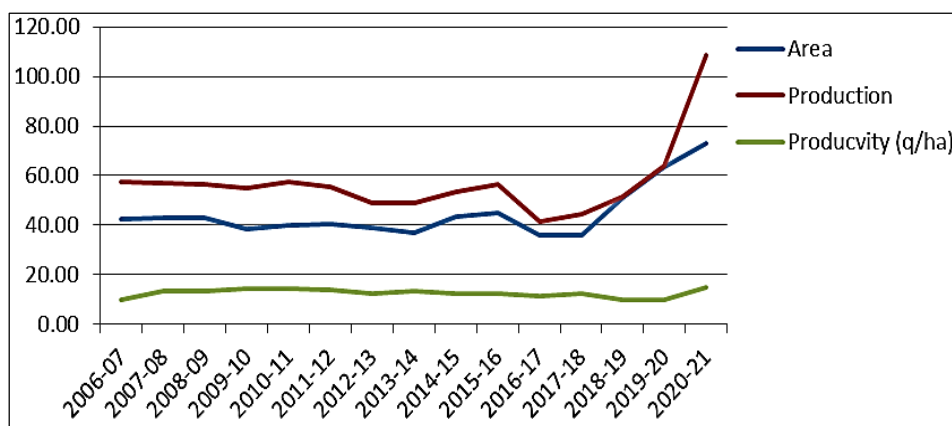


Fig 4: Trends in area, production and productivity of arecanut in Chikkamagaluru district.

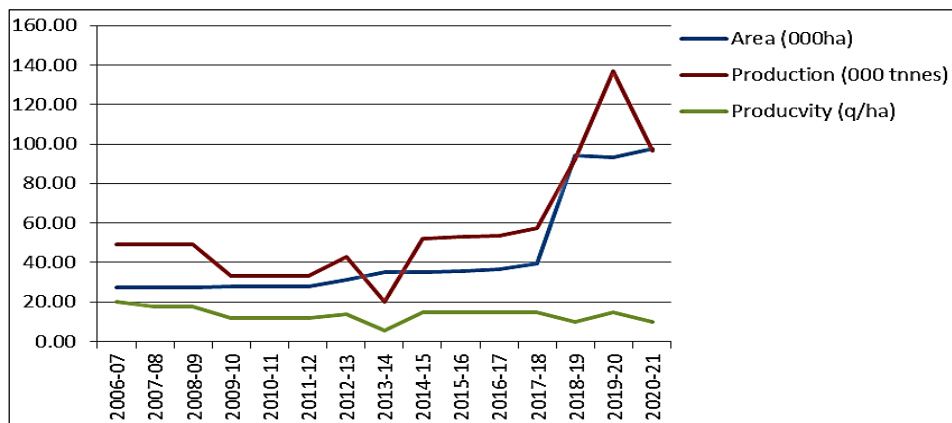


Fig 5: Trends in area, production and productivity of arecanut in Dakshin Kannada District

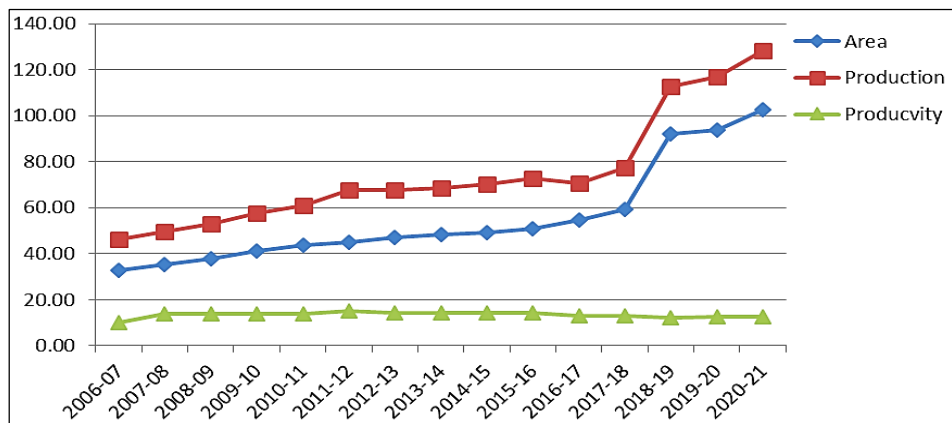


Fig 6: Trends in area, production and productivity of arecanut in Shivamogga District

Conclusion

Arecanut cultivation is one of the state's main economic activities, providing a significant source of money and employment for the population. As it is considered to be commercial crop arecanut area, production and productivity have all increased significantly over the last fifteen years, indicating that it is a major crop with a strong compound growth rate. Arecanut grew at the fastest pace in terms of area, production, and productivity during the study period. Arecanut productivity was found to be stagnant in all of the examined districts except Davanagere districts (2.32%) and Karnataka state as a whole over the study period, which was attributed to a lack of technological advancements and increased insect and disease attacks to the arecanut. As a result of the majority of farmers using native varieties in their crops, productivity growth was poor. So, in order to enhance output, extending the area under high yielding cultivars in the research region is a priority.

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