

Original Article

A Study on Trend and Growth of Cashew Nuts Production in Tamil Nadu

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Abstract - At the Global level, a result of the analysis reveals that in the year 2020, Cote D Ivoire has maintained its position as the world's largest producer of cashew nuts with 20.30 percentage of share, followed by India (18.48 %), in India level, it is found that cashew nut in area part continuous up trend throughout the study period except 2016-17, whereas production point of view continuous ups and down during the study period. The scenario is very similar in respect of productivity also. At the Tamil Nadu level, the cashew nut area of 96710 hectares in 2010-11 kept declining at a significant compound rate of 1.68 per cent and linear rate 1528.48 hectares on an average every year to reach 83977 hectares in 2019-20. Though there was not any notable growth in the production of cashew nut, the productivity in tonnes / hectare with average of 0.28 in tonnes / hectare, kept declining significantly at the rate of 3.61 per cent when compounded annually (CAGR = -3.61, $t = -0.92$, $p < 0.1$) and 0.01 tonnes / hectare on an average every years (LGR = -0.01, $t = -1.03$, $p < 0.1$) to stay at 0.31 tonnes / hectare in the end year from 0.41 tonnes / hectare in the beginning year. From the significant decline in area, production as well as in productivity, it is found that Tamil Nadu cashew nuts activities should be improved during the study period.

Keywords - Cashew nuts, Cote d ivoire, Tonnes/hectare, Coefficient of variation, Compound growth rate and linear growth rate.

1. Introduction

The cashew plant is a tropical evergreen that can grow up to 30 meters tall and has an average lifespan of 50 years. The cashew tree has a unique shape, with leaves on the top of its branches and short leaves on the trunk that provide shade for the lower branches. Cashew (*Anacardium occidentale* L.), a native of Eastern Brazil introduced to India just as other commercial crops like Rubber, Coffee, Tea, etc., by the Portuguese nearly five centuries back. The first introduction of cashew in India was made in Goa, from where it spread to other parts of the country. India is among the largest cashew-producing countries in the world. The country is the largest producer and processor of cashews in the world. The cultivation of cashew in India covers a total of 0.7 million hectares of area, and the country produces over 0.4 million metric tonnes (MT) annually. India is the largest cashew exporter, with more than 15% of the world's export share. During 2021-22, the country's exports grew by 7% to US\$ 452 million from US\$ 420 million in 2020-21. In March 2022, the country exported cashews worth US\$ 40 million, up from US\$ 33.58 million in February 2022.

2. Statement of the Problem

A paucity of trained manpower, less wages and welfare programs for labourers, moderate mechanization, shortage of quality and quantity of raw materials, and lack of policy push by the government are some of the problems faced by the cashew industry.

3. Objectives of the Study

The present research work is carried out with the following objectives:

1. Area, Production, and Productivity of cashew nuts in India
2. Area, Production, and Productivity of cashew nuts in Tamil Nadu.

4. Review of Literature

Patil Parashram. J and Shrikrishna S. Mahajan (2012) concluded that India is one of the world's largest cashew producers, processors, and exporters. It has tremendous potential for production and marketing, especially export to other countries. It is termed 'White Gold' to describe its importance in the economy. The Hilly region of Kolhapur district and its environment are suitable for cashew production. The cashew has significant importance in the life of the hilly region people of this district. Thus, the cashew-nut industry can play a decisive role in the development of the hilly region. The Kolhapur district is recognized as a hilly region area district. Thousands of people live in poverty in the hilly area of the district.

Baskara Rao (2014) has analyzed the national perspective on cashew development. The study has dwelt at length on the growth of cashew industry production and exports in India. The study highlights that cashew has been one of the sources of income and employment, and as it



fetches foreign earnings, its contribution to the national economy is quite significant.

Mahantesh Nayak and Manjunatha Paled (2018), in their study, concluded that nearly one-third of the total national cashew production is from Maharashtra only (32.93%), and productivity is also highest in Maharashtra state (1378 kg/ha). Growth in both area and production is highest in Maharashtra state, indicating immense scope to increase area and production in the state.

Soniyo Yomichan (2020), in her article, explained that India is the largest importer of unprocessed cashews from Guinea-Bissau, Almost 98% of the cashew crop is exported to India for processing. Guinea-Bissau revealed a very good competitive position in raw material production, and transformation yields potential (processing output) since more than 90% of Guinea-Bissau's cashew is processed in India- so we should also consider starting production and processing ventures there.

Haritha Paul and Ushadevi, K. N (2022), from analysis, have concluded that farmers will benefit if they tap the opportunities of increasing cashew demand in India and at the world level with government support. The government may subsidize farmers to replant the aged plants with high-yielding varieties, resulting in high productivity. With the expansion o area under cashew, cultivation is difficult to achieve due to the little wasteland available. On better soil [16], the homesteads and barren lands under the government's possession can be utilized for cashew cultivation. It will help restore the Kerala state's top position in the production of cashew nuts in India.

5. Research Methodology

5.1. Research Design

The selective sampling technique has been adopted in this article.

5.2. Source of Data

The present study is primarily based on secondary data. The data were collected from Food & Agricultural Organization (FAO), Horticulture Crops: Area and Production of Tamil Nadu for 2019-20(Final Estimates), Horticultural Statistics at a Glance, and various websites.

5.3. Period of the study

The present study covers a period of 10 years, from 2010-11 to 2019-20. The reason for confining the study to this period is the availability of the latest data on Cashew Nuts production.

5.4. Statistical Techniques

Statistical techniques like descriptive and time series analysis are used to analyze the collected data. 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 the student t-test.

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

Mean (\bar{X})

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

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

Standard Deviation (σ)

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

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

Coefficient of Variation (CV)

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

5.4.1. 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

$$\text{Log } Y = \log a + \log b X$$

Or simply say $Y = A + BX$

The least-square estimates of A and B are given by

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

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

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

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

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

5.4.2. Linear Growth Rate (LGR)

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

$$Y = a + b X$$

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

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

Table 1 reveals the country-wise cashew nuts production in the world during 2020. In that year, Cote D Ivoire has maintained its position as the world's largest producer of cashew nuts 20.30 percentage of share, followed by India (18.48 %), Vietnam Soc Rep (8.34%),

Burundi (7.20%), Philippines (6.12%), Tanzania Rep (5.57%), Benin (4.54%), Mali (4.14%), Burkina Faso (3.88%) and Guinea Bissau (3.84%).

The trend and growth of Area, Production, and Productivity for Cashew nut in India are analyzed, and the analysis results are reported in Table 2. It is understood from the table that the area in thousand hectares and production in thousand million tonnes of the cashew nut in India with an average of 1027.04 Area in thousand hectares and 732.96 Production in thousand million tonnes have reached to 1125 Area in thousand hectares and 703 Production in thousand million tonnes after testing at as high as 1125 cashew nut area in thousand hectares and 817 cashew nut production in thousand million tonnes in 2017-18 from 953 Area in thousand hectares and 675 productions in thousand tonnes in 2010-11 at a significant compound rate of 1.58 per cent (CAGR = 1.58, t =5.11, P < 0.01) and 0.49per cent (CAGR = 0.49, t =0.75, p = <0.1)

6. Results and Discussion

Table 1. Country-wise Cashew Nuts Production in the World during the year 2020

| S. No. | Country | Production (In Thousand MT) | Share (%) |
|--------|-----------------|-----------------------------|-----------|
| 1 | Cote D Ivoire | 848.70 | 20.30 |
| 2 | India | 772.78 | 18.48 |
| 3 | Vietnam Soc Rep | 348.50 | 8.34 |
| 4 | Burundi | 300.91 | 7.20 |
| 5 | Philippines | 255.91 | 6.12 |
| 6 | Tanzania Rep | 232.68 | 5.57 |
| 7 | Benin | 190.00 | 4.54 |
| 8 | Mali | 173.21 | 4.14 |
| 9 | Burkina Faso | 162.10 | 3.88 |
| 10 | Guinea Bissau | 160.63 | 3.84 |
| Total | | 3,445.42 | |

Source: Food & Agricultural Organization (FAO)

Table 2. Area, Production, and Productivity of Cashew Nuts in India during the year 2010-11 to 2019-20

| Year | Area (In'000 Ha) | Production(in '000 MT) | Productivity (in MT/HA) |
|---------|------------------|------------------------|-------------------------|
| 2010-11 | 953.00 | 675.00 | 0.7 |
| 2011-12 | 979.00 | 725.00 | 0.7 |
| 2012-13 | 992.00 | 753.00 | 0.8 |
| 2013-14 | 1011.00 | 753.00 | 0.7 |
| 2014-15 | 1029.50 | 745.00 | 0.7 |
| 2015-16 | 1035.60 | 670.90 | 0.6 |
| 2016-17 | 978.30 | 744.70 | 0.8 |
| 2017-18 | 1062.00 | 817.00 | 0.8 |
| 2018-19 | 1105.00 | 743.00 | 1.05 |
| 2019-20 | 1125.00 | 703.00 | 0.7 |
| Total | 10270.40 | 7329.60 | 7.55 |
| Mean | 1027.04 | 732.96 | 0.755 |
| SD | 56.40 | 42.72 | 0.12 |
| CV | 5.49 | 5.83 | 16.06 |
| CAGR | 1.58*** (5.11) | 0.49* (0.75) | 1.89* (1.16) |
| LGR | 16.29*** (5.10) | 3.63* (0.75) | 0.02* (1.24) |

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: Compiled from Various Horticultural Statistics at a Glance

with crisscross movements respectively. In absolute value, the rate of growth is 16.29 Area in thousand hectare (LGR = 16.29, $t = 5.10$, $p < 0.01$) and 3.63 production in thousand million tonnes (LGR = 3.63, $t = 0.75$, $p = < 0.01$) on an average every year for cashew nut area and production respectively. In the case of productivity in a million tonnes/hectare, continuous ups and down to reach 1.05 productivity in a million tonnes/hectare in the year 2018-19 and from 0.70 million tonnes/hectare in the beginning year with a significant growth rate of 1.89 per cent when compounded annually 0.02 million tonnes/hectare on an average year when measured in absolute value respectively. From the inferences of these results, it is found that cashew nuts in the area part continuously trended throughout the study period except 2016-17, whereas the production point of view continuously ups and down during the study period. The scenario is very similar in respect of productivity also.

Table 3 provides Tamil Nadu Cashew nuts' area, production, and productivity status from 2010-11 to 2019-20. As provided in the table, the cashew nut area of 96710 hectares in 2010-11 kept declining at a significant compound rate of 1.68 per cent and linear rate 1528.48 hectares on average every year to reach 83977 hectares in 2019-20. Though there was not any notable growth in the production of cashew nut, the productivity in tonnes / hectare with average of 0.28 in tonnes / hectare, kept declining significantly at the rate of 3.61 per cent when compounded annually (CAGR = -3.61, $t = -0.92$, $p < 0.1$) and 0.01 tonnes / hectare on an average every years (LGR = -0.01, $t = -1.03$, $p < 0.1$) to stay at 0.31 tonnes / hectare in the end year from 0.41 tonnes / hectare in the beginning year. From the significant decline in area, production as well as in productivity, it is found that Tamil Nadu cashew nuts activities should be improved during the study period.

Table 3. Area, Production, and Productivity of Cashew Nuts in Tamil Nadu during the year 2009-10 to 2019-20

| Year | Area (In'000 Ha) | Production(in '000 MT) | Productivity (in MT/HA) |
|---------|--------------------|------------------------|-------------------------|
| 2010-11 | 96710 | 39996 | 0.41 |
| 2011-12 | 97033 | 25532 | 0.26 |
| 2012-13 | 93302 | 19730 | 0.21 |
| 2013-14 | 92138 | 26273 | 0.29 |
| 2014-15 | 89021 | 36561 | 0.41 |
| 2015-16 | 88415 | 27094 | 0.31 |
| 2016-17 | 86280 | 10247 | 0.12 |
| 2017-18 | 85883 | 19279 | 0.22 |
| 2018-19 | 85272 | 19701 | 0.23 |
| 2019-20 | 83977 | 25690 | 0.31 |
| Total | 898031 | 250103 | 2.77 |
| Mean | 89803.1 | 25010.3 | 0.28 |
| SD | 4742.98 | 8637.99 | 0.09 |
| CV | 5.28 | 34.54 | 32.43 |
| CAGR | -1.68* (-13.48) | -5.33* (-1.36) | -3.61* (-0.92) |
| LGR | -1528.48* (-12.59) | -1390.13* (1.58) | -0.01* (-1.03) |

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.

Table 4. Top Ten District –Wise Cashew Nuts Area in Tamil Nadu during the year 2019-20

| S . No. | Districts | Area (In Hectare) | Rank |
|---------|-----------------|-------------------|------|
| 1 | Ariyalur | 30405.00 | 1 |
| 2 | Cuddalore | 29175.00 | 2 |
| 3 | Pudukkottai | 5526.00 | 3 |
| 4 | Villupuram | 3137.00 | 4 |
| 5 | Theni | 3054.00 | 5 |
| 6 | Sivagangai | 3039.00 | 6 |
| 7 | Thenkasi | 1860.00 | 7 |
| 8 | Thanjavur | 1482.00 | 8 |
| 9 | Nagapattinam | 1398.00 | 9 |
| 10 | Tirunelveli | 1067.00 | 10 |
| 11 | Other Districts | 3834.00 | 11 |
| | Total | 83977.00 | |

Source: Horticulture Crops: Area and Production of Tamil Nadu for 2019-20 (Final Estimates)

Table 5. Top Ten District –Wise Cashew Nuts Production in Tamil Nadu during the year 2019-20

| S.No. | Districts | Production (in tonnes) | Rank |
|-------|-----------------|------------------------|------|
| 1 | Ariyalur | 6993.15 | 1 |
| 2 | Cuddalore | 6126.75 | 2 |
| 3 | Villupuram | 2580.50 | 3 |
| 4 | Pudukkottai | 2541.96 | 4 |
| 5 | Thoothukudi | 1595.25 | 5 |
| 6 | Theni | 1435.38 | 6 |
| 7 | Thenkasi | 1041.60 | 7 |
| 8 | Nagapattinam | 796.86 | 8 |
| 9 | Sivagangai | 638.19 | 9 |
| 10 | Tirunelveli | 480.15 | 10 |
| 11 | Other Districts | 1459.77 | 11 |
| | Total | 25689.56 | |

Source: Horticulture Crops: Area and Production of Tamil Nadu for 2019-20 (Final Estimates)

Table 6. Top Five District –Wise Cashew Nuts Productivity in Tamil Nadu during the year 2019-20

| S.No. | Districts | Productivity | Rank |
|-------|-----------------|--------------|------|
| 1 | Thoothukudi | 3.28 | 1 |
| 2 | Villupuram | 0.82 | 2 |
| 3 | Ranipettai | 0.72 | 3 |
| 4 | Nilgiris | 0.59 | 4 |
| 5 | Nagapattinam | 0.57 | 5 |
| 6 | Other Districts | 8.92 | 6 |
| | Total | 14.90 | |

Source: Horticulture Crops: Area and Production of Tamil Nadu for 2019-20(Final Estimates)

Table 4 reveals that District – Wise Cashew nuts area in a hectare in Tamil Nadu during the year 2019-20, it may be observed that Ariyalur (304050.00 – the area in hectare) was the leading area of cashew nut followed by the Cuddalore, Pudukkottai, Villupuram, Theni, Sivagangai, Thenkasi, Thanjavur, Nagapattinam, Tirunelveli and Other Districts.

Table 5 reveals District–Wise Cashew nuts production in Tamil Nadu during 2019-20. The Ariyalur (6993.15 – in tonnes) was the leading production district of cashew nut in Tamil Nadu, followed by the Cuddalore, Villupuram, Pudukkottai, Thoothukudi, Theni, Thenkasi, Nagapattinam, Sivagangai, Tirunelveli and Other Districts.

Table 6 express that District – Wise Cashew nuts productivity in Tamil Nadu during the year 2019-20 may reveal that Thoothukudi (3.28) was the leading

productivity district of cashew nut in Tamil Nadu, followed by the Villupuram, Ranipettai, Nilgiris Nagapattinam and Other Districts.

7. Conclusion

At the Global level, a result of the analysis reveals that in the year 2020, Cote D Ivoire has maintained its position as the world's largest producer of cashew nuts 20.30 percentage of share, followed by India (18.48 percent), at India level, it is found that cashew nut in area part continuous up trend throughout the study period except 2016-17, whereas production point of view continuous ups and down during the study period. The scenario is very similar in respect of productivity also. From the significant decline in area, production, and productivity at the Tamil Nadu level, it is found that Tamil Nadu cashew nuts activities should be improved during the study period.

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