



GROWTH AND INSTABILITY OF COCONUT CULTIVATION IN INDIA

Gandhimathy. B

Assistant Professor, Department of Economics, Chikkaiah Naicker College, Erode – 638 004.

I. INTRODUCTION

Coconut as a perennial crop, one of the tropical plantations, having high economic value. Owing to the natural factor endowments, agro climatic conditions and perennial ability, the coconut is cultivated at large scale in different parts of the country particularly, coastal areas. The planting of the crop has taken up round the year on the farming systems viz., gardens and homestead. Coimbatore, Thanjavur, Tirupur, Dindugul and Kanyakumari are the major Districts for coconut cultivation in Tamil Nadu. In recent years, Krishnagiri district farmers also giving significant place for cultivating coconut.

Though the coconut palm takes two to seven years for germination its sustainable period can be extended from 60 to 100 years. Coconut farming seems to be less labour absorption but absorbs a large section of working force via their backward linkages. The prime raw material for coir industries are coconut fiber.

The coir and their related ancillary units give gainful employment opportunities to the rural areas (Rajendran and Gandhimathy 2012, 2011a&b). Coconut fiber extraction industries provide basic raw material for the industries like rope making, threats, air cooler, window curtains, bags, mats, carpets, furniture, bricks, construction works, copra processing, oil crushing and coconut husks handicrafts. Besides this, while transporting these items from the stage of raw materials – semi-finished – finished – value addition – Wholesale - retail - final consumer – second sales – repairing and so on, the workers engaged in this sector are larger and generates employment opportunities. Via exporting the value added coconut items, considerable foreign exchanges are earned. Every part of the coconut is valuable. The leaf stalk, sapth are not only used for firing, but also roofing the huts. Palm logs are used for roofing the huts. Pith of the palms (*Thennai Soru*) is eatable, tasty and healthy one. It is also possible to transplant the coconut palms with the help of bulldozers. The tender leaves of palms takes three months to shoot forth in bunches. Starting from traditional culture, the tender leaves, stalks, pith are used. Strips (*Keetru*) are used for both marriage and death ceremonies. In this context also, the coconuts have high potential, social and cultural value. This paper is divided into five sections. Section one gives the introduction, section two relates earlier studies, section three explores the objectives, section four studies analysis and last section gives the conclusion.

II. EARLIER STUDIES

Studies by Minhas and Vaithyanathan (1964 and 1965), Vidya Sagar (1977), Mehra (1981), Ray (1983), Deshpande (1988), Sharma and Joshi (1955), Prasad (1966), Prasad Eswara Manohar Rao and Narasimbha Reddy (1996), Radha and Prasad (1999), Deb, Bode and Dey (1999) Singh and Asokan (2000) ; Hazara (2001) Shaheen and Shiyani (2004), Chand and Raju (2009) ; Shivaj and others (2009); Sahu and Mishra P (2013); Joshi Singh (2015); and Anjum Shabana (2018) for different crops in different time periods. Gandhimathy (2020) explained growth and instability of rice cultivation in India. One more attempt is made in this paper to explore growth and instability of coconut cultivation in India. Exploration of growth and instability is an essential part in agricultural research works.

III. OBJECTIVES OF THE STUDY

- To find the growth rates of coconuts in India
- To study the average production of coconut in selected states.



- To measure the instability in coconuts by using Coefficient of variation, Cuddy Della Valley Index.

STATISTICAL TOOLS

Compound growth rates, coefficient of variation and Cuddy Della Valley index are used to find the results.

Compound growth rate

$$Y_t = Y_0(1+g)^t$$

$$= AB^t \text{ where } Y_0 = A \text{ and } (1+g) = B$$

$$Y_t = AB^t$$

Taking log both sides

$$\log Y = \log A + t \log B$$

$$\text{i.e } Y^* = A^* + t B^*$$

$$\text{when } \log Y_t = y^* \quad \log A = A^* \quad \log B = B^*$$

This is a simple regression line in Y^* and t . B^* can be estimated using least squares method. Then the estimate of compound growth rate can be obtained as:

$$g^{\wedge} = \text{anti log } B^{\wedge*} - 1$$

$$B^{\wedge} = \frac{\frac{\sum Y^*t - (\sum y^*)(\sum t)}{n}}{\frac{\sum t^2 - (\sum t)^2}{n}}$$

For expressing the compound growth rate in percentage terms g^{\wedge} has to be multiplied by 100. That is

$$100 g^{\wedge} = (\text{anti log } B^{\wedge*} - 1) \times 100.$$

$$\text{Co-efficient of variation} = \text{Standard Deviation} / \text{Mean} * 100.$$

Coefficient of variation and Cuddy Della Valley Index (CDVI) is used to measure the instability in the area, production and productivity of coconut cultivation. The formula for measuring the

$$CDVI = CV * \sqrt{(1-R^2)}.$$



IV. ANALYSIS

TABLE -1: Cagr of Coconut Cultivation In India Since 1950'S

Years	Area	Production	productivity
Phase I (1950-60)	1.29	4.02	2.69
Phase II(1960-70)	4.10	2.59	-1.44
Phase III (1970-80)	-0.17	-1.02	-0.85
Phase IV (1980-90)	3.47	4.69	1.18
Phase V (1990-2000)	2.34	2.70	0.35
Phase VI (2000-2010)	0.10	3.51	3.41
Phase VII (2010 – 2018)	0.87	1.88	1.00
Over all 1950 - 2018	2.01	2.80	0.77

Computed by the researcher.

Table 1 indicates compound annual growth rate of coconut cultivation in India. Growth rate of area had shown 4.10 percent 1960-70 and 3.47 percent 1980-90. Productivity rate had highest in 3.41 percent and 2.69 percent, and production shows 4.69 percent 1980-90 and 4.02 percent in 1950-60. Major coconut production states in tamil nadu are Andhra Pradesh, Karnataka, Kerala, Maharashtra, Orissa, Tamilnadu and west Bengal. The following table shows the average productivity of coconut nuts.

Table -2: Average Productivity of coconut nuts in Major States of India

Years	Andhra	Karnataka	Kerala	Maharashtra	Orissa	Tamil Nadu	West Bengal
2000- 01	--	--	--	--	--	--	--
2001-2002	1.57	-22.63	2.24	-20.70	-28.20	-0.60	-3.87
2002 - 2003	1.81	-0.07	3.84	-4.49	-13.50	-15.68	0.00
2003-04	4.33	0.10	-4.68	37.86	13.95	-12.21	0.34
2004 - 2005	0.37	-22.82	5.40	0.00	23.85	25.11	-2.87
2005-2006	-25.62	0.00	10.46	0.00	-0.66	44.59	2.80
2006 - 2007	51.77	29.09	-1.35	-45.14	0.04	10.37	10.12
2007 - 2008	-15.13	-0.37	-0.89	0.06	0.00	-10.60	-13.12
2008-09	-15.57	28.64	6.91	0.00	0.00	6.27	0.00
2009-10	7.47	7.53	7.51	7.14	7.69	7.44	7.71
2010-11	0.00	0.00	0.00	-0.02	-0.02	0.00	0.01
2011-12	39.46	10.73	2.41	0.00	28.47	10.75	1.46
2012-13	7.28	2.00	-10.42	-25.25	-6.20	-9.25	-6.89
2013-14	0.00	-17.47	3.06	0.00	-8.81	0.00	0.06
2014-15	-7.93	2.43	0.65	-0.09	0.19	0.01	0.01
2015-16	-0.55	-2.38	27.95	46.55	0.62	-9.75	0.01
2016-17	-12.93	35.27	0.24	-2.67	4.03	6.17	-0.13
2017-18	17.40	-8.19	8.36	-50.15	0.01	-4.31	-1.24
2018-19	-3.38	-31.19	-3.71	2.15	0.10	-10.95	-0.16
Average productivity	11945.89	7017.61	7507.33	9918.17	5823.22	12808.50	12963.33
Average % change	3.16	8.14	3.63	-3.35	1.26	2.84	-0.33

Computed by the researcher.

Among the major coconut producing states West Bengal stands first place accounting 12963.33 and least in Orisa 5823.2. The average percentage change has highest in Karnataka.



Measurements of Instability by Cuddy Della Valle Index (2000-18)

Table -3: Instability measurements

ATTRIBUTES	AREA	PRODUCTION	PRODUCTIVITY
C.V IN %	21.672	21.732	21.722
CDVI	14.045	21.721	21.438

Computed by the researcher.

The coefficient of variation is more in production 21.73 percent compared to area and productivity and it indicates the instability of production also lowest. By using Cuddy Della Valley Index, Instability more in area as compared with production and productivity. Cuddy Della Valley Index gives more reliable results as it uses de-trended values of coefficient of determination. Shifting cropping pattern, migration of agricultural laboureres, lack of sufficient finance are the few reasons for instability of area in coconut cultivation

V. CONCLUSION

This study pertains to measure the growth of coconut cultivation, average productivity and instability in production, productivity and area. Agricultural instability are due to several factors such as gamble of monsoon, lack of irrigation, subdivision and fragmentation of land holdings, marketing problems, financial problems natural disasters, weather conditions. Various methods are used to measure the agricultural instability such as coefficient of variation and Cuddy Della Valley Index. The CDVI attempts to de-trend the Coefficient of variation by using Coefficient of determination. Growth rate of area had shown 4.10 percent 1960-70 and 3.47 percent 1980-90. Productivity rate had highest in 3.41 percent and 2.69 percent, and production shows 4.69 percent 1980-90 and 4.02 percent in 1950-60. Major coconut production states in India are Andhra Pradesh, Karnataka, Kerala, Maharashtra, Orissa, Tamilnadu and west Bengal. Among the major coconut producing states West Bengal stands first place accounting 12963.33and least in Orisa 5823.2. The coefficient of variation is more in production 21.73 percent compared to area and productivity. By using Cuddy Della Valley Index, Instability more in area as compared with production and productivity. Cuddy Della Valley Index gives more reliable results as it uses de-trended values of coefficient of determination.

REFERENCES

1. Anjum Shabana (2018): "Growth and Instability analysis in Indian Agriculture" web source, <https://www. Research gate. Net /publication / 329208143>.
2. Chand R and Raju (2009): " Instability in Indian Agriculture during different phases of technology and policy", *Indian Journal of Agricultural Economics*, Vol 64, no(2), pp 283-88.
3. Cuddy J D A and Della VPA (1978): "Measuring the Instability of Time series data", *Oxford bulletin Economics Statistics*, Vol 40, no (10), pp79-85.
4. Deb UK, GK Bose, and MM Dey (1999), "Growth and Variability in Sugarcane production in Bangladesh", *The Asian Economic Review*, Vol 41, No 1, pp 152-165.
5. Deshpande (1988): " Growth and Instability in Maharashtra Agriculture", *Artha Vijnana*, vol 30, no 4, December.
6. Dr. B. Gandhimathy, *Growth and Instability of rice production in India*, *Social Vision*, Volume: 7 Issue: 2 July – September 2020, ISSN 2349-0519 Pp 19-126.
7. Gandhimathy B and S Rajendran (2012), *A Study of Coconut Fiber Extraction Industrial Co-operative Society in Salem District, Cooperative Perspective, October 2011 and March 2012: 44-55. (Peer Review) (Co-author)*.
8. Hazra C R (2001), *Rice production Scenario in India, and Central Interaction, Agricultural Situation in India*, Vol LVIII, No (1), 3-8.
9. Jadhav Rajendra (2020), "India's Rice Production could hit record this year as farmers expand area, livemint, epaper downloaded in 24th August 2020.
10. Joshi D and HP Singh (2015): "An Empirical Analysis of Growth and Instability in Major Spices in India, *International Journal of Agricultural Science*, Vol 7, No 2, pp 440-442. Issn 0975-3710. Issn – 0975-9107.
11. Mehra (1981): "Instability in Indian Agriculture in the context of the new technology", *research paper 25, National food policy Research institute, Washington DC, USA*.
12. Minhas B S and Vaidhyanathan (1965), "Growth of Crop output in India 1951-54 to 1958-61, *Analysis of Component Elements*", *Journal of Indian Society of Agricultural Statistics*, Vol 17, Issue 2, pp 230-252.
13. Mishra P and Others (2013): "Instability and Forecasting Using ARIMA model in Area, Production and Productivity of Onion in India", *Journal of Crop and Weed*, Vol 9, no 2, pp 96-101.
14. Mitra A K (1990): "Agricultural Production in Maharashtra: Growth and Instability in context of New technology", *Economic and Political Weekly*, vol 25, no 52, Dec 29.



15. Muruganandhi et al (2008): "A study on the direction of trade in the Indian Turmeric Exports, Markov Chain Approach- The IUP of agricultural Economics, volume V, No 4, pp 20-23.
16. Prasad Y, Eswara M Manohar Rao and Narasimbha Reddy (1996), Analysis of growth and causes for yield disparities in Rice in Karimnagar District of Andhra Pradesh, Agricultural situation in India, Vol LIII, no (2), pp 89-92.
17. Radha Y and Y Easwara Prasad (1999), Variability and instability Analysis of Area, Production and Productivity of Rice and Maize in Northern Telangana Zone of Andhra Pradesh, Agricultural situation in India, Vol LV, No 10, pp 623-636.
18. Rajendran and Gandhimathy B (2011), SWOT Analysis of Coir Co-operative marketing Society – A Case Study from Salem Region, Journal of Economic and Social Development, VII (1):57-63.(ISSN NO 0973-886X) (Co-author).
19. Ray SK (1983): "An Empirical investigation of the nature and causes for growth and instability in Indian Agriculture 1950-80", Indian Journal of Agricultural Economics, Vol 38, No 4, pp 459-474.
20. Shaheen and Shiyani (2004), Growth and Instability in Area and Production and Yield of Fruits in Jammu and Kashmir – A Disaggregate Analysis, Agricultural Situation In India, Vol LX, NO 10, PP 657-663.
21. Sharma and Joshi (1995), Performance of rice production and factors affecting acreage under rice in coastal regions of India, Indian Journal of Agricultural Economics, Vol 50, No 2, PP 153-67.
22. Shivaj and others (2009), "Trade Performance of Banana in India", International Journal of Research and Preview, Vol 6, No 5 pp 113-123. ISSN – 2345 2237.
23. Shivaji and Others (2009): "Trade Performance of Banana in India", International Journal of Research and Review, vol 6, No 5, pp 113-123, web source accessed on 2.4.20ISSn 2454-2237.
24. Vidya sagar (1977), "A component analysis of the growth of agricultural productivity in Rajasthan 1956—61 to 1969-74, Indian Journal of agricultural economics, Vol 32 no 1, January –March.