

Rubber Revolution: A Technical Analysis of Growth Trends in Kerala's Natural Rubber Industry

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Abstract

Agricultural sector has a significant status in the Indian economy since it is the largest employer of workforce and accounted for 18.8 per cent (2021- 22) in Gross Value Added (GVA) of the country (Economic Survey, 2021-22). Rubber is one of the major commercial crops produced in India. India is the fourth largest producer and second largest consumer of natural rubber in the world in 2020-21. Kerala accounts for 72.66 percent of natural rubber production in India in 2020-21 (Rubber Board, 2021). The present study analyses the growth rate in the area, production and productivity of natural rubber in Kerala. The growth rate in area, production and productivity of natural rubber in Kerala have been examined using secondary data for the period from 1970-71 to 2020-21 and exponential form of growth function has been used for the analysis. The empirical results showed that compound annual growth rate of area, production and productivity of rubber showed positive and significant growth rate during the period. The results also showed that there has been deceleration in area under cultivation, production and productivity of natural rubber in Kerala.

Keywords: productivity, deceleration, natural rubber, growth rate

Introduction

Rubber is an important plantation crop of considerable significance to the Indian economy. Rubber is a strategic industrial raw material and it is vital for national security and industrial development. Natural rubber (NR) is tapped from the bark of the tree *Hevea brasiliensis*. Rubber was introduced to India in 1873 and its commercial cultivation started in 1902. Globally and also in India, NR is mainly cultivated by smallholders and 91% of rubber planted area and 92% of production is in smallholding sector (below 10 ha) (National Rubber policy, 2019). Rubber is the main source of livelihood for about a million small holders and

0.6 million workers are engaged in rubber plantation sector in India (National Rubber policy, 2019). Rubber is an internationally traded commodity. Production of natural rubber is influenced by trends in economic growth, demand in major consuming countries and climatic factors.

Table:1 World Scenario in Natural rubber Production, 2021

Country	Production(million tonnes)	Percentage share in global production
Thailand	4.80	34.74
Indonesia	2.89	20.91
Vietnam	1.27	9.19
China	0.75	5.43
India	0.75	5.43
Malaysia	0.47	3.40
Others	2.888	20.90
World Total	13.818	100

Source: International Rubber Study Group (IRSG)

Table:1 shows world scenario in natural rubber production in 2021. Thailand, Indonesia, Malaysia, Vietnam, China and India are the leading natural rubber producers in the world. According to the International Rubber Study Group (IRSG), world NR production during 2021 was 13.818 million tonnes. India is the fourth largest producer of NR in 2021 with a share of 5.43% of world production

Table: 2 depicts world scenario in natural rubber consumption in 2021. China, India, USA, Japan, Thailand, Indonesia and Malaysia are the major consumers of NR in the world. China and India are the largest consumers with a share of 40.62 and 9.10 percent respectively of the global consumption (International Rubber Study Group, 2021). Sheet rubber, block rubber and latex account for 47%, 43% and 8% respectively in NR consumption in India. India imports around 40% of its total NR consumption. Automotive tyre sector accounts for 68% of NR consumption in India (National Rubber policy, 2019).

Table: 2 World Scenario in Natural rubber Consumption, 2021

Country	Consumption(million tonnes)	Percentage share in global consumption
China	5.67	40.62
India	1.27	9.10
U.S.A.	0.96	6.88
Thailand	0.81	5.80
Japan	0.67	4.80
Indonesia	0.58	4.16
Malaysia	0.50	3.58
Brazil	0.40	2.87
Rep. of Korea	0.34	2.44
Others	2.759	19.77
World Total	13.959	100.00

Source: International Rubber Study Group (IRSG).

Natural rubber production in India in 2021 is 715000 thousand tonnes. Kerala accounts for nearly 72.66 percent of the total production in India in 2021 (Rubber Board, 2021). Though there has been considerable regional diversification in the cultivation of NR in the recent past into non-traditional areas including the North eastern states like Tripura, Assam and Meghalaya NR still holds much importance in the regional economy of Kerala (George and Joseph 1992; Indian Rubber Statistics 2019).

Objectives of the study

The objectives of the study are

- To analyse the trends in area, production and productivity of rubber in Kerala
- To analyse the nature of growth in area, production and productivity of rubber in Kerala

Data Sources and Methodology

Secondary data on area, production and productivity of rubber published by Rubber Board, Govt. of India was used for the study. The period of study is from 1971 to 2021. The growth

performance in production, area under cultivation and productivity of rubber in Kerala were analysed using compound annual growth rate analysis.

The growth rate was analysed using the following regression equation

$$Y = a b^t e^{u_t} \quad (1)$$

Where, Y = Area / Production / Productivity

a = Intercept,

b= Regression coefficient

u_t = Disturbance term in the year 't'

By transforming equation (1) into log linear form :

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

Compound growth rate (g) is then calculated as

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

Where, g = Compound growth rate in percentage per annum

b = Antilog of log b

The standard error of the growth rate was calculated and its significance is tested with 't' statistic.

In order to examine the acceleration, deceleration or stagnation in the growth of area, production and yield of rubber cultivation, the log quadratic equation was used. The equation is expressed as $\ln Y_t = a + b.t + c.t^2 + u_t$

a, b and c in the equation are the parameters to be estimated. The linear and the quadratic time terms in the equation show the circular path in the dependent variable (Y_t). The quadratic time variable (t^2) indicates the acceleration, deceleration or stagnation in area, production and productivity of natural rubber in Kerala.

Results and Analysis

Trends in area, production and productivity of natural rubber in Kerala

Table-3 Computed annual growth rate in area, production and productivity of natural rubber in Kerala (Percentage)

Item	Period (1970-71 to 2020-21)
(1)	(2)
Area	2.37*** (18.49)
Production	4.45*** (14.79)
Productivity	2.09*** (10.72)

Note: ***1% Significant level; ** 5% Significant level; * 10% Significant level .Figures in the parenthesis are t-values

Source: computed on the basis of data from Rubber Board, Govt. of India.

The results indicated that during the period 1970-71 to 2020-21 the annual trend growth rate of area, production and productivity of natural rubber in Kerala is 2.37 percent, 4.45 percent and 2.09 percent respectively. All the trend estimates are positive and statistically significant at 1 percent level. The trend growth rate in productivity is lower compared to the trend growth rates of area and production.

Acceleration or Deceleration in India

Even though there was a positive growth rate in natural rubber production in Kerala during the period (1970-71 to 2020-21), the rate of growth changes is very crucial. Moreover, the rate of change is a major factor indicating the prospects of rubber economy of Kerala. In order to examine the acceleration, deceleration or stagnation in the growth of area and production of natural rubber cultivation, the log quadratic equation was used.

Table-4 Nature of Growth in Area under cultivation of Rubber in Kerala Period (1970-71 to 2020-21)

Variable	Coefficient	S.E	t-statistic
Constant	11.9675 ***	0.0260921	458.7
T	0.0548239 ***	0.00231485	23.68
T ²	-0.000603921***	0.00004315	-13.99
R ²	0.97		

Note: ***1% Significant level.

Source: computed on the basis of data from Rubber Board, Govt. of India

Results in Table: 4 shows that the value of coefficient of (T^2) for area is -0.000603921 and statistically significant which indicates that area under cultivation is growing at a declining rate.

Table-5 Nature of Growth in Production of Rubber in Kerala Period (1970-71 to 2020-21)

Variable	Coefficient	S.E	t-statistic
Constant	11.0279***	0.0867841	127.1
T	0.106453***	0.00769935	13.83
T^2	-0.00120981 ***	0.000143540	-8.428
R^2	0.92		

Note: ***1% Significant level.

Source: computed on the basis of data from Rubber Board, Govt. of India

Results in Table 5 show that the value of coefficient of (T^2) for production is -0.00120981 and statistically significant which indicates that production of rubber in Kerala is growing at a declining rate.

Table-6 Nature of Growth in Productivity of Rubber in Kerala Period (1970-71 to 2020-21)

Variable	Coefficient	S.E	t-statistic
Constant	6.26058***	0.0704735	88.84
T	0.0537415***	0.00625230	8.595
T^2	-0.000635325 ***	0.000116563	-5.450
R^2	0.81		

Note: ***1% Significant level.

Source: computed on the basis of data from Rubber Board, Govt. of India

Results in Table:6 indicate that the value of coefficient of (T^2) for productivity is -0.000635 and statistically significant which indicates that productivity of rubber in Kerala is growing at a declining rate.

Conclusion

The global economy is passing through hard times and there are uncertainties in the global market adversely affecting investor sentiments and consumer confidence. This would have its impact on all economic and industrial sectors. Speculative factors, oil price variations, slowing down of the economy, climatic variations resulted in volatility in natural rubber market. Adverse weather conditions especially, impact of heavy rains and floods in Kerala resulted in high level of incidence of abnormal leaf fall disease in Kerala. Many rubber growers are showing reluctance in harvesting or poor maintenance of trees because of low NR prices and high cost of production. All these have affected the production of NR in Kerala. There should be intensive efforts to increase the process of growth focusing on increasing yield since enhancing the production through expansion of area is limited due to inelastic supply of land.

References

- [1] Government of India, Indian Rubber Statistics, Rubber Board, Ministry of Commerce & Industry, New Delhi (various issues)
- [2] Harilal, K. N., & Joseph, K. J. (1998). Natural Rubber: Perils of Policy. *Economic and Political Weekly*, 1689-1690.
- [3] Lekshmi, S and George, K.T. (2003). Expansion of Natural Rubber Cultivation in Kerala: An Exploratory Analysis, *Indian Journal of Agricultural Economics*, Vol.58, No.2, April-June, 219-233.
- [4] RRIL. (2001). *Handbook of Natural Rubber Cultivation*. Rubber Research Institute of India, Kottayam
- [5] *Rubber Statistical News*, Vol . 77 . No. 12 . May 2019.