Original Research Article

Economic Analysis of Resource Use Efficiency of Turmeric in Erode District of Tamil Nadu

Abstract

Turmeric, a golden spice obtained from the rhizome of the plant *Curcuma longa*, has been used to give color and taste to food preparations since ancient times. to increase the productivity of turmeric it's essential to know the resource use efficiency of turmeric. Hence, the present study has taken up with the objective of to analyze the factors affecting yield of turmeric and study the factor use efficiency in turmeric. The study is based on the primary data collected from Erode district of Tamil Nadu. The primary data required for the study were collected through personal interview with the help of a comprehensive interview schedule. Results showed that 96 per cent of the variation in the dependent variable was explained by the independent variables selected for the study. The variables labour and irrigation were significant at one per cent level of probability. The variables quantity of rhizome, quantity of organic manure and quantity of inorganic fertilizer were significant at five per cent level of probability.

Keywords: Turmeric, Erode, Resource Use Efficiency

Introduction

Turmeric or *Curcuma longa* is a flowering plant belongs to the family Zingiberaceae.Turmeric, a golden spice obtained from the rhizome of the plant *Curcuma longa*, has been used to give color and taste to food preparations since ancient times. Traditionally, this spice has been used in Ayurveda and folk medicine for the treatment of such ailments as gynecological problems, gastric problems, hepatic disorders, infectious diseases, and blood disorders. Modern science has provided the scientific basis for the use of turmeric against such disorders. Various chemical constituents have been isolated from this spice, including polyphenols, sesquiterpenes, diterpenes, triterpenoids, sterols, and alkaloids. (Gupta et al., 2012).

Turmeric, a golden spice obtained from the rhizome of the plant *Curcuma longa*, has been used to give color and taste to food preparations since ancient times. Traditionally, this spice has been used in Ayurveda and folk medicine for the treatment of such ailments as gynecological problems, gastric problems, hepatic disorders, infectious diseases, and blood disorders. Modern science has provided the scientific basis for the use of turmeric against such disorders. Various chemical constituents have been isolated from this spice, including polyphenols, sesquiterpenes, diterpenes, triterpenoids, sterols, and alkaloids.

While turmeric is well known for its capacity to preserve food through its antioxidant mechanism, add flavor, and offer food color, its health-promoting properties are less well understood or valued. It was formerly thought to be a digestive aid, an appetite suppressant, and a treatment for jaundice. (Aggarwal et al., 2010).

Numerous preclinical investigations identified a variety of potential health benefits, including treatment for heart disease, arthritis, Alzheimer's disease, gastrointestinal disorders, and the metabolic syndrome (MetS) (Singletary 2020).India shares around 90 per cent of the global turmeric production. India has more than 333 thousand hectares under turmeric cultivation with a total production of 1222 thousand tones during the year 2021-22.(National Horticulture Board, GoI)

Maharashtra topped both in area and production with 102.67 thousand hectares and 367.84 thousand tonnes respectively. Tamil Nadu occupies fifth position with 24.17 thousand hectares with 124.92 thousand tonnes (2021-22). In Tamil Nadu Turmeric is being cultivated traditionally more than 40 years. Erode is a major turmeric belt in the state. This district is well known for turmeric production and turmeric market in the entire country.

In this background, to increase the productivity of turmeric it’s essential to know the resource use efficiency of turmeric. Hence, the present study has taken up with the objective of to analyze the factors affecting yield of turmeric and study the factor use efficiency in turmeric production.

Methodology

Data and Sample Size

The study is based on the primary data collected from Erode district of Tamil Nadu. The primary data required for the study were collected through personal interview with the help of a comprehensive interview schedule. Among the taluks in Erode district, Erode taluk was

selected purposively for the present study, since both production and processing are concentrated in this taluk. In Erode taluk, two villages from Kodumudi block and one village from Modakurichi block were selected randomly. Thirty farmers were selected from each block and thus the total sample size is 90.

Econometric Analysis

The relationship between yield of turmeric and different inputs was studied using regression analysis. After studying the scatter diagram, Cobb-Douglas production function was fitted for the data collected. The production function was estimated using ordinary least square (OLS) method. The estimated values of the regression coefficients were tested for statistical significance using t-test and F-test. Yield of turmeric per hectare was taken as the dependent variable and other variables like quantity of planting material, quantity of organic manure, quantity of inorganic manure, number of irrigations, number of weeding, cost for plant protection, cost of herbicide were considered as independent variables.

The form of regression model used was

$$Y = a X_1^{b1} X_2^{b2} X_3^{b3} X_4^{b4} X_5^{b5} X_6^{b6} X_7^{b7} U_t$$

Where,

Y = Yield of turmeric (Quintals)

X_1 = Quantity of planting material (kgs)

X_2 = Labour (man days)

X_3 = Quantity of organic manure (kgs)

X_4 = Quantity of inorganic manure (kgs)

X_5 = Irrigation (numbers)

X_6 = Cost of weed control (in Rs)

X_7 = Cost of plant protection (in Rs)

$a, b_1, b_2, \ldots\ldots b_7$ = Parameters to be estimated

U_t = Error term

Results and Discussion

The results of the production function analysis relating yield of turmeric and factors influencing it are given in Table 1.

Table 1. Results of Cobb-Douglas production function for turmeric

Dependent variable: Turmeric yield (kg / ha)

S. No	Explanatory variables	Regression coefficient	Standard error	t-value
1.	Constant	0.062651***	0.287295	2.892563
2	Quantity of rhizome (kg)	0.03733**	0.019979	1.998454
3.	Labour (man days)	0.23548***	0.063535	3.706297
4.	Quantity of organic manure (kg)	0.071756**	0.034489	2.080574
5.	Quantity of inorganic fertilizer (kg)	0.043707**	0.0297	2.071639
6.	Irrigation (numbers)	0.204082***	0.025522	7.996205
7.	Cost of weed control (in Rs)	0.005709	0.006748	0.846
8.	Cost of plant protection (in Rs)	0.001807	0.004809	0.375709

R^2= 0.96 N = 90

F = 290.38 *** Significant at 1% level

** Significant at 5% level

* Significant at 10% level

The results indicated that the R^2 (coefficient of multiple determination) was 0.96 implying that 96 per cent of the variation in the dependent variable (turmeric yield) is accounted by the independent variables selected for the study. The independent variables viz., human labour, and irrigation were significant at one per cent level of probability.

This implied that an increase in use of labour by one per cent, *ceteris paribus*, would increase yield of turmeric by 0.23 per cent and an increase in number of irrigations by one per cent *ceteris paribus* would increase the yield by 0.21 per cent.

The regression coefficient for seed material (rhizome), organic manure and inorganic fertilizer used in turmeric cultivation were significant at five per cent level of probability. An increase in organic manure by one per cent *ceteris paribus*would increase the yield 0.07 per cent from the geometric mean level. An increase in seed material applied by one percent *ceteris paribus*would increase the yield by 0.04 percent from the geometric mean level. The variables cost of weed control and cost of plant protection turned out to be non-significant.

Conclusion

Turmeric is extensively used as a spice, food preservative and colouring material in India, China and South East Asia. It also considered as auspicious and is a part of religious rituals. In view of the economic importance of turmeric in both national and farm economy and the problems faced by farmers in production and marketing of turmeric the present study was taken up with the following specific objective of analyzing the factors affecting yield of turmeric and study the factor use efficiency in turmeric production. Results showed that 96 per cent of the variation in the dependent variable was explained by the independent variables selected for the study. The variables labour and irrigation were significant at one per cent level of probability. The variables quantity of rhizome, quantity of organic manure and quantity of inorganic fertilizer were significant at five per cent level of probability.

References:

1. Achyut Pandey, Shruti Mishra, Anupam Patra, Pallavi Somvanshi, Neel Sarovar Bhavesh, Rupesh Chaturvedi (2024). Role of curcumin's phenolic –OH group in the inhibition of Helicobacter pylori CagA phosphorylation, Journal of Molecular Structure,Vol.1296, Part 2.

2. Aggarwal BB, Sundram C, Malani N and Ichikawa H.,(2010). Curcumin. The Indian Solid Gold. Current Science; 2010; 332: 16-34.
3. Amarnath J.S., and M. Brindha (2013). A Comparative Analysis of Sustainability in Crop And Dairy Production System In Tamil Nadu, India. Bangladesh J. Agric. Econs. XXXVI, 1&2 (2013) 35-51.
4. Bhatia, G.R. "Marketing Cost and Margins of Agricultural Commodities", Agricultural Marketing, 1996, 39 (1): p.8-11.
5. Ganaprakasam, A. "Contract Farming of Coleus and Turmeric in Salem District-An Economic Analysis", (Unpublished M.Sc.(Ag) thesis, submitted to Tamil Nadu Agricultural University, Coimbatore, 2006).
6. Gupta, S. C., Sung, B., Kim, J. H., Prasad, S., Li, S., & Aggarwal, B. B. (2013). Multitargeting by turmeric, the golden spice: From kitchen to clinic. Molecular nutrition & food research, 57(9), 1510-1528.
7. Kerur, K.M, Basavaraj Banakar, H.G.Shankara Murthy and M.T.Dodmani. "Efficiency of Sunflower Marketing in North Karnataka", The Bihar Journal of Agricultural Marketing, 1998, 6(2): p. 227-237.
8. Kiruthika, N. (2013). "The Economics of Production of Turmeric in India: A Case Study of Erode District of Tamil Nadu", Journal *of Innovative Research and Solutions (JIRAS). 1(2),*23-30.
9. Ladaniya, M.S., Vinod Wanjari and Bipin Chandra Mahalle. "Price Spread of Pomegranate", Indian Journal of Agricultural Economics, 2004, 58 (4): p.800-811.
10. Lal Gupta, S.B. and Salik Ram. "Resource Productivity on Paddy Farms in Chandauli block of Varanasi District", Agricultural Situation in India, 33(6): p. 373-374, 1978.
11. Marothia, D.K., S.P.Gupta and M.R.Chandrakar. "Vegetables Marketing: A Case Study of Two Markets in Chhattisgarh Region of Madhya Pradesh", The Bihar Journal of Agricultural Marketing, 1996, 4(1): p. 44-50.
12. Mohapatra, S.C. "Production and Marketing of Onion in Bolangir District of Orissa", The Bihar Journal of Agricultural Marketing, 2001, 9 (2): p. 25-26.
13. Ram Singh, Alethea Dympep, S Passah, S M Feroze, A Choudhury, Shiv Kumar, and A Jhajharia, (2020). Value chain analysis of Lakadong turmeric in Meghalaya: a micro-level study. Agricultural Economics Research Review 2020, 33 (2), 239-249.

14. Shyama Sundar and M.V. Srinivasa Gowda. "Resources Productivity and Allocation Efficiency of Irrigated Onion – An Econometric Analysis", Southern Economist, 1994, 33 (11): p.11.
15. Singletary, Keith (2020.). Turmeric: Potential Health Benefits. Nutrition Today 55(1):p 45-56, 2020. | DOI: 10.1097/NT.0000000000000392.
16. Stein, C, and J Barron. 2017. Mapping actors along value chains: integrating visual network research and participatory statistics into value chain analysis. Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Research Program on Water, Land and Ecosystems (WLE). 24p.