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A study on production process and production efficiency of turmeric cultivation in India

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Abstract
The study deals with the cultivation processing of turmeric farmers. The turmeric growers suffering from problems on various aspects like monsoon failure slacks technology, storage problem, problems with private vendors and intermediaries. The results indicated that the agricultural development strategy for developing countries needs to be geared towards increasing the productivity of land under cultivation, with reduced cost, higher efficiency use of inputs with little or no harm to both human and the environment.

Keywords: constraints, turmeric growth, costs, returns

Introduction

Prologue

India is the world kingdom of spices and largest producer as well as consumer of turmeric in the world. Turmeric is an important commercial spices crop grown in India since ancient times and it is named as "Indian saffron" It is known as the golden spices well as the spices of life. Turmeric (*Curcuma Longa* L) one of the major spice of India as well as the North Eastern hill regions of India belongs to the family Zingiberene. India turmeric is considered best in the world market. And is one of the essential spices used as an important Ingredient in culinary all over the world. (Shri. Anantkawlas M.B. Sept., 2014) [6].

Through turmeric has a 5000-year-old history in India, cultivation practices have not been adequately researched. As a result, productivity has been, at best, moderate, as this wonder spices now get global recognition for its tremendous medical value better cultivation method need to be adopted. Turmeric reached China by 700 AD, East Africa by 800 AD and West Africa by 1200. It was introduced to Jamaica in the eighteenth century and started becoming popular though out the world. Turmeric was probably cultivated at first as a dye, and then became valued as condiments as well as for cosmetic purposes. The Arab traders took turmeric to Europe in the thirteenth century during his travels in China in 1280 (Naresh Babu 2015).

Needs and Importance of Turmeric

India is the major country in producing turmeric and second largest producer in India. It is cultivated only small area of land, which was 222 thousand, hectors during 2016-17 with the production of 1132 thousand metric tons. It has higher production than any other country in the world. The export of Turmeric in India ranked at second place as per the statistics of DAC (Department of Agriculture and Cooperation), in horticulture division. Total turmeric production 99 thousand tonnes is used for domestic consumption and 1.00 per cent of the production is exported by India. Boosting up of export of turmeric will lead to bringing more foreign exchanges to the country and the farmers may get more prices subsequently it will encourage them to produce more. But behind this, there are several problems faced by the turmeric cultivators. The productivity of turmeric seems to be high in some countries of South Asia, South East Asia and East countries. However, in efficient modern methods of cultivating turmeric and lack of awareness of farmers in India are to less or productive. Hence, the researcher wanted study the problems faced by turmeric production.

In India, the state of Tamil Nadu is highest in producer of turmeric among the other states. Different varieties of turmeric are used by cultivator for cultivation of turmeric in Tamil Nadu. In Tamil Nadu, the districts of erode is famous for turmeric farming. Turmeric farmers are facing several problems like production and marketing. For this purpose researcher collected many review for identifying the problems of cultivators.

Hence, problems of production processing of turmeric need to be studied. It is needed to study important players in turmeric cultivation, especially the pre-harvesting contactors. Pre-harvest contractors occupy the turmeric cultivated land from the cultivators by paying price for turmeric before harvesting turmeric.

Review of Literature

The researcher has reviewed many secondary data from various magazines, newspapers, books, published research reports of research organizations and especially national and international journals. The statistical information was collected mainly from Annual Reports of turmeric board in India, State Wise Crop Report in Government of India, Season and Crop Report in Government of India, Spices Statistics and Horticultural Statistics in Agriculture Government of India.

Statement of Problems

On the basis of the review of the literature the researcher identifies the following problems.

The spices of turmeric growers suffering from problems on various aspects like monsoon failureslacks technology, storage problem, problems with private vendors and intermediaries. Indian agricultural is heavily dependent on monsoon. The monsoon plays a critical role in determining whether the harvest will be rich, average or poor. The structural weakness of the agriculture sector is reflected in the low level of public investment, exhaustion of the yield potential of new high yielding varieties of turmeric, imbalanced fertilizers use, low seeds replacement rate, an inadequate incentive system and post-harvest value addition.

Generally, the turmeric growers are cultivating varieties of turmeric depending on the soil conditions. Due to poor literacy, they are very weak in marketing their products. The majority of turmeric growers depend only on intermediaries to sell out their products and they yield low income.

The turmeric cultivation in Tamil Nadu does generate more employment opportunities especially among the people in rural areas. Turmeric grower has to rely mainly upon human labour for preparation of land, mulching, weeding, manuring, spraying of pesticides and harvesting. But, today unskilled and deficit workforce is a very big problem in cultivation of agro activities due to agricultural labour forces that are shifting towards the construction industry, textile industry, and other unorganized sectors.

Objectives of the Study

The following objectives are framed by the researcher on the basis of problems identified from the review of literature.

1. To study the growth performance turmeric production in India.
2. To analysis of production process and Efficiency in Turmeric Plantations.

Research Methodology

The present study is based on the secondary data and ten years of 2007-08 to 2016-17 data were collected for the study. The researcher interprets and analyzes with simple percentage tools for the study.

Production of Turmeric in India

In India, 20 states are cultivated and used turmeric for the various purposes. The states like Andhra Pradesh, Tamil Nadu, Karnataka, Orissa and West Bengal are the top four turmeric-producing states among 20 states. Maximum area under turmeric cultivation is in Andhra Pradesh (71.61 thousand ha), where production is very high i.e.371.64 thousand tones. The Tamil Nadu, Orissa, and West Bengal come in the next in order. The production of turmeric production by Andhra Pradesh accounted 31.11% of total turmeric production in India. In Tamil Nadu, turmeric is cultivated in about 67246 ha with a production of about 368411 tons with an average productivity of 5.48t/ha. The tables below explain the production of turmeric in India.

Table 1: Production of Turmeric

Sl.no	Year	Quantity (MT)	Per cent of increase and decrease
1	2007-08	794.64	-
2	2008-09	825.95	31.31
3	2009-10	807.24	-18.71
4	2010-11	1034.54	227.3
5	2011-12	1268.97	234.43
6	2012-13	1002.63	-266.34
7	2013-14	874.15	-128.48
8	2014-15	830.35	-43.8
9	2015-16	698.80	-131.55
10	2016-17	820.20	121.4

***Source*:** Compiled by The Researcher from Various Reports published by Agricultural Department of Tamil Nadu.

The above table shows that production of turmeric in India from the period of 2007-08 to 2016-17. The table reveals that production of turmeric during 2007-08 is 794.64MT and it increased to 1268.97 MT in 2011-12 but it is declined from1002MT to 820.20 MT from 2012-13 to 2016-17. However, during 2010-11 and 2011-12 production of turmeric is increased with 227.3 and 234.43per cent over the previous years. The researcher found that the following are the reason for decreasing the turmeric productions in India.

- The decrease in the area of turmeric cultivation
- Higher realization in other crop grown in the same area
- Unfavorable climatic condition for turmeric cultivation
- Increased Labor cost
- The middlemen and pre-harvest contractors' exploitation of small and medium farmers
- Non-availability of specific and high yielding varieties and
- Lack of marketing facilities

Processing of Turmeric

The turmeric crop is harvested in the form of wet rhizomes, which are not used for direct consumption on large scale. It requires certain kind of farm level processing. These rhizomes consist of two sets. The first set, is preserved and used as planting material for next season. The second set bears some fingers, the material which is actually used for processing and consumed as turmeric. The processing of turmeric takes place may be on the farmers' own field or at the processing units located at nearby fields on hiring basis. Farm level processing starts from separation of fingers from rhizomes. The produce has to pass through different operations like Cleaning, Curing, Drying, Polishing, Colouring, Grading, Milling, Packing, Storage and Marketing of the cooked fingers.

Cleaning

Harvested turmeric rhizomes (75.80 per cent) are cleaned by freshwater under pressure for removal of soil and other foreign matter.

Curing

Cleaned rhizomes are submerged in hot water in tins and boiled uniformly; cured rhizomes are then poured into a bamboo basket to drain the water and dried in yards. This

process gives attractive color and characteristics aroma to turmeric. Boiling kills the growth of fresh rhizomes, eliminates and odor, reduces the time of drying, ensures even distribution of color and gives better quality product by gelatinization of starch in rhizomes.

Drying
Sun drying takes 12-15 days, till it becomes thoroughly hand and brittle and can break with finger pressure with a metallic sound. The moisture content of the dried turmeric is kept at 8-10 per cent for better storage. Artificial mechanical drying using cress flow heated hair dryers at 65-degree centigrade is also used and found to provide best products, particularly for sliced turmeric a brighter color product than the sun-dried material.

Polishing
Polishing of rhizomes is done by rubbing with a hand under several folds of gunny cloth or using polishing drum water.

Colouring
To impart uniform bright yellow color to the turmeric, the polished rhizomes are treated with an emulsion or mixer of turmeric power and alum under continuous shaking in a basket.

Grading
Grading refers to the process of sorting of products into different lots on the basis of similar quality, turmeric is graded into bulbs and fingers in different reactions, based on their sizes, it is done either manually, which is time-consuming or using mechanical Reciprocating type grader. Grading for both rhizomes and turmeric power is performed as per India mark standards.

Milling
Usually, turmeric is milled on the home scale in flours mills, milling is done in two stages, namely breaking into small pieces and powering them to the desired fineness.

Packing
Packing is defined by archarya and Agarwal as the ‘putting of content in the market in a size rack which is convenient for the buyerswell-cured turmeric is kept in double burlap new gunny bags which are properly fumigated prior to packing, turmeric power is packed in fiber board drums, multi-wallbagsand tin containers.

Storage
Cured turmeric bags are storage in a pit made on a raised ground with sides and the bottom padded with a thick layer of paddy straw.

Marketing
Turmeric is marketed through terminal markets located in producing states and other major markets.

Production Efficiency in Turmeric Plantations
This is probably due to increase in the efficiency in use of resources in large farms together with economies of scale in production. The per hectare cost of cultivation along with the details of yield, gross returns per hectare, net returns per heactarewas estimated for the sample farms.

Cost of cultivation of turmeric
The cost of cultivation was higher in the case of marginal farmers followed by small and large farmers respectively which reflected the economies of scale. Cultivation function analysis results indicated that an increase in quantity of rhizome, labour, quantity of organic manure, irrigation and quantity of inorganic fertilizer would attribute towards an increase in yield. It was also found that quantity of rhizome, labour, quantity of organic manure and quantity of inorganic fertilizers were under-utilized. High labour cost, low price, water scarcity, price fluctuation, storage cost, low price were some of the production and marketing constraints faced by the sample farmers.

Cost and Returns Structure in Turmeric Cultivation
It was attempted to know per hectare output, cost of cultivation, returns and profitability in the cultivation of turmeric. The details in this regard are given through table II.
It is observed from table II that, the per hectare utilization of different resources and cost of cultivation. The various cost structure in the cultivation of turmeric based on total variable cost (TVC) and total fixed costs (TFC). The cost of cultivation was worked out to be Rs. 103,050/ha. The share of the variable cost in total cost was Rs. 54,550/ha. While the fixed cost was Rs. 48,500/ha. The net income was Rs. 66,950/ha.

Table 2: Cost and Returns Structure in Turmeric Cultivation (in Rs./ ha)

S. No.	Cost/acre	Conventional	
	Item of expenditure	Quantity/ unit	Cost (Rs.)
1	Operations (labour) Cleaning of field	2	600
2	Plowing	16	6400
3	Trench/bed making	2	600
4	Carrying & application of manure	8	1500
5	Rhizome treatment & planting	15	3750
6	Irrigation costs	40	12000
7	Intercultural operations (hoeing, weeding)	48	7500
8	Harvesting (labour)	50	12500
9	Transport from the field to the stockyard	4	1200
10	Boiling of fingers (Rs.60/quintal)	100	6000
11	Drying of fingers	10	1800

12	Polishing/ packaging (Rs.50/quintal)	20	1000
	Variable cost		54550
	Materials		
13	Planting materials (Rs. 12 kg)	1000	12000
14	Farmyard manure (Rs.1000/ton)	8	8000
15	Basal fertilizer		2700
16	Top dressing		3800
17	Neem cakes		4000
18	Plant protection		12230
19	Fuel wood for boiling		2500
	Fixed costs		48500
	Total costs		103050

Table 3: Economic Evaluation

Particulars	Conventional
Revenue at the rate of Rs.17/ha	Rs. 170,000 (10 tons/acre)
Cost of cultivation/ acre	Rs. 103,050
Net income/ acre	Rs. 66,950

***Source*:** Combined by The Researcher from Various Reports, Publications by Agricultural Department of Tamil Nadu.

Conclusion

Turmeric cultivation in India is very familiar because it contributes income of the nation as well as to the farmers but recent past the trend of cultivation area and the farmers are diverted to another field due to difficulties of turmeric farming. So, the study has been purposively conducted to identify the production efficiency and its process. It is found that the maintaining labour cost by farmers is impact in their farming income and it leads to losses. Hence it is important to encourage the farmers and help them to achieve good yield and income through the farming of Turmeric cultivation.

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