Economics of turmeric cultivation in Erode district of Tamil Nadu

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Received: 03-08-2018 Accepted: 17-10-2018

ABSTRACT
Turmeric is the major spice crop in India. This paper attempts to estimate the cost and economic returns of turmeric cultivation among various size categories (marginal, small, semi medium, medium and large), of farmers in Erode district of Tamil Nadu, which is one of the major turmeric growing region in India. The results of the study showed that of all the size categories, the economic returns realized by large farmers were comparatively higher.

Key words: Cost of cultivation, Economies of size, Input usage.

INTRODUCTION
India is the largest producer, consumer and exporter of turmeric in the world. Turmeric is one among the blood thinner food, which have antiplatelet, anticoagulant and fibrinolytic properties. (Kanjana et al., 2016). Indian turmeric is considered consider to be the best in the world market because of its high curcumin curcumin content. In India, turmeric is cultivated in an area of 0.18 million hectares with a production of 0.83 million tonnes in 2014-15. The major turmeric producing states are Telangana, Maharashra, Tamil Nadu, Andhra Pradesh and Karnataka. Tamil Nadu shares 14.04 per cent of the total production. In Tamil Nadu, Erode district is the largest district in turmeric cultivation by contributing 24.14 per cent of the total area and 33.37 per cent of the total production (Statistical Hand Book of Tamil Nadu, 2016, Government of Tamil Nadu). It is grown as a kharif crop.

MATERIALS AND METHODS
For the selection of samples, three stage proportional sampling was used in the study. On the basis of data obtained from Season and Crop Report of Tamil Nadu, the major crops grown were identified. All the development blocks (385) in Tamil Nadu were considered for the study. In each block, villages were chosen by crop complex approach, there by the village having the most representation of major crops was selected. In each village, 10 farmers were selected at random randomly. Thus for the 385 blocks, the total sample farm households were 3850. Out of the total sample, a sample size of 50, representing 10 farmers in each size category namely marginal, small, semi medium, medium and large was selected for turmeric crop in Erode district.

The primary data pertained to resource use, cost and returns of turmeric cultivationere collected for the period 2014-15.

Analytical Tools: The cost of cultivation for turmeric was estimated based on the cost principle adopted by the Commission for Agricultural Costs and Prices (CACP) viz. cost A1, A2, B1, B2,C1, C2& C3.(Ministry of Statistics and Programme Implementation, Government of India), The details are furnished in Table 1.

RESULTS AND DISCUSSION
The input use pattern of the turmeric cultivation is presented in Table 2. Turmeric is a labour intensive crop. It could be observed from the Table 2 that about 338 man days of human labour per ha was used for turmeric cultivation. Among the sample farms, small farms used more amount of human labour (370 man days per ha), followed by marginal farms (360 man days perha). The use of machine labour in turmeric cultivation was mainly for land preparation. The average machine labour used was 19.15 hrs per ha and it was maximum in case of large farms (23 hrs ha\(^{-1}\)).

The average seed rhizome rate adopted by sample turmeric farms was 1955 kg ha\(^{-1}\). The seed rhizome rate used among the size categories of farms were 2000 kg per ha, 1900 kg ha\(^{-1}\), 1850 kg ha\(^{-1}\), 2000 k / ha\(^{-1}\) and 2025 kg ha\(^{-1}\) respectively by marginal, small, semi medium, medium farms and large farms respectively. In fertilizer consumption, Muriate of Potash (MoP) has the highest consumption (210 kg ha\(^{-1}\)), followed by super phosphate (198.60 kg ha\(^{-1}\)) and Diammonium Phosphate (DAP) (160 kg ha\(^{-1}\)). Besides, urea, complex and ammonium sulphate were also used by sample farmers. To boost up the organic carbon level in the soil, the sample farms on an average used 2.35 tonnes per ha of farmyard manure and 1.51 tonnes per ha of neem cake. The value of input used by the sample farms of Turmeric cultivation in the district is given in the Table 3.

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It could be inferred from the Table 3 that the average input cost of turmeric cultivation was ₹184877.09 ha⁻¹ and it was the highest in case of medium farms (₹195694.41 ha⁻¹), followed by large farms (₹190880.59 ha⁻¹) and small farms (₹185193.31 ha⁻¹). The share of human labour in the total variable cost accounted for 45.31 per cent and machine labour accounted for 8.97 per cent. Rhizome accounted for a greater share in the input expenditure (30.07 per cent). Fertilizers and organic manures constitute 8.75 per cent and 2.55 per cent respectively, and plant protection chemicals shared 3.16 per cent of the total input expenditure.

The cost and returns of turmeric cultivation on various cost concept basis in Erode District is furnished in Table 4. It could be seen from the Table 4 that the average cost of cultivation of turmeric in the district was ₹245577.08 ha⁻¹ in which cost A1 was ₹173095.18 ha⁻¹ whereas cost A2 was ₹182169.58 ha⁻¹. The average productivity of turmeric in Erode district was 54.80 qtl ha⁻¹ valued at ₹302840 ha⁻¹. The turmeric productivity were 52, 54.50, 53 57.60 and 56.90 qtl per for marginal, small, semi medium, medium and large farms, respectively.

The net return from per hectare cultivation of turmeric was ₹57262.92 and it was the highest in case of large farms (₹60937.40 ha⁻¹), followed by medium farms (₹58199.61 ha⁻¹) and semi medium farms (₹55893.35 ha⁻¹).

**Table 1: Different cost concepts.**

| Cost A1 | All actual expenses in cash and kind in production by the owner farmer |
|---------|-----------------------------------------------------------------------|
| i       | Value of hired human labour                                           |
| ii      | Value of hired bullock labour                                         |
| iii     | Value of owned bullock labour                                         |
| iv      | Value of machinery labour                                             |
| v       | Hired machinery labour                                                |
| vi      | Value of seed (a) farm produced & (b) purchased                       |
| vii     | Value of insecticides and pesticides                                  |
| viii    | Value of manure (owned and purchased)                                 |
| ix      | Value of fertilizers                                                  |
| x       | Depreciation of implements and machinery                               |
| xi      | Irrigation charges                                                    |
| xii     | Land revenue, cesses and other taxes                                  |
| xiii    | Interest on working capital                                           |
| xiv     | Miscellaneous expenses                                                |
| Cost A2 | Cost A1 + rent paid for leased-in land.                               |
| Cost B1 | Cost A1 + interest on value of owned fixed capital assets (excluding land). |
| Cost B2 | Cost B1 + rental value of owned land and rent paid for leased-in land |
| Cost C1 | Cost B1 + imputed value of family labour.                             |
| Cost C2 | Cost B2 + imputed value of family labour.                             |
| Cost C3 | Cost C2 + 10 per cent of Cost C2 for managerial input of the farmer    |

**Table 2: Average resource usage of turmeric farmers in Erode District of Tamil Nadu.** (per hectare).

| Particulars         | Marginal | Small  | Semi medium | Medium | Large | District Average |
|---------------------|----------|--------|-------------|--------|-------|-----------------|
| Labour (man days)   |          |        |             |        |       |                 |
| Family Labour       | 104.00   | 110.00 | 118.00      | 129.00 | 80.00 | 108.20          |
| Hired Labour        | 256.00   | 260.00 | 203.00      | 220.00 | 213.00| 230.40          |
| Owned Machine Labour (hrs) | -      | -      | -          | 2.50   | 3.00  | 2.75            |
| Hired Machine Labour (hrs) | 14.00 | 14.00  | 16.00       | 18.00  | 20.00 | 16.40           |
| Input Application   |          |        |             |        |       |                 |
| Seed Rhizome        | 2000.00  | 1900.00| 1850.00     | 2000.00| 2025.00| 1955.00         |
| Manures (Tonnes)    |          |        |             |        |       |                 |
| Purchased           | 1.50     | 2.00   | 2.86        | 2.50   | 2.89  | 2.35            |
| Neem cake           | 0.02     | -      | -          | -      | 3.00  | 1.51            |
| Fertilizers (Kg)    |          |        |             |        |       |                 |
| DAP                 | 50.00    | 150.00 | 150.00      | 200.00 | 250.00| 160.00          |
| Urea                | 25.00    | 150.00 | 100.00      | 250.00 | 300.00| 131.25          |
| MOP                 | 150.00   | 150.00 | 200.00      | 300.00 | 250.00| 210.00          |
| Complex             | 100.00   | 115.00 | 150.00      | 200.00 | 208.00| 154.60          |
| Super phosphate     | 200.00   | 203.00 | 215.00      | 225.00 | 150.00| 198.60          |
| Ammonium sulphate   | 120.00   | 126.00 | 130.00      | 153.00 | 220.00| 149.80          |
| Particulars                        | Marginal | Small    | Semi medium | Medium     | Large     | District Average |
|-----------------------------------|----------|----------|-------------|------------|-----------|------------------|
| Labour                            |          |          |             |            |           |                  |
| Hired Human Labour                | 63500.00 | 64775.00 | 50750.00    | 52000.00   | 54250.00  | 57055.00         |
| Family Labour                     | 25796.88 | 27404.81 | 29500.00    | 30490.91   | 20375.59  | 26713.64         |
| Total Human Labour                | 89296.88 | 92179.81 | 80250.00    | 82490.91   | 74625.59  | 83768.64         |
| Hired machine Labour              | 12000.00 | 14000.00 | 14000.00    | 16000.00   | 16000.00  | 14400.00         |
| Owned machine labour              |          |          |             |            |           |                  |
| Total                             | 101296.88| 106179.81| 94250.00    | 100490.91  | 93025.59  | 99048.64         |
| Rhizome                           | 53050.00 | 52226.00 | 53000.00    | 60000.00   | 59737.50  | 55602.70         |
| FYM                               | 3000.00  | 4000.00  | 5720.00     | 5000.00    | 5780.00   | 4700.00          |
| Neem cake                         | 80.00    |          |             |            |           | 80.00            |
| Total                             | 3080.00  | 4000.00  | 5720.00     | 5000.00    | 5780.00   | 4716.00          |
| Fertilizers                       |          |          |             |            |           |                  |
| DAP                               | 1300.00  | 3900.00  | 3900.00     | 5200.00    | 6500.00   | 4160.00          |
| Urea                              | 150.00   | 900.00   | 600.00      | 1500.00    | 1800.00   | 990.00           |
| MOP                               | 2625.00  | 2625.00  | 3500.00     | 5250.00    | 4375.00   | 3675.00          |
| Complex                           | 1700.00  | 1955.00  | 2550.00     | 3400.00    | 3536.00   | 2628.20          |
| Super phosphate                   | 1920.00  | 1928.50  | 2031.75     | 2137.50    | 1434.00   | 1890.35          |
| NH\textsubscript{4}S\textsubscript{2}O\textsubscript{3} | 2280.00  | 2394.00  | 2470.00     | 2907.00    | 4180.00   | 2846.20          |
| Total                             | 9975.00  | 13702.50 | 15051.75    | 20394.50   | 21825.00  | 16189.75         |
| Plant Protection                  |          |          |             |            |           |                  |
| Total                             | 4900.00  | 5485.00  | 5768.50     | 6209.00    | 6912.50   | 5855.00          |
| Gunny bags                         | 3150.00  | 3600.00  | 3375.00     | 3600.00    | 3600.00   | 3465.00          |
| Total                             | 3150.00  | 3600.00  | 3375.00     | 3600.00    | 3600.00   | 3465.00          |
| Total variable cost               | 175451.88| 185193.31| 171765.25   | 195694.41  | 190880.59 | 184877.09        |

**Table 3:** Value of inputs used in turmeric cultivation in Erode district (Rs/hectare).

**Table 4:** Cost of cultivation of turmeric on different cost concepts basis in Erode District of Tamil Nadu (Rs/hectare).

- **Cost A1**: Wages for hired human labour
- **Cost A2**: Cost of cultivation of turmeric on different cost concepts basis in Erode District of Tamil Nadu (Rs/hectare)
CONCLUSION
Turmeric farmers in the country face a lot of constraints. Lack of knowledge about pest management is the major constraint faced by farmers in production, whereas fluctuation in market price is the major constraint in marketing. (Janailin and Tripathi, 2013) Though the yield realized by turmeric farmers in the study area was higher than the state average yield of 4027 kg ha$^{-1}$, the price realized by the farmers is lesser per quintal. The price of turmeric soared to an all-time high of Rs. 17000 per quintal during 2010. But the prices had come down and were hovering around Rs. 6400-6500 per quintal now. Lack of proper storage facilities is one among the major constraints, since it was not possible for every farmer to spend more on transportation and store their produce in the Erode regulated market. Thus, the uncertainty in price and devoid of proper storage facilities forced many farmers to sell their produce immediately after the harvest. This indicates the need for adequate storage facilities. Ensuring reasonable price to the farmers is much needed in order to hold them in turmeric cultivation. It is time to take measures so as to retain Erode as the major turmeric centre of India. Besides, the study suggested for maximum value addition, like boiling, drying and grading of rhizomes in order to achieve maximum returns in turmeric cultivation, since a minimum level of value addition will enhance the price level to a greater extent.

ACKNOWLEDGEMENT
The article is based on the study “Estimating the cost of cultivation of major crops in Tamil Nadu” done by Centre for Agriculture and Rural Development Studies” with the financial support from Government of India and Department of Economics and Statistics, Government of Tamil Nadu. The first author as the Principal Investigator of the study is thankful to Government of India and Department of Economics and Statistics, Government of Tamil Nadu for funding the study.

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