## AN ECONOMICS ANALYSIS OF TURMERIC CULTIVATION IN GUNTUR DISTRICT OF ANDHRA PRADESH

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**ABTRACT**

India is the largest producer, consumer, and exporter of turmeric in the world. Indian turmeric is considered to be of the best quality due to its high curcumin content, making it increasingly popular in medicinal and cosmetic applications. Turmeric production in India is estimated to be about 10.54 lakh tonnes, with an area of 3.05 lakh hectares and a productivity of 3656 kg/ha during 2023-24. Since the 1950s, the area under turmeric cultivation has increased by 454.91%, with a Compound Annual Growth Rate (CAGR) of 2.71%. Production has increased by 593.55% (CAGR of 4.05%), and productivity has increased by 25% (CAGR of 1.3%). The main objective of the paper is to examine the costs and returns of turmeric cultivation in Guntur district of Andhra Pradesh. Guntur district was purposively selected for the study as it ranks first in area and production of turmeric crop in the region of Andhra Pradesh. And second in area and production of turmeric in Guntur district, they are selected purposively for the study. All together 50 farmers were selected for the study, 25 from each size group. The data were analysed to fulfil the objectives, using conventional and functional analysis. The cost of producing a quintal of turmeric showed no great difference between size groups as it was Rs.1,219.68 on small farms and Rs.1,205.98 on large farms. A quintal of turmeric yielded a net return of Rs.1,132.88, Rs.1,142.99 and Rs.1,195.52 on small large and total farms respectively. The farm business analysis in turmeric revealed that farm business income, family labour income, farm investment income, net income showed direct relationship with the size of holding. However, gross income exhibited inverse relationship. The net income per rupee of investment was Rs.0.93, Rs.1.03 and Rs.0.97 on small, large and total farms respectively, which shows that turmeric cultivation is more profitable on large farms than on small farms. The break-even analysis indicated that break-even output per hectare was 11.48, 10.39, 10.84 quintals on small, large and total farms respectively. Margin of safety was 64.49 and 61.87 on small and large farms in that order. It is evident from the functional analysis that human labour, bullock labour and fertilizers were significantly contributing to the yield of turmeric.

**KEYWORDS:** Turmeric, Guntur, Farm business income, family labour income, gross income, Net income.

**INTRODUCTION**

India is popularly known as the "Spice Bowl of the World" as a wide variety of spices with premium quality is grown in the country since ancient times. Among the commodities that were traded during that period, spices occupied a major portion due to their superior quality and diversity which attracted foreigners to India. India has been well known for the trade since the period of exploration of sea routes, because of its various spices and superior quality. This was the key reason because of which

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India has invaded by the European countries and was imperialized. To such an extent India was famous for the spices.

The important varieties in India are: Alleppey Finger (Kerala) and Erode and Salem turmeric (Tamil Nadu), Rajapuri and Sangli turmeric (Maharashtra) and Nizamabad Bulb (Andhra Pradesh). In domestic and international markets Salem turmeric has established itself as the best quality and it fetches a higher price compared to the price of Erode turmeric. Turmeric, as a spice, is well known all over the world. In India, it is intimately allocated with her customs and traditions from ancient times. It was more a medicinal plant than a spice in ancient India. It was also playing an important role in the socio-religious life of the Indian people.

But today turmeric was put to several uses. Besides being used as an auspicious substance in social and religious functions in India, it is used as a spice, a dye, a cosmetic and a medicine.  Annually, 13.5lakh tones of turmeric are produced globally.  India is the world's largest producer and exporter of turmeric. It accounts for 80 per cent of total turmeric production followed by China at 8 percent, Myanmar at 4 percent, Nigeria and Bangladesh at 3percent.  India has 3.05 lakh hectares of area under turmeric during 2023-24. The annual production was estimated about 10.54 lakh tonnes, with an and a productivity of 3656 kg/ha. In India, Maharashtra tops in turmeric production with 326.97 thousand metric tons, followed by Karnataka (129.4 thousand MT) and Tamil Nadu (111.67 thousand MT).   The highest turmeric productivity was reported in Telangana (6.72 MT/ha), Puducherry (6.29 MT/ha), Karnataka (6.26 MT/ha), Arunachal Pradesh (5.1 MT/ha), and Tamil Nadu (4.5 MT/ha).  India exported 162.02 thousand tones with a value of Rs. 187.59 crores of turmeric to countries like Bangladesh, UAE, USA, Malaysia, Morocco and Iran. In Andhra Pradesh, turmeric was grown on 22.37 thousand hectares, which is 11.05 thousand hectares less compared to the previous year. The annual production is estimated to be about 38.03 thousand tonnes, with a productivity of 1.7 MT/ha during 2023- 24. The state ranks 8th in turmeric production and 22nd in productivity. Its production is concentrated in a few districts in Andhra Pradesh. One of them is Guntur with an area and production of 2476 ha and 17,221 tonnes respectively

## OBJECTIVE AND METHODOLOGY

The main objective of the paper is to examine the costs and returns of turmeric cultivation in Guntur district of Andhra Pradesh.  Guntur district was purposively selected for the study as it ranks first in area and production of turmeric crop in the region of Andhra Pradesh.  And second in area and production of turmeric in Guntur district, they are selected purposively for the study. Four villages namely Duggirala, Morampudi from Duggirala mandal, and Kollipara and Munnangi villages from Kollipara mandal are selected, which accounted for the maximum area under turmeric were cultivated. The sample turmeric cultivators were stratified into two size groups viz., small (less than 2 ha) and large (above 2 ha). All together 50 farmers were selected for the study, 25 from each size group. The data were analysed to fulfil the objectives, using conventional and functional analysis.

## COST OF CULTIVATION OF TURMERIC:

The profitability of any enterprise depends upon costs and returns. Generally costs in any economic study are discussed under two heads viz., variable costs and fixed costs. In general, variable costs alone are reckoned as the cost of cultivation by the farmers and profit and loss are worked out ignoring the overhead costs. But in economic analysis of any business enterprise, the fixed costs are also taken into account to arrive at total costs and, thereby, to compute profits.

The operational costs include the costs on human labour, bullock labour, tractor power, seed material, manures and fertilizers, irrigation, plant protection chemicals, interest on working capital. The fixed costs include the rental value of owned land, depreciation charges, land revenue and interest on fixed capital. The particulars of cost of cultivation are presented in Table-1 .The cost of cultivation of turmeric was worked out to Rs.89,519.32 per hectare for the sample as a whole. The cost of cultivation decreased with the increase in the size of holding from Rs.92,671.26 on small farms to Rs.87,143.91 on large farms Indicating inverse relationship with the size of holding. It was found that the operational

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costs accounted for a major share in the total costs on all categories of farms. The total operational costs ranged from Rs.77,341.34 (83.46 per cent) on small farms to Rs.72,053.14 (82.68 per cent) on large farms with an overall average of Rs.74,326.73 (83.07 per cent).

It is discernable from the Table -1 that the cost of human labour is the major cost component among operational costs accounting for 23 per cent of the total cost on total farms. The same was Rs.22,085 on small farms and Rs.19,645.50 on large farms accounting for 23.83 and 22.54 per cent of total cost respectively. The next important operational cost was seed cost which ranged from Rs.18,969.77 (20.47 per cent) on small farms to Rs.18,549.66 (21.28 per cent) on large farms. It was followed by manures and fertilizers (14.71 per cent), bullock labour (14.70 per cent), interest on working capital (5.79 per cent) and machine power (2.32 per cent).Fixed costs per hectare were estimated at Rs.15,329.92, Rs.15,089.87 and Rs.15,192.59 accounting for 16.54, 17.32 and 16.97 per cent on small, large and total farms, respectively. The rental value of owned land was the most important item among fixed costs, which accounted for 14.33, 15.27 and 14.86 per cent of total costs on small, large and total farms. Interest on fixed capital (1.40 per cent) and depreciation (0.68 per cent) were other fixed costs.

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**Table -1: cost of cultivation of turmeric – size-wise and component-wise**
**(In rupees per hectare)**

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| Sl. No. | Particulars | Small | Large | Total |
|---------|-------------|-------|-------|-------|
| I. | **Operational costs** | | | |
| 1. | Human labour | 22085 (23.83) | 19645.5 (22.54) | 20621 (23.03) |
| | a. Owned labour | 6215.5 (6.71) | 3019.5 (3.46) | 5627.5 (6.29) |
| | b. Hired labour | 15869.5 (17.12) | 16626.0 (19.08) | 14993.5 (16.75) |
| 2. | Bullock labour | 15228 (16.43) | 11643 (13.36) | 13164 (14.70) |
| | a. Owned labour | 4479 (0.78) | 7414.73 (8.51) | 6258.20 (6.99) |
| | b. Hired labour | 10749 (11.59) | 4337.20 (4.98) | 6905.60 (7.71) |
| 3. | Machine power | 1344 (1.45) | 2658 (3.05) | 2082 (2.32) |
| | a. Owned labour | - | 1098 (1.25) | 624 (0.69) |
| | b. Hired labour | 1344 (1.45) | 1560 (1.79) | 1458 (1.63) |
| 4. | Seed | 18969.77 (20.47) | 18549.66 (21.28) | 18839.12 (21.04) |
| 5. | Manures and fertilizers | 13119.67 | 13200.03 | 13168.89 |
| | a.Manures | 10395 (11.22) | 10672.5 (12.24) | 10563 (11.80) |
| | b. Fertilizers | 2724.67 | 2527.53 | 2605.89 |
| 6. | Plant protection chemicals | 869 (0.94) | 1000 (1.15) | 936.15 (1.04) |
| 7. | Irrigation charges | 330 (0.35) | 330 (0.37) | 330 (0.37) |
| 8. | Interest on working capital | 5395.90 (5.82) | 5026.95 (5.77) | 5185.57 (5.79) |

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|---|---|---|---|---|
| | **Total operational costs** | 77341.34 (83.46) | 72053.14 (82.68) | 74326.73 (83.07) |
| II. | **Fixed costs** | | | |
| 1. | Depreciation | 684.88 (0.73) | 531.76 (0.61) | 597.29 (0.68) |
| 2. | Land revenue | 40.00 (0.04) | 40.00 (0.05) | 40.00 (0.04) |
| 3. | Rental value of owned land | 13288 (14.33) | 13309.37 (15.27) | 13300.22 (14.86) |
| 4. | Interest on fixed capital | 1317.04 (1.42) | 1208.74 (1.39) | 1255.08 (1.40) |
| | **Total fixed costs** | **15329.92 (16.54)** | **15089.87 (17.32)** | **15192.59 (16.97)** |
| | **Total costs** | **92671.26 (100.00)** | **87143.91 (100.00)** | **89519.32 (100.00)** |

**Source: Primary data**
**Note:** Figures in parentheses indicate percentages to the respective column totals

### MEASURES OF FARM INCOME:

The cost concepts which were mostly used in the farm management studies were employed in the present study also. The cost concepts were Cost A1, Cost A2, Cost B and Cost C. Of all the cost concepts, Cost C is the most comprehensive cost as it includes both fixed and variable costs. The components included under each concept were elaborated in the chapter on methodology. The cost of cultivation of turmeric according to cost concepts was worked out and presented in Table -2. It is clear from the details furnished in the table that there was no leasing activity among the selected farmers and hence Cost A1 and Cost A2 were the same. On an average, the total cost of cultivation (Cost C) of turmeric per hectare was Rs.89,519.32 on total farms. It was higher on small farms (Rs.92,671.26) as compared to large farms (Rs.87,143.01), indicating negative relationship with farm size. The same trend was evident in case of Cost A1 and Cost B. They were Rs.71,850.72 and Rs.86,455.76 on small farms and Rs.69,605.40 and Rs.84,123.51 on large farms, respectively.

**Table-2 Cost concepts in turmeric production (Rupees per hectare)**

| S.No. | Particulars | Small | Large | Total |
|---|---|---|---|---|
| 1. | Cost A1/A2 | 71,850.72 (77.53) | 69,605.40 (79.87) | 69,336.52 (77.45) |
| 2. | Cost B | 86,455.76 (93.29) | 84,123.51 (96.53) | 83,891.82 (93.71) |
| 3. | Cost C | 92,671.26 | 87,143.01 | 89,519.32 |

**Source: Primary data**
**Note:** Figures in parentheses indicate percentages to the respective column totals

### Output and Returns from Turmeric Production

From the Table -3, it is clear that the small farms recorded a yield of 75.98 quintals of turmeric compared to large farms, 72.26 quintals. The same was 73.85 quintals on total farms. More yields on small farms may be ascribed to the more attention paid and timely operations done to the crop by small farmers. The gross returns obtained by small, large and total farms were Rs.1,78,747.50, Rs.1,76,961.85 and Rs.1,77,808.94 respectively.

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### Table-3: Output and Returns per hectare of turmeric

| S.No. | Particulars | Small | Large | Total |
|-------|-------------|-------|-------|-------|
| 1. | Yield(Qtls.) | 75.98 | 72.26 | 73.85 |
| 2. | Gross returns(Rs.) | 178747.50 | 176961.85 | 177808.94 |

**Source: Primary data**

## Costs and Returns per quintal of Turmeric

A study was taken up by Vani and Krishnaiah (1998) in Guntur district of Andhra Pradesh to assess the price integration existing between two regulated markets, Guntur and Tadikonda as central and local markets, respectively (table-4). The index of market connection was 0.82, indicating a high degree of short-run market integration. The influence of change in central market price over local market price was 0.30, which implied that one rupee change in Guntur market prices between the current and the last year's price brought about 0.30 increases in Duggirala market price during the same time period. Guntur market prices influenced Duggirala market price with an increase of 0.63 during the same period, while it would increase the difference by 0.63 at Duggirala market price during last year. Dynamic marketing is necessary for maintaining proper price structure in turmeric so as to provide remunerative prices to turmeric growers.

The particulars in Table-4 reveal that the cost of producing a quintal of turmeric was Rs.1,219.68 on small farms, Rs.1,205.98 on large farms and Rs.1,212.18 on total costs. An important aspect in farm business management and decision making relates to the manner in which available resources are allocated. A measuring rod is necessary to evaluate the optimal use of resources. To achieve this objective, various farm efficiency measures viz., gross income, net income, farm business income, family labour income, farm investment income and benefit-cost ratio were computed and presented in Table -4.

### Table -4: Costs and returns per quintal of turmeric (Rupees per quintal)

| S.No. | Particulars | Small | Large | Total |
|-------|-------------|-------|-------|-------|
| 1. | **Costs** | | | |
| a) | Variable costs | 1017.92 | 997.14 | 1006.46 |
| b) | Fixed costs | 201.76 | 208.83 | 205.72 |
| c) | Total costs | 1219.68 | 1205.98 | 1212.18 |
| 2. | **Returns** | | | |
| a) | Gross returns | 2352.56 | 2448.96 | 2407.70 |
| b) | Net returns | 1132.88 | 1242.99 | 1195.52 |

**Source:** Primary data

Gross income exhibited indirect relationship with the farm size and it was of the order of Rs.1,78,553.50, Rs.1,77,037.89 and Rs.1,77,240.26 on small, large and total farms respectively (table-5). The gross income was slightly more on small farms due to higher productivity attained by this category of farms. Though the gross income is a measure to assess the efficiency of the farm business, it alone does not help us to gauge the success of the farm business. Therefore, another measure namely net income which represents surplus over total costs was estimated. Higher net income reflects the degree of success of the farm business. The net income showed a direct relationship with the farm size. Large farms recorded a net income of Rs.89,894.81 against Rs.85,881.93 on small farms. The same was Rs.87,720.53 on total farms. This trend clearly revealed that the large farms were more efficient in the utilization of resources in the production of turmeric. Farm business income which indicates returns on owned resources like land, capital and labour was also more on large farms (Rs.1,07,432.49) as compared to small farms (Rs.1,06,702.78), which means the large farms were definitely superior to small farms in productively using these resources. Family labour income is another measure of farm efficiency representing the returns from farmers own labour and family labour. Large farms derived

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family labour income amounting to Rs.92,914.38 while small farms, Rs.92,097.74. The same on total farms was Rs.93,348.44. Farm investment income, a measure of returns to fixed capital was Rs.1,00,486.97, Rs.1,04,412.92 and Rs.1,02,275.57 on small, large and total farms respectively. Large farmers were able to secure a net income of Rs.1.03 per every rupee invested in turmeric cultivation as against Rs.0.93 by the small farmers.

### Table -5: Measures of farm income – turmeric production (Rupees per hectare)

| S.No. | Particulars | Small | Large | Total |
|-------|-------------|-------|-------|-------|
| 1. | Gross income | 178553.50 (100.00) | 177037.89 (100.00) | 177240.26 (100.00) |
| 2. | Net income | 85881.93 (48.09) | 89894.81 (50.77) | 87720.53 (49.49) |
| 3. | Farm business income | 106702.78 (59.75) | 107432.49 (60.68) | 107903.74 (60.87) |
| 4. | Farm family labour income | 92097.74 (51357) | 92914.38 (52.48) | 93348.44 (52.66) |
| 5. | Farm investment income | 100486.97 (56.27) | 104412.92 (58.97) | 102275.57 (57.70) |
| 6. | B.C Ratio | 0.93 | 1.03 | 0.97 |

**Source:** Primary data

### Break-Even Analysis:

The profitability of turmeric cultivation can also be studied with the help of a management tool known as break-even analysis, for assessing whether the farm business is moving profitability or not. The details of break even output, margin of safety for different size groups in turmeric production are presented in Table-6. The break-even output on small, large and total farms was 11.48, 10.39 and 10.84 respectively. It is evident from the table that the average yields obtained by small and large farms far exceeded the minimum output to be produced, indicating the profitability of turmeric cultivation. The margin of safety stood at 64.49, 61.87 and 63.00 on the above said categories of farms. The higher margin of safety on small farms over large farms might be due to the greater attention paid to farming by this category of farmers. The margin of safety fully confirmed the ability of the farmers to cope with any risk in this enterprise. The proportion of break-even output to the yield was 15.11, 14.38 and 14.68 on small, large and total farms respectively.

### Table-6: Break-even analysis- turmeric cultivation

| S.No. | Particulars | Small | Large | Total |
|-------|-------------|-------|-------|-------|
| 1. | Average yield in quintals per hectare | 75.98 | 72.26 | 73.85 |
| 2. | Price per quintal of turmeric | 2352.56 | 2448.96 | 2407.70 |
| 3. | Fixed costs per hectare | 15329.92 | 15089.87 | 15192.59 |
| 4. | Variable costs per hectare | 77341.34 | 72053.14 | 74326.73 |
| 5. | Total costs per hectare | 92671.26 | 87143.01 | 89519.32 |
| 6. | Variable cost per quintal | 1017.92 | 997.14 | 1006.46 |
| 7. | Break even output in quintals | 11.48 | 10.39 | 10.84 |
| 8. | Percentage of BEO to the average yield | 15.11 | 14.38 | 14.68 |
| 9. | Margin of safety | 64.49 | 61.87 | 63.00 |

**Source:** Primary data

### CONCLUSION

The value of farm assets per hectare including the value of land was Rs.2,07,325.88, Rs.2,22,875 and Rs.2,16,220.82 for small, medium and total farms respectively. The land value was to the extent of

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89.63 per cent of the total value of farm assets on total farms. The trend was more or less same on both the size groups.

The human labour requirement per hectare of turmeric cultivation was 441.7, 392.91 and 412.42 mandays on small, large and total farms respectively. The maximum labour absorption was in weeding (32.65), harvesting (27.04), irrigation (13.13), sowing (9.54) and land preparation (5.43) on total farms. The family labour use showed inverse relationship with  the farm size. The bullock labour utilization was more on small farms (50.76 cattle pair days per ha) compared to large farms (43.81 cattle pair days) showing inverse relationship with the size of holding in the cultivation of turmeric. Machine (Tractor) power exhibited direct relationship with the size of holding.

Farmers used 29.08 kg of seed, 30.18 tonnes of FYM, 43.56 kg of nitrogen, 59.31 kg of phosphorus and 53.49 kg of potash as against the recommended dose of 25 kg of seed, 25 tonnes of FYM, 60 kg of nitrogen, 50 kg of phosphorus and 60 kg of potash in turmeric cultivation.  The total cost of cultivation of turmeric crop per hectare was Rs.92,671.26, Rs.87,143.01 and Rs.89,519.32 for small, large and total farms respectively. The cost of cultivation was inversely related with the size of the farm. Out of total costs, operational costs accounted for 83.46 per cent on small farms, 82.68 per cent on large farms and 83.03 per cent on total farms. Among the operational costs, human labour (23.03%), followed by seed material (21.04%), manures and fertilizers (14.71%) bullock labour (14.70%) were the major items of expenditure. Among fixed costs, rental value of owned land was the major cost component accounting for 14.86 per cent of the total costs, followed by interest on fixed capital with 1.40 per cent. The share of the total fixed costs in total cost of cultivation of turmeric was 16.97 per cent on total farms.

The turmeric yield per hectare was 75.98 quintals on small farms and 72.26 quintals on large farms. The gross returns were Rs.1,78,747.50 and Rs.1,76,961.85 on the above farms respectively which showed an inverse relationship with the size of the farm. According to the cost concepts analysis, on an average, Cost A1, Cost B and Cost C were Rs.69,336.52, Rs.83,891.82 and 89,519.32, respectively. They were higher on small farms compared to large farms indicating inverse relationship with farm size.

The cost of producing a quintal of turmeric showed no great difference between size groups as it was Rs.1,219.68 on small farms and Rs.1,205.98 on large farms. A quintal of turmeric yielded a net return of Rs.1,132.88, Rs.1,142.99 and Rs.1,195.52 on small large and total farms respectively. The farm business analysis in turmeric revealed that farm business income, family labour income, farm investment income, net income showed direct relationship with the size of holding. However, gross income exhibited inverse relationship. The net income per rupee of investment was Rs.0.93, Rs.1.03 and Rs.0.97 on small, large and total farms respectively, which shows that turmeric cultivation is more profitable on large farms than on small farms. The break-even analysis indicated that break-even output per hectare was 11.48, 10.39, 10.84 quintals on small, large and total farms respectively. Margin of safety was 64.49 and 61.87 on small and large farms in that order. It is evident from the functional analysis that human labour, bullock labour and fertilizers were significantly contributing to the yield of turmeric. The MVP to MFC ratios were more than unity for the above variables on all size groups indicating their under utilization in the production of turmeric.

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