



Economic Analysis of Cost of Production and Profitability of Watermelon in Thiruvallur District of Tamil Nadu in India

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

The current study, "Economic Analysis of Cost of Production and Profitability of Watermelon in Thiruvallur District of Tamil Nadu in India," was conducted from 2022 to 2023. 100 farmers from the study area were chosen at random to participate in the study. Analyzing the costs, returns, profitability, marketing, and production of watermelons in the study area were the study's primary goals. 100% of the farmers used drip irrigation to grow watermelons and sowed seeds during the rabi season. The majority of farmers in the study area employed inputs that were above what was advised for watermelon cultivation. Pre-structured interview schedules were used to collect the data. The survey indicated that marginal farmers, small and semi-medium farmers, and medium farmers, respectively, spent Rs 155691.8, Rs 154302.5, Rs 149897, and Rs 148131.5 per hectare on watermelon farming on average. On marginal, small, semi-medium, and medium farms, the input-output ratio concerning cost C was (1:1.36), (1:1.39), (1:1.41), and (1:1.44), respectively. The cost of production lowers as farm size grows.

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1. INTRODUCTION

The scrambling and trailing watermelon vine, *Citrullus lanatus* var. *lanatus*, belongs to the Cucurbitaceae family and is native to southern Africa. Large, spreading perennial with pinnately lobed leaves that are rough and hairy and white to yellow flowers. It is cultivated for its sizable edible fruit, commonly referred to as watermelon, and classified botanically as a pepo, which is a unique type of berry with a hard rind and no internal division. The fruit has smooth, hard skin that is typically green with dark green stripes or yellow spots. The inside flesh is typically deep red to pink, although there are also occasionally orange, yellow, or white seeds. Breeders have worked hard to create disease-resistant cultivars and a "seedless" variant with just white, edible seeds. Many varieties start producing full fruit 100 days after the crop is planted. The fruit's rind can be cooked, and it can be consumed raw or pickled. Water content in watermelons is 92% by weight. It helps relieve your thirst on scorching summer days. It is a gift from nature to escape the oppressive summer heat. It is a wonderful fruit that is beneficial to human skin. It maintains the skin calm, radiant, and fresh and serves as a natural moisturizer and toner. It has a good amount of potassium, which aids in regulating blood pressure and protects the health of the heart [1]. In the past, watermelon farming in India was only permitted along the banks of the Yamuna, Ganges, and Narmada rivers in the north and the Kaveri, Krishna, and Godavari rivers in the south. It is currently grown in practically all regions of the nation. For poor and marginal farmers with limited land, it is a rapidly expanding cash crop. In India, watermelon is primarily grown in large states like Uttar Pradesh, which produces 544.57 thousand tonnes of it in an area of 11.65 thousand hectares, Karnataka, which produces 357.03 thousand tonnes in an area of 11.11 thousand hectares, Tamil Nadu, which produces 248.63 thousand tonnes on an area of 6.77 thousand hectares, Odisha, which produces 245.04 thousand tonnes on an area of 12.69 thousand hectares, and Andhra Pradesh, which [2].

2. RESEARCH METHODOLOGY

One of the 38 districts in Tamil Nadu, Thiruvallur, is where the study was carried out. Sholavaram block was chosen for this study out of the 14 blocks in the Thiruvallur district. Seven villages

were chosen from that block: Chinnaamullaivoyal, Periyamullaivoyal, Mabuskanpettai, Thachur, Thirunilai, and Valudigaimedu. With the assistance of the head of the village in each chosen village in the block, a list of all watermelon farmers and respondents is created. Farmers and respondents are then divided into 4 size groups according to the amount of land they own, and 10% of the farmers in each village are chosen at random from each of the various size groups. 100 farmers were randomly chosen to provide data for the study.

3. RESULTS AND DISCUSSION

The study was carried out in Tamil Nadu's Thiruvallur district. The required information was gathered from the sample farmers dispersed throughout the blocks in the aforementioned district. The outcomes and discussions for various targets will be covered in the current chapter. The chapter is divided into several subsections in accordance with the study's goals.

To research the cost and return per hectare as well as the input-to-output ratio of various farm size groups. The utilization of resources and cost of growing watermelon per hectare in various farm size groups: The following table includes information on the economics of watermelon, including the cost of production, returns per hectare, and input-to-output ratios for marginal, small, semi-medium, and medium-sized farm groups.

According to Table 1, the total cost of growing the watermelon crop was Rs. 151230.2 per hectare. The portion of material input costs, which came to Rs. 105603, accounted for 69.82 percent of the total cost. Human labour use made a significant contribution to the whole cost, contributing Rs 31629 or 20.91 percent of it. The power use in the form of tractor hours made up the smallest portion of the entire cost of watermelon production, among the materials input cost, manure, and fertilizer shared the most (13.14%), followed by seeds (4.14%), irrigation (2.25%), and plant protection chemicals with a percentage of 9.19. Family labour utilization was calculated to have an input value of Rs. /Ha. 7688. In marginal, small, semi-medium, and medium farm groups, the cost of growing watermelon per hectare is, correspondingly, Rs. 155691.8, Rs. 154302.5, Rs. 149897, and Rs.

148131.5. and the cost of cultivation is 151230.2 per hectare on average. The table clearly shows that the cost of watermelon cultivation per hectare is higher in the marginal size group than in the small and semi-medium farm groups, then in the medium size group. The major cost of labour used in watermelon production is found to

be Rs. 31629 per hectare in the marginal, small, semi-medium, and medium groups, respectively [3]. Cost of cultivation of watermelon crop per hectare in different size of farm groups: The Table 2 details watermelon crop production costs per hectare for various farm size groupings, with costs A, B, C1, and C2.

Table 1. Resource use and cost of cultivation of watermelon crop per hectare in different sizes of farms group

| S. No. | Particular | Size of farm groups | | | | Average |
|---------------------------|--|---------------------|-------------------|------------------|-------------------|-------------------|
| | | Marginal | Small | Semi-medium | Medium | |
| 1 | Land preparation | 20349 (13.07) | 17723 (11.48) | 14256 (9.51) | 12287 (8.29) | 15830 (10.46) |
| 2 | Cost of mulching sheet | 14824 (9.52) | 14824 (9.60) | 14825 (9.89) | 14825 (10.01) | 14825 (9.80) |
| 3 | Cost of seed | 6293 (4.04) | 6266 (4.06) | 6266 (4.18) | 6266 (4.23) | 6273 (4.14) |
| 4 | Manures & fertilizers | 19643 (12.61) | 19700 (12.76) | 19771 (13.18) | 19770 (13.34) | 19721 (13.04) |
| 5 | Cost of PPC | 13912 (8.93) | 13912 (9.01) | 13912 (9.28) | 13912 (9.39) | 13912 (9.19) |
| 6 | Cost of irrigation | 4500 (2.89) | 4000 (2.59) | 3500 (2.33) | 3000 (2.02) | 3413 (2.25) |
| 7 | Hired human labour | 31629 (20.31) | 31629 (20.49) | 31629 (21.10) | 31629 (21.35) | 31629 (20.91) |
| 8 | Interest on working capital | 7780 (4.99) | 7563 (4.90) | 7291 (4.86) | 7118 (4.80) | 7392 (4.88) |
| 9 | Depreciation | 2403 (1.54) | 2689 (1.74) | 2700 (1.80) | 3359 (2.26) | 2788 (1.84) |
| 10 | Land revenue | 86 (0.05) | 86 (0.05) | 86 (0.05) | 86 (0.05) | 86 (0.05) |
| 11 | The rental value of land | 11000 (7.06) | 12500 (8.10) | 12500 (8.33) | 12500 (8.43) | 12125 (8.01) |
| 12 | Interest on fixed capital | 1619 (1.03) | 1833 (1.18) | 1834 (1.22) | 1913 (1.29) | 1800 (1.19) |
| 13 | Owned labour | 7500 (4.81) | 7550 (4.89) | 7700 (5.13) | 8000 (5.40) | 7688 (5.08) |
| 14 | 10 percent of cost c1. As managerial charges | 14153.8 (9.09) | 14027.5 (9.09) | 13627 (9.09) | 13466.5 (9.09) | 13748.2 (9.09) |
| Total input cost (cost c) | | 155691.8 | 154302.5 | 149897 | 148131.5 | 151230.2 |

(Figures in parenthesis indicate percentage to total)

Table 2. Cost Concepts in watermelon crop per hectare in different size of farms group

| Sl. No | Cost concepts | Size of farms group | | | | Sample average |
|--------|---------------|---------------------|----------|-------------|----------|----------------|
| | | Marginal | Small | Semi-medium | Medium | |
| 1. | Cost A | 121419 | 118392 | 114236 | 112252 | 115869 |
| 2. | Cost B | 134038 | 132725 | 128570 | 126665 | 129794 |
| 3. | Cost C1 | 141538 | 140275 | 136270 | 134665 | 137482 |
| 4. | Cost C2 | 155691.8 | 154302.5 | 149897 | 148131.5 | 151230.2 |

Table 3. Costs and returns in watermelon crop per hectare in different size of farms group

| Sl. No. | Particular | Size of Farm groups | | | | Average |
|---------|----------------------------------|---------------------|----------|-------------|----------|----------|
| | | Marginal | Small | Semi-medium | Medium | |
| 1. | Watermelon production in quintal | 311 | 315 | 318 | 317 | 315 |
| 2. | Total cost | 155691.8 | 154302.5 | 149897 | 148131.5 | 151230.2 |
| 3. | Gross income | 211838 | 215916 | 212493 | 213706 | 213487 |
| 4. | Net income | 56146.2 | 61613.5 | 62596 | 65574.5 | 62256.8 |
| 5. | B: C ratio | 1:1.36 | 1:1.39 | 1:1.41 | 1:1.44 | 1:1.41 |

Table 2 shows how cost concepts for farms of various sizes are group by hectare. Cost A was Rs. 121419/ha, Rs. 118392/ha, Rs. 114236/ha, and Rs. 112252/ha, respectively, for marginal, small, semi-medium, and medium-sized farms. Cost A in the groups of marginal, small, semi-medium and medium-sized farms was Rs. 134038/ha, Rs. 132725/ha, Rs. 128570/ha, and Rs. 126665/ha, respectively. Cost B was therefore marginally raised. Cost C1 was Rs. 141538/ha, Rs. 140275/ha, Rs. 136270/ha, and Rs. 134665/ha, respectively, for marginal, small, semi-medium, and medium-sized farms. Medium-sized farms had the lowest cost (Rs. 148131.5/ha) while marginal-sized farms had the greatest cost (Rs. 155691.8/ha). In the group of farms of various sizes, the sample average for Costs A, B, C1, and C2 was Rs. 115869/ha, Rs. 129794/ha, Rs. 137482/ha, and Rs. 151230.2/ha [4-7].

Cost and returns in watermelon crop per hectare in different size of farm groups: The output of watermelons in quintals, cost of production, gross return, net return, and benefit-cost ratio are all explained in the Table 3.

According to Table 3, the watermelon's expected gross return was Rs/ha 213487 and its actual net return was Rs/ha 62256.8. The return on investment was 1.41 rupees or benefits. The gross return of watermelon varied across farm sizes, ranging from marginal to medium farms at Rs/ha 211838 to Rs/ha 213706. For small to large farms, the obtained net return varied from Rs/ha 69550 to Rs/ha 78241. Marginal, small, semi-medium, and medium farm sizes have benefit-cost ratios of 1:1.36, 1:1.39, 1:1.41, and 1:1.44, respectively [8-10]. However, with an average of 315 quintal per hectare, watermelon output per quintal in marginal, small, semi-medium, and medium farm sizes is 311, 315, 318, and 317, respectively. The average net return per hectare is determined to be Rs. 65574.5, suggesting that the production of watermelons in the research area is very

profitable. According to research, medium farms were more productive than semi-medium, marginal, and tiny farms due to good administration and oversight throughout the cultivation of watermelons [11,12].

4. CONCLUSION

The research demonstrates that the district of Thiruvallur produces watermelons. The primary goal of the study is to examine the economics of watermelon production costs and profits. In semi-medium farms as opposed to marginal-size farms, small-size farms, and medium-size farms, watermelon farming is more economically viable. This will be the means via which watermelon farming can become more profitable. The high cost of labour was discovered to be one of the main constraints.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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