

A STUDY ON COST, RETURNS AND PROFITABILITY OF MANGO CULTIVATION IN SALEM DISTRICT

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ABSTRACT

Mango is one of the important fruit crops cultivated in Tamil Nadu and provides income and employment opportunities to a large number of farming households. Salem District is one of the important mango-producing regions of Tamil Nadu, where mango cultivation is undertaken under both irrigated and rain-fed conditions. The present study examines the cost, returns and profitability of mango cultivation in Salem District. The study focuses on the different components of cultivation expenditure, gross returns, net returns and profitability of mango farming. A sample survey approach may be adopted to collect primary data from mango growers through a structured interview schedule. The major costs considered in the study include land preparation, planting material, manure and fertilizers, plant protection, irrigation, labour, harvesting, transportation and other farm expenses. The study is expected to identify the major factors influencing profitability and the constraints faced by mango growers. The findings can help farmers, agricultural extension agencies and policymakers formulate appropriate strategies for improving productivity, reducing production costs and enhancing the economic viability of mango cultivation in Salem District.

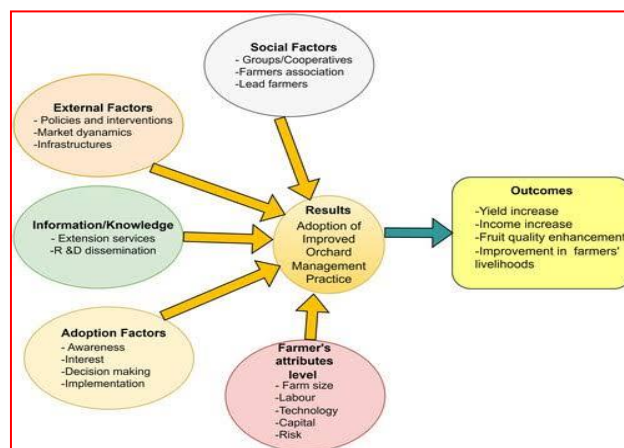
Keywords: Mango cultivation, Cost of cultivation, Gross returns, Net returns and Profitability and Benefit-Cost Ratio

INTRODUCTION

Agriculture continues to play an important role in the rural economy of Tamil Nadu by providing employment, income and livelihood opportunities. Horticultural crops, particularly fruit crops, have gained importance because of their increasing market demand and income-generating potential. Among fruit crops, mango occupies an important position due to its nutritional value, consumer preference and commercial significance. Mango cultivation provides income to farmers through the sale of fresh fruits in local markets, wholesale markets and other marketing channels. Salem District has favourable agro-climatic conditions for the cultivation of mango. Different varieties of mango are cultivated by farmers depending upon soil characteristics, water availability, market demand and climatic conditions. Mango cultivation is, however, associated with considerable expenditure on labour, irrigation, fertilizers, plant protection, harvesting and transportation. In addition, fluctuations in market prices, climatic variations, pest and disease attacks and post-harvest losses influence the profitability of mango farming.

Therefore, an economic assessment of mango cultivation is essential to understand whether the income generated from the crop adequately compensates farmers for the resources employed. A study of cost and returns provides information regarding the financial performance of mango cultivation and helps identify opportunities for improving farm profitability.

Figure: 1



FACTORS INFLUENCING PROFITABILITY

Several factors can influence the profitability of mango cultivation in Salem District.

Yield: Yield refers to the quantity of agricultural produce obtained from a specific area of cultivated land during a particular crop season. It is an important indicator of farm productivity and directly influences the income and economic well-being of farmers. The level of yield depends on several factors, including soil fertility, quality of seeds, climatic conditions, availability of irrigation, application of fertilizers and pesticides, labour efficiency, and adoption of improved cultivation practices. Higher yields enable farmers to obtain greater returns from the same area of land and improve their capacity to meet production costs. However, inadequate rainfall, pest attacks, diseases, poor-quality inputs, and inappropriate farm management may reduce productivity. Therefore, improving yield through modern technologies, efficient resource management, and scientific cultivation practices is essential for increasing agricultural profitability and ensuring sustainable farming.

Market Price: Market price refers to the prevailing price at which agricultural produce is bought and sold in the market at a particular period. Agricultural prices are influenced by various factors, such as demand and supply, seasonal production, quality of produce, transportation costs, market conditions, government policies, and the activities of intermediaries. Fluctuations in market prices can create uncertainty for farmers, particularly when production costs remain high. A favourable market price enables farmers to recover their cultivation expenses and earn reasonable profits, whereas low prices may result in financial losses. Access to reliable market information, regulated markets, farmer producer organisations, direct marketing, and appropriate storage facilities can help farmers obtain better prices. Thus, market price is an important factor influencing farmers' economic decisions and agricultural sustainability.

Labour Cost: Labour cost represents the expenditure incurred by farmers for employing human labour in various agricultural operations. It generally includes wages paid for activities such as land preparation, sowing, transplanting, weeding, irrigation, application of fertilizers and pesticides,

harvesting, threshing, and post-harvest handling. Labour constitutes an important component of total cultivation expenditure, particularly for crops that require intensive manual operations. Increasing wage rates, shortage of agricultural labourers, and seasonal migration can substantially increase production costs and reduce farm profitability. Farmers may respond to rising labour costs by adopting mechanisation, improved farming equipment, or labour-saving technologies wherever economically feasible. The availability and productivity of labour also influence the timely completion of farm operations, which can ultimately affect crop yield and quality. Therefore, effective management of labour resources is essential for controlling production costs and improving the economic efficiency of agricultural activities.

Irrigation: Irrigation refers to the artificial supply of water to agricultural land to support crop growth when rainfall is inadequate or irregular. It is an essential component of agricultural production, particularly in areas where farming depends heavily on seasonal rainfall. Adequate irrigation helps farmers maintain soil moisture, improve crop growth, increase productivity, and reduce the risks associated with drought and rainfall variability. Common sources of irrigation include wells, borewells, canals, tanks, ponds, and other water resources. The cost and availability of irrigation may vary according to the source of water, energy requirements, infrastructure, and climatic conditions. Efficient irrigation methods such as drip and sprinkler systems can help conserve water and improve its utilisation. However, excessive groundwater extraction and inefficient water management may create long-term sustainability problems. Hence, reliable and efficient irrigation is important for improving agricultural productivity and reducing production risks.

Input Management: Input management refers to the systematic planning, selection, utilisation, and monitoring of agricultural inputs required for crop production. Major farm inputs include seeds, fertilizers, pesticides, plant-protection chemicals, organic manure, water, machinery, and labour. Efficient input management helps farmers use resources appropriately, control cultivation expenses, and improve crop productivity. The selection of high-quality seeds and suitable varieties is particularly important for achieving better yields. Similarly, the balanced application of fertilizers and pesticides can support healthy crop growth while reducing unnecessary expenditure and environmental damage. Poor input management may result in excessive costs, declining soil fertility, pest resistance, and lower profitability. Farmers can improve input management through soil testing, scientific recommendations, proper timing of application, access to quality inputs, and adoption of modern agricultural practices. Therefore, effective input management is essential for increasing resource-use efficiency, reducing production risks, and enhancing the overall profitability of farming.

Marketing Channel: Marketing channel refers to the route through which agricultural produce moves from the farmer to the final consumer. Direct marketing can enable farmers to obtain a larger share of the consumer price by reducing intermediary involvement, while traditional channels may provide easier access to markets and quicker disposal of produce. However, dependence on intermediaries can sometimes reduce farmers' bargaining power. Improved market infrastructure, digital marketing platforms, collective marketing, storage facilities, and better market information can strengthen farmers' negotiating capacity and help them obtain more remunerative prices.

PROBLEMS FACED BY MANGO GROWERS

1. Fluctuation in Mango Prices: Fluctuation in mango prices is one of the major problems faced by mango growers. Mango prices vary considerably according to season, demand, supply, quality, variety, and market conditions. During the peak harvesting period, large quantities of mangoes enter the market simultaneously, often resulting in a decline in prices. Farmers who are unable to store their produce are compelled to sell immediately, even at lower prices. Price fluctuations create uncertainty

regarding farm income and make it difficult for growers to plan production and investment decisions. Dependence on local markets and intermediaries may further reduce farmers' bargaining power. Better market information, storage facilities, processing opportunities, and collective marketing can help farmers obtain more stable and remunerative prices.

2. High Labour Cost: High labour cost is an important constraint affecting the profitability of mango cultivation. Mango production requires labour for activities such as land preparation, pruning, weeding, application of fertilizers and pesticides, harvesting, grading, sorting, and packing. Increasing agricultural wages and the shortage of skilled workers have raised cultivation expenses for mango growers. Labour requirements are particularly high during the harvesting season, when timely collection of mature fruits is essential to maintain quality and reduce losses. In some areas, the migration of rural workers to urban centres creates additional labour shortages. The increased dependence on hired labour reduces farmers' net returns. Adoption of suitable mechanisation, improved farm management practices, and availability of trained agricultural workers can help reduce the impact of high labour costs.

3. Pest and Disease Problems: Pest and disease problems are significant constraints in mango cultivation because they can adversely affect both yield and fruit quality. Mango trees are vulnerable to various pests and diseases that may attack leaves, flowers, shoots, and fruits at different stages of crop development. Infestation can lead to premature fruit dropping, reduced fruit size, poor appearance, and lower market value. Farmers often depend on pesticides and other plant-protection measures to control these problems, which increases cultivation expenditure. Excessive or improper use of chemicals may also create environmental and health concerns.

4. Irregular Rainfall: Irregular rainfall is an important climatic constraint affecting mango production. Mango cultivation depends significantly on suitable rainfall conditions, particularly during flowering, fruit development, and other critical stages. Changes in the timing, intensity, and distribution of rainfall can negatively influence flowering, fruit setting, fruit growth, and overall productivity. Excessive rainfall may increase the incidence of pests and diseases, while insufficient rainfall can cause moisture stress and reduce fruit development. Unpredictable rainfall also makes it difficult for farmers to plan irrigation and other agricultural operations effectively. Climate variability has increased uncertainty regarding crop performance and farm income. Mango growers can reduce the impact of irregular rainfall through efficient irrigation systems, water conservation measures, mulching, improved drainage, and adoption of suitable climate-resilient cultivation practices.

5. Inadequate Irrigation Facilities: Inadequate irrigation facilities are a major constraint for mango growers, particularly in areas where agricultural production depends heavily on rainfall. Mango trees require adequate moisture for healthy growth, flowering, fruit development, and maintaining productivity during dry periods. Limited access to wells, borewells, canals, tanks, or other reliable water sources can affect crop performance and increase dependence on uncertain rainfall. Farmers with insufficient irrigation facilities may experience moisture stress during critical stages of production, resulting in lower yield and poor fruit quality. The cost of installing irrigation infrastructure can also be difficult for small and marginal growers. Development of farm ponds, water harvesting structures, drip irrigation, and efficient water-management practices can improve water availability and support sustainable mango production.

6. High Cost: Fertilizers are necessary for maintaining soil fertility and supporting healthy plant growth, while pesticides are commonly used to manage pests and diseases. Rising prices of agricultural inputs can place considerable financial pressure on mango growers, particularly small and marginal farmers with limited resources. Farmers may sometimes reduce the quantity or frequency of

input application because of financial constraints, which can negatively affect crop productivity and quality. Dependence on purchased inputs also increases production risks when market prices for mangoes are low. Soil testing, balanced fertilizer application, integrated pest management, use of organic inputs, and access to affordable quality inputs can help reduce this constraint.

7. Lack of Adequate Storage Facilities: Lack of adequate storage facilities is an important post-harvest constraint faced by mango growers. Mango is a highly perishable fruit, and improper storage can result in rapid deterioration of quality and increased spoilage. This reduces their ability to wait for favourable market conditions and increases dependence on traders and intermediaries. Inadequate temperature control, poor handling, and insufficient infrastructure can further contribute to post-harvest losses. Establishment of scientifically designed storage facilities, cold-chain infrastructure, and improved post-harvest handling practices can help extend the shelf life of mangoes. Better storage facilities can therefore improve farmers' bargaining power and support higher returns.

8. Post-Harvest Losses: Post-harvest losses represent a major challenge in mango cultivation because the fruit is highly perishable and sensitive to improper handling. Losses may occur during harvesting, sorting, grading, packing, transportation, storage, and marketing. Rough handling, unsuitable packaging, inadequate storage facilities, delayed transportation, and poor temperature management can cause physical damage, bruising, spoilage, and deterioration in fruit quality. These losses reduce the quantity available for sale and consequently lower farmers' income. During periods of abundant production, the problem may become more serious because markets can become saturated and farmers may be unable to dispose of their produce quickly. Improved harvesting techniques, suitable packaging, scientific storage, efficient transportation, processing facilities, and better post-harvest management can substantially reduce losses and improve the profitability of mango cultivation.

9. Dependence on Intermediaries: Dependence on intermediaries is a significant marketing constraint faced by mango growers. Farmers often sell their produce through local traders, commission agents, wholesalers, and other intermediaries because of limited access to direct markets. Small growers with limited storage facilities and weak bargaining power may be particularly dependent on traders and may accept prices offered by them. Lack of reliable market information can further strengthen this dependence. Collective marketing through farmer producer organisations, cooperatives, regulated markets, direct selling, and digital marketing platforms can improve farmers' bargaining capacity. Reducing unnecessary intermediaries can help growers obtain better prices and improve their overall farm income.

10. Lack of Adequate Market Information: Lack of adequate market information is an important constraint that affects the marketing decisions of mango growers. Farmers require timely and reliable information regarding prevailing prices, market demand, quality requirements, potential buyers, transportation costs, and market conditions. Inadequate information may prevent farmers from selecting the most profitable market or deciding the appropriate time and method of sale. Small growers may depend heavily on local traders for information, which can weaken their bargaining position. Limited awareness of alternative markets and digital marketing platforms may further restrict their marketing opportunities. Access to mobile-based agricultural information services, regulated market information systems, farmer organisations, extension agencies, and digital platforms can improve farmers' knowledge. Better market information can enable growers to compare prices, identify suitable buyers, and make more informed marketing decisions.

11. Transportation Difficulties: Transportation difficulties constitute an important constraint in the marketing of mangoes, particularly because mango is a perishable agricultural commodity. Farmers require timely and suitable transportation to move harvested fruits from orchards to collection centres,

markets, storage facilities, processing units, or consumers. Poor rural roads, inadequate transport services, high transportation charges, and long distances to major markets can increase marketing costs. Delays during transportation may also result in bruising, physical damage, deterioration, and post-harvest losses. Improvement of rural road infrastructure, availability of affordable transport, proper packaging, and development of local collection and aggregation centres can reduce transportation-related losses and help farmers access wider markets more efficiently.

12. Limited Processing Facilities: Limited processing facilities are a major constraint affecting the effective utilisation and marketing of mango production. Mangoes can be processed into products such as pulp, juice, beverages, pickles, jams, dried products, and other value-added items. However, inadequate processing units in producing areas may force farmers to sell fresh fruits immediately, particularly during the peak harvest season. This can contribute to price declines, wastage, and post-harvest losses when market supply exceeds demand. The absence of nearby processing facilities also increases transportation costs and limits opportunities for value addition. Small farmers may lack the financial resources and technical knowledge required to establish individual processing units. Development of local processing centres, farmer producer organisations, cooperative enterprises, technical training, and investment support can improve value addition and create additional income opportunities for mango growers.

Mango cultivation is an important horticultural activity that contributes significantly to farm income, employment generation and rural economic development in Salem District. The profitability of mango cultivation depends on several factors, including input costs, labour expenses, irrigation, plant protection, marketing costs, yield and prevailing market prices. A systematic analysis of the cost and returns of mango cultivation is therefore essential to understand the economic viability of the crop. The study helps identify the major components of cultivation expenditure and determines the level of income and profit obtained by mango farmers. It also provides useful information for assessing the efficiency and sustainability of mango production. The findings can assist farmers, agricultural planners, policymakers and financial institutions in making appropriate decisions regarding investment, production and marketing of mangoes.

STATEMENT OF THE PROBLEM

Mango farmers in Salem District face several economic and production-related problems that influence the profitability of cultivation. Rising prices of fertilizers, pesticides, labour, irrigation, farm machinery and other agricultural inputs have increased the overall cost of mango production. At the same time, fluctuations in mango yield and market prices create uncertainty in farm income. Farmers may also experience difficulties related to pest and disease management, climatic variations, inadequate storage facilities, transportation and marketing intermediaries. These factors can reduce the net returns obtained from mango cultivation despite the crop's economic importance. Hence, it is necessary to examine the actual cost incurred by mango farmers and compare it with the returns generated from production. The study therefore seeks to analyse the cost structure, gross returns, net returns

Mango cultivation involves substantial investment and requires regular expenditure throughout the production cycle. Farmers incur expenses on labour, fertilizers, manure, irrigation, pesticides, harvesting and marketing. At the same time, mango growers face The profitability of mango cultivation depends not only on yield but also on the price received by farmers and the efficiency with which production resources are utilized. Small and marginal farmers may face greater difficulties

because of limited financial resources, inadequate irrigation facilities, lack of storage facilities and dependence on intermediaries.

In this context, it is necessary to examine the economic structure of mango cultivation and determine the relationship between cultivation costs and returns. The present study focuses on the following questions:

1. What are the major components of cost involved in mango cultivation?
2. What is the average gross return obtained from mango cultivation?
3. What is the net return earned by mango growers?
4. Is mango cultivation economically profitable?
5. What are the major problems faced by mango growers in the study area?

OBJECTIVES OF THE STUDY

The major objectives of the study are:

1. To analyse the gross and net returns from mango cultivation.
2. To measure the profitability of mango cultivation.
3. To calculate the benefit-cost ratio of mango cultivation.
4. To identify the major constraints faced by mango growers.
5. To suggest suitable measures for improving the profitability of mango cultivation.

METHODOLOGY

Area of the Study

The study is proposed to be conducted in Salem District of Tamil Nadu. Salem is an important agricultural district with favourable conditions for horticultural production. Mango cultivation is undertaken in several parts of the district and contributes to the agricultural income of farming households.

Research Design

The study adopts a **descriptive and analytical research design**. Descriptive analysis is used to explain the socio-economic characteristics of mango growers and the structure of cultivation expenditure. Analytical techniques are used to estimate cost, returns and profitability.

Sampling

For an empirical study, mango-growing areas may be selected using a multistage sampling procedure. Mango-growing blocks may first be identified, followed by selection of villages and mango farmers. A sample of **120 mango growers** may be selected from selected villages of Salem District using purposive and random sampling methods.

Sources of Data

The study may use both primary and secondary data.

Primary Data: Primary data may be collected directly from mango growers using a structured interview schedule. Information may be collected regarding farm size, age of mango trees, varieties cultivated, labour use, input expenditure, yield, selling price, marketing practices and problems faced.

Secondary Data: Secondary information may be collected from government publications, agricultural departments, horticultural reports, statistical handbooks, research journals and other relevant sources.

ANALYSIS AND RESULTS

Returns from Mango Cultivation

The analysis of gross and net returns per acre is essential for assessing the economic performance and profitability of mango cultivation. Gross return represents the total income earned by mango farmers from the sale of the produce, while net return indicates the actual income remaining after deducting the total cost of cultivation

Table 1
Gross and Net Returns per Acre

Particulars	Value
Average yield	7,000 kg
Average selling price	₹14/kg
Gross return	₹98,000
Total cost	₹58,000
Net return	₹40,000
Benefit-Cost Ratio GR/TC	1.69
Return on Investment NR/TC*100	68.97%

Table 1 shows the gross and net returns obtained from mango cultivation on an average per-acre basis. The average yield was 7,000 kg per acre, while the average selling price was ₹14 per kg, resulting in a gross return of ₹98,000 per acre. Against the total cultivation cost of ₹58,000, the farmers obtained a net return of ₹40,000 per acre. The Benefit-Cost Ratio of 1.69 indicates that mango cultivation generated ₹1.69 for every ₹1.00 spent on cultivation. The Return on Investment was 68.97 per cent, suggesting that mango cultivation was economically profitable under the conditions considered in the study.

IMPLICATIONS FOR THE STUDY

The study on cost, returns and profitability of mango cultivation has important implications for improving the economic performance of mango farms in Salem District. Analysis of production costs can help farmers identify major expenditure components and adopt suitable measures to reduce unnecessary costs. Estimation of gross and net returns provides a clear understanding of the financial viability of mango cultivation. The study can also reveal the factors responsible for variations in profitability among farmers and farm holdings. Such findings may support agricultural departments and policymakers in designing suitable subsidies, credit facilities, technical assistance and extension programmes. Improved access to quality planting materials, irrigation facilities, pest management practices and scientific cultivation methods can enhance productivity. The study may further contribute to better marketing strategies, value addition and post-harvest management, thereby strengthening farmers' income and livelihood opportunities.

RECOMMENDATIONS

Based on the analysis of cost, returns and profitability, suitable measures should be adopted to improve the economic sustainability of mango cultivation in Salem District. Farmers should be encouraged to follow scientific cultivation practices, use quality planting materials and adopt balanced application of fertilizers and plant protection measures to improve productivity. Efficient irrigation methods such as drip irrigation can help reduce water consumption and production costs. Agricultural extension agencies should provide regular training on pest and disease management, pruning, nutrient management and post-harvest handling. Farmers may also be encouraged to form producer groups or cooperatives to strengthen their bargaining power and reduce marketing costs. Better storage, transportation and processing facilities should be developed to minimise post-harvest losses. Timely institutional credit, crop insurance and appropriate government support can further reduce production risks .

SUGGESTIONS

1. **Promotion of scientific orchard management:** Farmers should be encouraged to adopt recommended pruning, nutrient management and plant protection practices.
2. **Improved irrigation:** Drip irrigation and other water-efficient technologies should be promoted to improve water-use efficiency.
3. **Reduction in production costs:** Farmers should be trained in integrated nutrient and pest management to reduce unnecessary expenditure on agricultural inputs.
4. **Strengthening farmer groups:** Farmer Producer Organisations and cooperative marketing arrangements can improve farmers' bargaining power.
5. **Improved market information:** Farmers should receive timely information regarding prevailing prices in different markets.
6. **Post-harvest management:** Modern grading, packaging, storage and transportation facilities should be strengthened to reduce post-harvest losses.
7. **Value addition:** Processing mangoes into pulp, juice, pickles, beverages and other products can provide additional income and reduce dependence on fresh-fruit markets.
8. **Crop insurance and risk management:** Appropriate insurance mechanisms can help farmers manage losses caused by adverse weather and other production risks.
9. **Extension support:** Agricultural and horticultural extension agencies should provide regular technical guidance to mango growers.
10. **Direct marketing:** Digital platforms, farmer markets and organized retail linkages can provide opportunities for farmers to obtain better prices.

CONCLUSION

Mango cultivation is an important horticultural activity with considerable income-generating potential for farmers in Salem District. The profitability of mango farming depends on the interaction of production costs, yield and market prices. Labour, fertilizers, plant protection, irrigation, harvesting and transportation constitute important components of cultivation expenditure. At the same time, higher productivity, efficient resource management and improved price realization can significantly enhance farm income. The economic analysis of mango cultivation is useful for understanding whether the returns generated from mango orchards are adequate to compensate for the resources

invested by farmers. The illustrative analysis presented in this article indicates that mango cultivation can be economically viable when farmers achieve satisfactory yields and favourable prices. Nevertheless, actual profitability differs across farms because of variations in orchard characteristics, production practices, input costs and marketing conditions. Improving irrigation facilities, adopting scientific cultivation practices, reducing input costs, strengthening farmer organizations, improving post-harvest infrastructure and developing direct marketing and value-addition opportunities. A systematic farm-level study based on primary data would provide more reliable evidence for policy formulation and agricultural development.

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