**RESEARCH PAPER**

# Cost -return analysis and constraints faced by the finger millet growers in Karnataka

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**Abstract:** Finger millet is an important millet crop which is mainly cultivated as rainfed crop. The present study was conducted to assess cost of production of finger millet in Karnataka. The study has been carried out based on primary data and the data were collected from the growers of finger millet with the help of well-structured questionnaire. Tabular analysis was computed. The total cost of cultivation of finger millet was ₹ 44,534 per hectare in which total variable cost constitutes ₹ 35,902 and total fixed cost constitutes ₹ 8,632. The total yield of main product obtained was 24.07 quintals with the farm harvest price of the main product was ₹ 1,928 per quintal. The total yield of by-product obtained was 2.46 quintals with the farm harvest price of the main product was ₹ 3,370 per quintal. In the cost of cultivation, the highest share contributed was the cost of human labour with 27.91 per cent which was due to involvement of labourers in major cultivation practices of finger millet followed by the cost of plant protection chemicals with 1.41 per cent which is because of pest and disease incidence and machine labour charges with 18.95 per cent respectively which is due to the increased mechanized operation in agricultural package of practices. Dependence on monsoon, fluctuation in market price and high margin of middlemen were found to be the major constraints faced by the finger millet growers.

**Key words**: Constraints, Cost of Cultivation, Gross return, Net Return

## Introduction

Finger millet or ragi is one of the important food crops mainly cultivated and consumed in India and Africa. It is very high in calcium, rich in iron and fibre and has better energy content than other cereals. It can grow on various soils, including highly weathered tropical lateritic soils. Furthermore, it can tolerate soil salinity up to a certain extent. Finger millets ability to bear water logging is limited, so good drainage of the soils and moderate water-holding capacity are optimal (Adhikari, 2012). It is generally considered as a drought-tolerant crop, but compared with other millets, such as pearl millet and sorghum, it prefers moderate rainfall (500 mm annually).

In India, finger millet is grown and consumed in Karnataka, Andhra Pradesh, Tamil Nadu, Odisha, Maharashtra, Kumaon region of Uttarakhand and Goa. The total area under finger millet in India is 1004 thousand hectares (2019-20) which was mainly contributed by Karnataka, Maharashtra, Telangana and Tamil Nadu. The total area under finger millet in Karnataka is 641 thousand hectares (2019-20) which was mainly contributed by Tumakuru, followed by Hassan and Ramanagara. From this area, 1164 thousand metric tonnes of finger millet was produced in 2019-20. During this period, productivity of finger millet was recorded as 1,816 kg/ha (Anonymous, 2020).

The study of cost and returns is a major economic analysis because the estimation of product cost is useful in decision-making process at farm level. Knowing the profitability of the individual products can help in planning of future production. The administrators and policy planners are the prime users of cost of cultivation data for policy formation and recommendation. The cost of cultivation survey is statistically well planned so that the required information can be obtained efficiently and precisely. It is appropriate to mention that due to the changes taking place at the global level, the importance

of cost of cultivation data has increased manifold (Bellundagi, 2017). This is attributable to the phenomenon of global competitiveness which implies that those who are efficient and can produce the crops at competitive prices will survive in the market. This study is aimed at exploring cost and profitability of ragi and constraints faced by the finger millet growers in Karnataka.

## Material and methods

Based on the highest area under finger millet in Karnataka, the districts like Tumkur and Ramanagar were selected for the study. 45 farmers from each district, thus takes the sample size of 90 farmers. Primary data were collected through personal interviews from the farmers with the help of a pre-tested and well-structured schedule. Samples were selected by random sampling method in the agricultural year 2020-21.

### A) Estimation of costs and returns

The costs were classified into variable and fixed costs. Variable cost includes cost of inputs (seed, FYM, fertilizer), labour cost and interest on working capital. Fixed cost includes depreciation on farm implements, rental value of land and interest on fixed farm implements. The measurement and definitions of various cost components are as follows,

### i) Variable cost

Those costs which vary with the level of production were included in this category. The items included under this section are given below.

### a) Labour cost

The cost on human labour was calculated by multiplying the man days with existing wage rate. Women days were converted into man days by multiplying it with the ratio of

wages given to women labour to that of men labour (0.75). The cost on family labour was imputed by multiplying man days with the prevailing wage rate. The bullock labour was taken in pair days and the cost towards it was estimated by multiplying pair days with wage rate. Machine labour was measured in hours and valued at prevailing hourly rates in the study area.

**b) Cost of inputs**

Cost of various inputs like seeds, fertilizers, and FYM were included in this category. Non-farm inputs were valued at prevailing prices while owned farm inputs were imputed at current prices.

**c) Irrigation cost**

The cost of electricity (subsidy by Government) to lift the water from bore well was calculated using the following formula (Rs. 3.5 is the cost of electricity per KWH), Electricity charges =No. of irrigations x No. of hours irrigated per irrigation x Area x hp of motor x 0.75 KWH x 3.5 per KWH. Amortization cost of bore well, pump and conveyance structure was calculated using the formula,

**Amortized cost = Initial investment × [(1+i) AL × i ] ÷ [(1+i) AL–1]**

Where,

AL- Average life of bore well, pump and other assets.

i - Discounting rate of interest.

Thus, Irrigation cost was obtained by the summation of electricity charges and amortization cost.

**Irrigation cost = Electricity charges + Amortized cost**

**d) Interest on working capital**

The prevailing bank rate of eight per cent (Commercial bank lending rate in study area) was taken to work out the interest on working capital for the duration of the crop.

**ii) Fixed cost**

This consists of those cost items which do not vary with the level of production. The items included under this section were

**a) Rental value of land**

The prevailing rental value of the land for the crop depending on the duration of the crop was considered.

**b) Depreciation**

Depreciation on each capital equipment and machinery owned by the farmers were calculated separately, by using straight line method. The average life of the asset as indicated by each farmer was used in computation of the depreciation.

**c) Interest on fixed capital**

Interest on fixed capital was computed at the rate of ten per cent per annum. The interest was worked out on the values of fixed assets, after deducting depreciation for the year.

**d) Land revenue and taxes**

Land revenue and taxes was charged at the rates levied by the government.

**e) Total cost**

Total cost is the summation of total variable cost and total fixed cost.

**iii) Returns**

**a) Gross return**

Gross returns including the gross value of main product and by product imputed on the basis of post-harvest prices prevailing in the study area.

**b) Net returns over total cost**

Net return was computed by subtracting the total cost of cultivation from gross returns.

**c) Cost of production per quintal**

Cost of production per quintal was worked out by dividing total cost of cultivation by the yield of main product.

**d) Returns per rupee of expenditure**

Return per rupee of expenditure was calculated by dividing the gross return by total cost.

**B) Problem Confrontation Index**

The problem confrontation index was used to find out the major problems by finger millet growers while cultivation and marketing of produce through ranking method. The ranking was calculated through the following formula (Chaudhary and Chauhan, 2016).

$$PCI=(P_n×0) + (P_l×1)+ (P_m×2)+ (P_h×3)$$

Where,

PCI = Problem Confrontation Index

$P_n$ = Frequency of the farmers who rated the problem as not encountered

$P_l$ = Frequency of the farmers who rated problem as low

P = Frequency of the farmers who rate the problem as moderate

$P_h$ = Frequency of the farmers who rated the problem as high

Based on formula, the problems were listed in rank- order. First rank indicates the most severe problem.

**Result and discussion**

**Cost and Returns of finger millet cultivation**

The cost and returns structure of finger millet cultivation was discussed in table 1. The estimation revealed that the total cost of cultivation was ₹ 44,533.95 per hectare. The total variable costs formed the maximum share with 80.62 per cent. Among variable cost, major cost was towards wages for human labour with ₹ 12,430 (27.91 per cent) followed by machine labour with ₹ 8,437.00 (18.95 per cent). The other variables shared its contribution towards variable cost like cost of seeds was ₹ 500.00 per hectare (1.12%), farm yard manure was ₹ 2,250 (5.05 %), the cost of fertilizers was ₹ 4,837.00 (10.86), cost of plant protection chemicals was ₹ 6,27 (1.41 %) and other miscellaneous cost was ₹ 56 (0.13 %).

Table 1 Cost and returns of finger millet cultivation          (₹   per hectare)

| Particulars | Quantity | Per Unit Cost(₹) | Cost (₹) | Percent to Total Cost |
|---|---|---|---|---|
| I     Variable Cost | | | | |
| Human Labour (man days) | 62.15 | 200 | 12,430.00 | 27.91 |
| Bullock labour (pair days) | 5.52 | 800 | 4,416.00 | 9.92 |
| Machine Labour (hours) | 11.25 | 750 | 8,437.50 | 18.95 |
| Seeds (kg) | 20.00 | 25 | 500.00 | 1.12 |
| FYM (tractor) | 1.50 | 1,500 | 2,250.00 | 5.05 |
| Chemical Fertilizers | - | - | 4,837.00 | 10.86 |
| Plant Protection Chemicals | - | - | 627.00 | 1.41 |
| Miscellaneous cost | - | - | 56.00 | 0.13 |
| Interest on working capital @ 7 per cent per annum | - | - | 2,348.75 | 5.27 |
| Total Variable Cost | - | - | 35,902.25 | 80.62 |
| II     Fixed Cost | | | | |
| Depreciation cost | - | - | 797.00 | 1.79 |
| Land Revenue | - | - | 50.00 | 0.11 |
| Interest on fixed capital @ 10 per cent per annum | - | - | 784.70 | 1.76 |
| Rental value of owned land | - | - | 7,000.00 | 15.72 |
| Total Fixed Cost | - | - | 8,631.70 | 19.38 |
| III    Total Cost of Cultivation | - | - | 44,533.95 | 100.00 |
| IV    Yield: A :Main product (qtl/ha) | 24.07 | - | - | - |
| B : By-product (tonnes/ha) | 2.46 | - | - | - |
| V     A: Farm harvest price of the main product( ₹ /qtl) | - | 1,928 | 46,406.96 | - |
| B: Income from by-product ( ₹ /tonnes) | - | 3,370 | 8,290.20 | - |
| VI    Gross income : main product+ by-product (₹ /ha) | - | - | 54,697.16 | - |
| VII   Net Income (VI - IV) | - | - | 10,163.21 | - |

The fixed cost constituted almost 19 per cent of total costs, with the majority of the share by means of rental value of land with the amount ₹ 7,000.00 (15.72 %) followed by depreciation cost was ₹ 797 (1.79 %) and the land revenue was ₹ 50.00 (0.11 %). The total yield of main product obtained was 24.07 quintals with the farm harvest price of the main product was ₹ 1,928 per quintal.  The total by-product obtained per hectare was 2.46 quintals with the price of ₹ 3,370 per quintal. Total returns obtained from the sale of the main product were ₹ 46,406.96 and total return from the sale of by-product was ₹ 8,290.20. The gross income obtained from the sale of main product and by-product was ₹ 54,697.16 and the net return obtained from the sale of finger millet and its by-product was ₹ 10,163.21.

In the cost of cultivation, the highest share contributed was the cost of human labour with 27.91 per cent which was due to involvement of labours in major cultivation practices of finger millet followed by the cost of plant protection chemicals with 1.41 per cent which is because of pest and disease incidence and machine labour charges with 18.95 per cent respectively which is due to the increased mechanized operation in agricultural

package of practices. The findings were similar to Uma and Praveena (2019) which concluded that the highest benefit cost ratio for the integrated pest management adopted farmers when compared to the non-adopted farmers. Similar results were observed by Vennila and Murthy (2021) which concluded that compare to the conventional technology, the other improved method found more benefitted.

**Production and marketing constraints faced by finger millet growers**

The information was collected, analysed and ranked using problem confrontation index. The result represented in the table 2 indicated the production constraints faced by the finger millet growers in which dependence on monsoon was ranked first with Problem Confrontation Index score 141 in the study area followed by lack of quality seeds for production with Problem Confrontation Index score 140, high cost of inputs with Problem Confrontation Index score 134, lack of irrigation facility with Problem Confrontation Index score 133 lack of labour and high cost with 130 Problem Confrontation Index score, and non-availability of agricultural credit with Problem

Table 2 Production constraints faced by the finger millet growers  (n=90)

| Particulars | High | Moderate | Low | No Problem | PCI | Rank |
|---|---|---|---|---|---|---|
| Dependence on monsoon | 25 | 28 | 10 | 27 | 141 | I |
| Lack of quality seeds | 28 | 18 | 20 | 24 | 140 | II |
| High cost of inputs | 21 | 26 | 19 | 24 | 134 | III |
| Lack of irrigation facility | 26 | 17 | 21 | 26 | 133 | IV |
| Lack of labour and high cost | 20 | 22 | 26 | 22 | 130 | V |
| Non-availability of agricultural credit | 18 | 24 | 20 | 28 | 122 | VI |

Table 3 Marketing constraints faced by the finger millet growers  (n=90)

| Particulars | High | Moderate | Low | No Problem | PCI | Rank |
|---|---|---|---|---|---|---|
| Fluctuation in market price | 27 | 21 | 21 | 21 | 144 | I |
| High margin of middlemen | 21 | 28 | 19 | 22 | 138 | II |
| Delay in cash payment from the traders | 21 | 20 | 28 | 21 | 131 | III |
| Inadequate storage facilities | 25 | 17 | 21 | 27 | 130 | IV |
| High cost of transportation | 20 | 28 | 12 | 30 | 128 | V |
| Less awareness of online trading | 23 | 19 | 19 | 29 | 126 | VI |
| Malpractice in market yard | 15 | 22 | 23 | 30 | 112 | VII |

Confrontation Index score 122. Dependence on monsoon was considered as the major problem because the major area under finger millet was cultivated as rainfed crop. The similar findings were observed in the study Gireesh *et al.* (2019).

Table 3 indicated the marketing constraints faced by the finger millet growers in which fluctuation in market price was ranked first with Problem Confrontation Index score 144 in the study area followed by high margin of middlemen with Problem Confrontation Index score 138, delay in cash payment from the traders with Problem Confrontation Index score 131, inadequate storage facilities with Problem Confrontation Index score 130, high cost of transportation with Problem Confrontation Index score 128, less awareness of online trading with Problem Confrontation Index score 126 and malpractice in market yard with Problem Confrontation Index score 112. Fluctuation in market price was considered as major problem due to unawareness about major market and less availability of produce to the market. The similar findings were observed in the study Vennila *et al.* (2018).

**Conclusion**

From the results of the study it was found that cost of production of finger millet was ₹ 44,534 per hectare in which total variable cost constitutes ₹ 35,902 and total fixed cost constitutes ₹ 8,632. The total yield of main product obtained was 24.07 quintals with the farm harvest price of the main product was ₹ 1,928 per quintal. The total yield of by-product obtained was 2.46 quintals with the farm harvest price of the main product was ₹ 3,370 per quintal. In the cost of cultivation, the highest share contributed was the cost of human labour with 27.91 per cent which was due to involvement of labours in major cultivation practices of finger millet followed by the cost of plant protection chemicals with 1.41 per cent which is because of pest and disease incidence and machine labour charges with 18.95 per cent respectively which is due to the increased mechanized operation in agricultural package of practices. More than 50 per cent of the produce was used for family consumption. Dependence on monsoon, fluctuation in market price and high margin of middlemen were found to be the major constraints faced by the finger millet growers.

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