International Journal of Agriculture Sciences
ISSN: 0975-3710&E-ISSN: 0975-9107, Volume 10, Issue 4, 2018, pp.-5196-5198.
Available online at http://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000217

Research Article

COST STRUCTURE AND PROFITABILITY OF FINGER MILLET IN SOUTH GUJARAT REGION

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Received: December 26, 2017; Revised: February 24, 2018; Accepted: February 25, 2018; Published: February 28, 2018

Abstract- The study examined the economics of finger millet production in South Gujarat region. From South Gujarat region two districts namely Valsad and Dang were selected purposively, subsequently 3 and 2 taluks from Dang and Valsad districts were selected respectively and from each taluka 5 village were selected by Probability Proportionate Sampling (PPS) method and from each village 6 farmers by simple random sampling (SRS) method. Thus, total sample size was 150 finger millet growers. From this study it was observed that, the commercial cost of cultivation (cost C_3) worked out to be Rs.23727.48 per hectare. Cost A_1/A_2, cost B_1, cost B_2, cost C_1 and cost C_2 were Rs.9334.67, Rs.9370.09, Rs.13170.44, Rs.17770.09 and Rs.21570.44 per hectare respectively. The Cost-benefit ratioin the cultivation of finger millet was estimated for cost A_1/A_2, cost B_1, cost B_2, cost C_1, cost C_2 and cost C_3 were 2.54, 2.53, 1.80, 1.33, 1.10 and 1.001 respectively.

Key Words- Fixed cost, Variable cost, Output and returns, Cost-benefit ratio.

Citation: Tandel V. B., *et al*., (2018) Cost Structure and Profitability of Finger Millet in South Gujarat Region. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 10, Issue 4, pp.-5196-5198.

Academic Editor / Reviewer: Dr Zheko Radev, Parameswaranaik J, L. Y. Aktas, I. Aygun

Introduction

Finger millet [*Eleusine coracana*(L.) Gaertn.] is one of the most important millet crop belonging to family Poaceae and sub family Chloridoidae. Finger millet is a short-day plant with a growing optimum at 12 hours day length for most varieties. Its main growing area ranges from 20° N to 20° S, meaning mainly the semiarid to arid tropics. 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).

The majority of worldwide finger millet farmers grow it rainfed, although yields often can be significantly improved when irrigation is applied. In India, finger millet is a typical *rabi* crop. Heat tolerance of finger millet is high. It is grown from about 500 meters above sea level up to about 2400 meters above sea level (e.g. in Himalaya region). Hence, it can be cultivated on higher elevations than most tropical crops. Finger millet can grow on various soils, including highly weathered tropical lateritic soils. Furthermore, it can tolerate soil salinity up to a certain extent. Its ability to bear water logging is limited, therefore, good drainage of the soils and moderate water holding capacity are optimal. Finger millet can tolerate moderately acidic soils but also moderately alkaline soils. Minor millet is grown as *Kharif* rain fed crops in the least fertile hilly soil by tribal and area adjoining to hilly tract and they are the staple food for the large section of rural and working class in the state. Nowadays, finger millet gets popularity among minor millets due to its high content of calcium (344mg/100g), magnesium (191mg/100g) and its different nutritive bakery products [1].

Objectives

1. To study the input use, cost structure in production of finger millet.
2. To study the profitability of finger millet production.

Methodology

From South Gujarat region two districts namely Valsad and Dang selected purposively. It has been reported that there are 3 talukas in Dang district and 2 talukas in Valsad district under finger millet cultivation. Hence, we were purposively select 3 and 2 talukas from Dang and Valsad district, respectively by purposive method. As numbers of villages are approximately equal in each selected taluka of the two districts, we were selected 5 villages from each taluka as sample villages by Probability Proportionate Sampling (PPS) method and from each village we were selected 6 farmers by simple random sampling (SRS) method. Thus, total sample size was 150 finger millet growers.

The various cost concepts are determined by agricultural economists who were used while analyzing the data by using cost A_1, cost A_2, cost B_1, cost B_2, cost C_1, cost C_2 and cost C_3.

Benefit cost ratio (BCR)

It is the ratio between the discounted cash inflows and discounted cash outflows and the ratio must be unity or more for an investment to be considered worthwhile. The benefit cost ratio (BCR) was worked out by using following formula:

$$\text{B : C ratio} = \frac{\sum_{t=1}^{n} \frac{B_n}{(1+r)^n}}{\sum_{t=1}^{n} \frac{C_n}{(1+r)^n}}$$

Where,

B = Benefit in n^{th} year
C= Cost in n^{th} year

n = number of years
r = Discount rate

Ethical Approval:
Primary data were collected through personal meeting on farmers field. Hence this particular study did not require ethical approval.

Results and Discussion
The growth of area, production and productivity of basmati paddy was analyzing in Hanumangarh District of Rajasthan and this study revealed that the growth rate of area and productivity were significant [1].
On an average, the total cost of cultivation per hectare of finger millet was Rs.21570.44. The breakup of total cost into operational and fixed costs indicated that the operational costs were Rs.17584.67 (81.52%) and fixed costs were Rs.3985.77 (18.48%). The expenditure incurred towards human labour was Rs.9600.00 per hectare accounting for 44.51 per cent of the total costs. Soil was brought to fine tilth by ploughing, harrowing and incorporating organic manure. These operations require bullock labour. The expenditure towards bullock labour was Rs.3969.00 (18.40%). Seedlings of finger millet were transplanted. The seed cost was Rs.150.00 accounting for 0.70 per cent of total cost.

Table-1 *Cost of cultivation per hectare of finger millet*

Sr. No.	Particulars	Unit	Value (Rs.)	% Total cost
1	Operational costs			
a.	Human labour (No.)	80	9600	44.51
	Owned	70	8400	38.94
	Hired	10	1200	5.56
b.	Bullock labour (Pair days/ha)	10.50	3969	18.40
c.	Machinery services (Hours/day)	3.50	1925	8.92
d.	Seeds (Kgs)	6	150	0.70
e.	Manures and fertilizers			
	Manures (Tones)	1	500	2.32
	Fertilizers (Kgs)	5	625	2.90
f.	Miscellaneous cost		500	2.32
	Total working capital		8869	41.12
g.	Interest on working capital	-	315.67	1.46
	Total operational costs		**17584.67**	**81.52**
2.	Fixed costs			
a.	Land revenue	-	-	
b.	Rental value of owned land	-	3800.34	17.62
c.	Interest on fixed capital	-	35.43	0.16
d.	Depreciation	-	150	0.70
	Total fixed costs		**3985.77**	**18.48**
	Total costs		**21570.44**	**100**

The machinery services cost was Rs.1925.00 accounting for 8.92 per cent of total cost. The balanced supply of plant nutrients would also help to maintain disease free conditions to a larger extent. The farmers had spent Rs.500.00 on manures and Rs.625.00 on fertilizers accounting for 2.32 per cent and 2.90 per cent of the total cost respectively. Among the fixed costs, rental value of owned land was the major item, it was Rs.3800.34 per hectare.

Cost Concepts
The gross returns per hectare for kodra, finger millet and vari were found to be Rs.3,348, Rs.13,580 and Rs.16,950 respectively and net income per hectare over cost C2 was found to be Rs.161, Rs.6,202 and Rs.8953 respectively in Dang district of South Gujarat [2]. The cost of cultivation of summer maize was worked out to Rs.6237 per acre during 2011-2012 in Punjab [3]. The cost of cultivation of finger millet crops according to cost concepts worked out and presented in [Table-2].It is clear from the details furnished in the [Table-2] that there was no leasing activity among the sample farmers and hence cost A_1 and cost A_2 remained the same. It was noticed that the commercial cost of cultivation (cost C_3) worked out to be Rs.23727.48 per hectare. Cost A_1/A_2, cost B_1, cost B_2, cost C_1 and cost C_2 were Rs.9334.67, Rs.9370.09, Rs.13170.44, Rs.17770.09 and Rs.21570.44 per hectare respectively.

Output and returns
The details of physical output and returns per hectare from the production of finger millet are presented in [Table-3]. On an average, the yield of main product was 10.98 quintals while that of by-product was 10 quintals. The sample farmers, on an average realized a total income of Rs.23752.15 per hectare. The net returns were estimated at Rs.2181.71 per hectare.

Table-2 *Various Cost of finger millet cultivation*

Sr. No.	Particulars	Cost (Rs./ha)
1.	Cost A_1/A_2	9334.67
2.	Cost B_1	9370.09
3	Cost B_2	13170.44
4.	Cost C_1	17770.09
5.	Cost C_2	21570.44
6.	Cost C_3	23727.48

Table-3 *Output and returns per hectare of finger millet*

S. No.	Particulars	Units	Output and return
1.	Yield in physical units		
a.	Main product	Quintals	10.98
b.	Byproduct	Quintals	10
2.	Yield in monetary terms		
a.	Main product	Rs.	23060.35
b.	Byproduct	Rs.	691.81
3.	Gross returns	Rs.	23752.15
4.	Cost of cultivation	Rs.	21570.44
5.	Net returns	Rs.	2181.71

Measures of farm income
To achieve this objective, various farm efficiency measures *viz.*, farm business income (FBI), family labour income (FLI), net income (NI) and returns per rupee (RPR) of expenditure were worked out and presented in [Table-4]. In Sarguja district of Chhattisgarh study carried out for production and marketing of hybrid maize and it was observed that average total cost per quintal was Rs.572.85 [4]. The gross income realized in the cultivation of finger millet was estimated at Rs.23752.15 per hectare. Though the gross income is a measure to analyze the efficiency of farm business, but it alone does not help us to judge the success of farm business. Therefore, another measure namely net income which represents surplus over the total costs was estimated. Higher net income reflects the degree of success of farm business. Finger millet farmers in the study area realized a net income of Rs.2181.71 per hectare. Farm business income is a measure which indicates return for owned resources like land, labour and capital and this amounted to Rs.14417.48 per hectare. Family labour income is another measure of farm efficiency which represents the returns to farmer's owned labour and family labour and this amounted to Rs.10581.71 per hectare. Farmers were able to secure a net income of Re.1.10 per every rupee spent in finger millet cultivation.

Table-4 *Measures of farm income of finger millet production*

S. No.	Particulars	Farm income (Rs./ha)
1.	Gross income (GI)	23752.15
2.	Farm business income (FBI)	14417.48
3.	Family labour income (FLI)	10581.71
4.	Net income (NI)	2181.71
5.	Returns per rupee (RPR)	1.10

Returns and Benefit-Cost ratio
Benefit-Cost ratio is an important tool to judge the profitability of an enterprise. It helps to locate the breakeven output, which is the minimum output that needs to be produced to continue the production without incurring loss. The output-input ratio in the cultivation of finger millet was worked out and presented in

[Table-5]. In this study on an average, cost of cultivation per ha of Kodo, Kutki and Ragi was calculated as Rs.2866.75, Rs.2751.01 and Rs.3342.10 respectively and input-output ratio in was 1:1.33, 1:1.28, 1:3.25, respectively. [5] In northern Karnataka, study on production analysis of minor millets estimated the per hectare cost of cultivation of savi at Rs.7,236.92 and gross returns realised by the sample farmers were Rs.8,442.92 per hectare. The benefit-cost ratio worked out to be 1.17 indicating the profitability of savi cultivation in the study area. [6] The Benefit-Cost ratio in the cultivation of finger millet was estimated for cost A_1/A_2, cost B_1, cost B_2, cost C_1, cost C_2 and cost C_3 were 2.54, 2.53, 1.80, 1.33, 1.10 and 1.001 respectively.

Table-5 *Returns over different cost Benefit-Cost ratio*

S. No.	Particulars	Returns over cost(Rs.)	B:C Ratio
1.	Cost A_1	14417.48	1:2.54
2.	Cost B_1	14382.06	1:2.53
3.	Cost B_2	10581.71	1:1.80
4.	Cost C_1	5982.06	1:1.33
5.	Cost C_2	2181.71	1:1.10
6.	Cost C_3	24.67	1:1.001

Conclusion

The total cost of cultivation per hectare of finger millet was Rs.21570.44. The breakup of total cost into operational and fixed costs indicated that the operational costs were Rs.17584.67 (81.52%) and fixed costs were Rs.3985.77 (18.48%).The commercial cost of cultivation (cost C_3) worked out to be Rs.23727.48 per hectare. Cost A_1/A_2, cost B_1, cost B_2, cost C_1 and cost C_2 were Rs.9334.67, Rs.9370.09, Rs.13170.44, Rs.17770.09 and Rs.21570.44 per hectare respectively. It was observed that, the yield of main product was 10.98 quintals while that of by-product was 10 quintals. The sample farmers, on an average realized a total income of Rs.23752.15 per hectare.

The net returns were estimated at Rs.2181.71 per hectare. It was observed that, the gross income realized in the cultivation of finger millet was estimated at Rs.23752.15 per hectare and net income of Rs.2181.71 per hectare. Farm business income was amounted to Rs.14417.48 per hectare. Family labour income is another measure of farm efficiency which represents the returns to farmer's owned labour and family labour and this amounted to Rs.10581.71 per hectare. Farmers were able to secure a net income of Re.1.10 per every rupee spent in finger millet cultivation. The Cost-benefit ratioin the cultivation of finger millet was estimated for cost A_1/A_2, cost B_1, cost B_2, cost C_1, cost C_2 and cost C_3 were 2.54, 2.53, 1.80, 1.33, 1.10 and 1.001 respectively.

Application of research: research helpful to study the profitability of finger millet production

Research Category: Agricultural Economics

Acknowledgement / Funding: Author thankful to N.M. College of Agriculture, Navsari Agricultural University, Navsari, 396450, Gujarat for research funding. All authors are thankful to farmers for their valuable cooperation.

***Principle Investigator: Dr. Narendra Singh**
University: Navsari Agricultural University, Navsari, 396450, Gujarat
Research project name or number: MSc Thesis

Author Contributions: All author equally contributed

Author statement: All authors read, reviewed, agree and approved the final manuscript

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

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