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A study on cost of cultivation, marketable and marketed surplus of pearl millet in gird region of Madhya Pradesh

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Abstract

An investigation has been conducted on a study cost of cultivation, marketable and marketed surplus of Pearl Millet in Gird Region of Madhya Pradesh. Morena district was selected purposely for this study due to this district has remarkable position under pearl millet production in the Madhya Pradesh. After selection of district and crop, Morena tehsils, was selected randomly out of six Tehsil, then five village namely Rajhanspura, Jharoni, Bhanpura, Bhitholi, Beretta were selected randomly from Morena tehsil, thereafter a list of pear millet growers prepared and arranged into ascending order namely small (Less than 2 ha) medium (2-4 ha) Large and large (above 4 ha) from each categories 30 farmers selected randomly. After analysis of study it was found that average cost of cultivation (cost C_3) of pearl millet in the study area was found to be Rs20655.73 /ha, which was highest on Rs 21135.31 /ha on large, Rs20925.89 /ha on small farmers and Rs 19906.01 /ha on medium farmers. The cost of cultivation of pearl millet decrease with the increase in size of land holdings. An average, the share of operational costs was 60.92 per cent of the total cost (cost C_3) for the sample farms. An overall gross income per hectare of pearl millet cultivation was observed Rs 23483.6667/ ha, the gross income per hectare from pearl millet cultivation was higher on large farms as compared to medium and small sized farms. The (B: C Ratio) Input output ratio was highest as 1.17 on large farm followed by 1.14 and 1.10 on small and medium farm, respectively.

Keywords: Cultivation, gird region, purposely

Introduction

Pearl millet is considered a poor man's food and is one of the major coarse grain cereals (millets). It is most widely grown as a rainfed crop. In India, Pearlmillet was introduced from Africa. Since pre-historic times, this crop has been produced in Africa and Asia. It is planted in Africa, where it has mostly overtaken sorghum as the main crop on sandy soils and in dry climates. It is a key cereal crop in Asia, particularly in India, Pakistan, China, and Southeast Asia. Pearl millet covers almost half of the entire area beneath all millets grown in the world. Some belief, Pearl millet is sixth in terms of the area behind rice, wheat, maize, barley and sorghum. It is a widely grown crop in Africa and Asia particularly in India, Pakistan, China, and southeastern Asia. India, China, Pakistan, Sudan, Egypt, Arabia, and Russia are all major pearl millet producers. India is the world's leading producer of pearl millet and along with Africa accounts for 93.2 percent of the total pearl millet production of the world. Among the various important pearl millet growing states of the country, Madhya Pradesh is the fifth largest producer of Pearlmillet in the country which occupies 3.69 percent area with 7.31 percent production with the productivity of 2458 kg/ha which is above national productivity which is 1243 kg/ha (Anonymous, 2019) ^[1] Any increase or decrease in area and production of Pearl millet crop will have a considerable effect on the farm economy of the state in particular grid agro-climatic zone of Madhya Pradesh [Gwalior and Chambal division] of Madhya Pradesh having largest area and production in Pearlmillet production which contributes 94.93 percent of total area and 96.59 percent production of the state during 2018-19. Morena District of Gird agro-climatic zone of Madhya Pradesh having first position which contributes 60.48 percent in area and 53.90 percent production of the state during 2018-19.

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Research Methodology

Morena district of the Madhya Pradesh was selected purposely for the present study. Because this district is one of the major pearl millet growing district of Madhya Pradesh. Pearl millet crop was selected for the detailed study because this crop has a good place among the cereal crops in Madhya Pradesh. After selection of district and crop, morena tehsils, was selected randomly out of Ambah, Porsa, Joura, Kailashrash (Kailashgrah) Pahargarh and Sabalgrah thereafter a list of villages were prepared from the secretary, Krishi Upaj Mandi Samiti, Morena which farmers has been sold maximum their produce in the market. Out of this, five village namely Rajhanspura, Jharoni, Lbhanpura, Bhitholi, Beretta were selected randomly. With the help of patwary, a list of pearl millet growing farmers from these five villages were prepared along with their size of operational holding then arrange in ascending order and categorized into following three groups.

Small - Less than 2 ha

Medium - 2 -4 ha

Large - 4 ha and above

Finally 30 famer from each category were selected (total 90 farmers) For the research purpose. The study required primary data in respect to cost of cultivation, cost of production, price of output, consumption, and sale pattern of peal millets. Pertains to the agricultural year 2019-2020

Analysis of data

For achieving the stated objective, following analytical procedure was used.

Cost concepts

The different cost concepts were worked out by grouping the cost items as under cost group.

Cost A₁ = All Actual expenses incurred in cash i.e

1. Value of hired human labour
2. Value of owned bullock labour
3. Value of hired bullock labour
4. Vale of owned machine labour
5. Value of hired machine labour
6. Value of owned seed
7. Value of purchased seed
8. Value of owned farm yard manure
9. Value of purchased farm yard manure
10. Value of fertilizers and insecticides
11. Irrigation charges
12. Land revenue
13. Interest on working capital
14. Deprecation
15. Miscellaneous expenses
16. Rent paid for the leased in land
17. Interest on fixed capital
18. Rental value of owned land
19. Value of family labour

Cost A₂ = Cost A₁ +rent paid for leased in land

Cost B₁= Cost A₁ + interest on fixed capital (excluding Land)

Cost B₂ = Cost B₁ +rent paid for leased in land +rental value of owned land

Cost C₁ = Cost B₁ + value of family labour

Cost C₂ = Cost B₂ + value of family labour

Cost C₃ = Cost C₂ + 10% of cost C₂

Interest on working capital

Interest on working capital was worked out for items like hired human labour, bullock labour, machine labour, farm yard manure, fertilizers and plant protection chemicals, seed and irrigation charges for half the period of the crop season. Interest was charged at 12% prevailing rates for a period of 3 months on the working capital.

Rental Value of Owned Land

It was calculated on the basis of prevailing rates in the sample villages.

Depreciation

Depreciation was computed on the items of fixed capital like farm buildings, well & irrigation structure and machinery such as electric motors, thresher and other items excluding tractor. Depreciation was also computed on minor agricultural implements used in crop production. Depreciation on an asset was calculated using the formula:

$$\text{Depreciation} = \frac{\text{Purchase price of an asset} - \text{junk value}}{\text{Number of useful years of life (expected life)}}$$

$$\text{Depreciation for crop 'X'} = \frac{\text{Total annual depreciation}}{\text{Total cropped area}} \times \text{Area under crop 'X'}$$

Interest on Fixed Capital

Interest on fixed capital was charged at 10% prevailing rates per annum. Items on which interest was computed are the same as included for calculation of depreciation. After calculating the total interest, it was apportioned for the particular crop as per the method used in apportioning of the depreciation.

Operational Cost (O.C.)

It is the variable cost that varies with the level of production. It is expressed as:

$$\text{O.C.} = \text{Cost A}_1 - \text{Land revenue} - \text{Depreciation} + \text{Family labour cost}$$

Overhead Cost (O.H.C.):

It is the fixed cost which is incurred irrespective of the volume of production. It is expressed as:

$$\text{O.H.C.} = \text{Cost C}_2 - \text{Operational cost}$$

Cost of Production (Per quintal)-

Cost of production was worked out with the help of following formula:

$$\text{Cost of production} = \frac{\text{Cost of cultivation} - \text{Value of by-product}}{\text{Quantity of main product (per quintal)}}$$

Farm Business Measures

The various farm business measures were calculated as under Gross income (G.I.)

It is the total value of main product as well as of by-product.

$$\text{G.I.} = \text{Qm} \times \text{Pm} + \text{Qb} \times \text{Pb}$$

Where

G.I. = Gross income
 Qm = Quantity of main product
 Pm = Price of main product
 Qb = Quantity of by-product
 Pb = Price of by-product
 Farm Business Income (F.B.I)

The various farm business measures were calculated as under:

F.B.I. = Gross income – Cost A₂

Return over variable cost = Gross income - Total variable cost

Family labour income = Gross income-Cost B₂

Net income = Gross income – Total cost (Cost C₂)

Return per rupee = Gross income / Total cost (Cost C₂)

Marketable and marketed surplus

Marketable

Marketable surplus refers to the residual quantity left with the producers after meeting their requirement for family consumption, seeds, wages and other requirements. The marketable surplus “M” is calculated as per the marketable surplus of pearl millet will be worked out using the following formula:

MS = P-C

Where,

MS= Marketable surplus (qtls)

P= Total production of pearl millet (qtls/farm)

C= Total requirements for family and farm (qtls/annum)

Marketed surplus

The marketed surplus was worked out as under: It is the quantity of a commodity which a farmer actual sale in the market.

Marketed surplus = MS-Qs

Where,

MS= Marketable surplus

Qs= Quantity stored for future sales

Results and discussion

Cost of cultivation of pearl millet in Morena district involved various costs and these various costs were presented in the Table 1. The table represented various costs such as overhead cost and operational cost in Morena district. It was clear from the table that human labour was an important component of operational cost on farms under study. Land preparation and sowing cost 15.60% for small farmers, 17.08% for medium farmers and 18.02% on large farmers. Small farmers of Morena incurred more cost in labour unit as the per unit cost would decrease with the increase in the farm size. Manure and fertilizer was another important component of the operational cost. The cost of Manure and fertilizer was reported highest on large farms (10.09 %) followed by medium farms (8.82) and then small sized farms (6.60 per cent). Thus, it can be concluded from the above analysis that, the cost imputed due to manures and fertilizers were increased with increase in farm size in Morena district. Average cost imputed due to fertilizers was 8.50% in the study area.

Cost on seed purchase was considered another important component. Cost imputed for seeds purchase was 632.60 Rs(3.02%) by small farmers, 628.52 Rs(3.15%) by medium farmers and 659.48 Rs(3.39%) by large farmers. On an average the cost on seeds was calculated as 659.48 Rs (3.19%) to the total cost in the Morena district. Large farmers incurred highest cost on seeds among all farmers as they were more interested in using the improved varieties to fetch high yield. The share of plant protection chemicals in Morena district farmers were as follows, The total cost incurred including herbicide and fungicide by small farmers was recorded as 1088.3 Rs (5.19%) for medium farmers it was 993.66 Rs (4.98%) and for large farmers it was 1216.95 Rs (5.75%). This cost was also highest in large farmers. Interest percentage on working capital for small farmers was 719.63 Rs (3.43%) , for medium farmers 681.19 Rs(3.42%) and for large farmers 736.64 Rs (3.48%) and average of 712.49 Rs (3.44%). The interest to be paid on working capital had reported to increase with increased farm size of Morena farmers.

Table 1: Cost of cultivation of pearl millet production at sample farms (Rs/ha)

Particular	Small	Medium	Large	Average
Land preparation and sowing	3265.00(15.60)	3400.00(17.08)	3809.00(18.02)	3491.33(16.90)
Manure and fertilizer	1383.00(6.60)	1756.00(8.82)	2134.00(10.09)	1757.67(8.50)
Seeds	632.6(3.02)	628.52(3.15)	717.33(3.39)	659.48(3.19)
Irrigation	409.00(1.95)	475.00(2.38)	500.00(2.36)	461.33(2.23)
Weedicide	640.30(3.05)	511.97(2.57)	642.84(3.04)	598.37(2.89)
Fungicides	448.00(2.14)	481.69(2.41)	574.11(2.71)	501.27(2.42)
Harvesting	3317.00(15.85)	2600.00(13.06)	2600.00(12.30)	2839.00(13.74)
Threshing	1899.00(9.07)	1500.00(7.53)	1300.00(6.15)	1566.33(7.58)
Interest on working capital	719.63(3.43)	681.19(3.42)	736.64(3.48)	712.49(3.44)
Working cost	12713.53(60.74)	12034.37(60.45)	13013.92(61.56)	12587.28(60.92)
Depreciation	310.00(1.48)	350.00(1.75)	450.00(2.12)	370.00(1.79)
Land revenue	100.00(0.47)	100.00(0.50)	100.00(0.47)	100.00(0.48)
Cost A ₁ /A ₂	13123.53(62.71)	12484.37(62.71)	13563.98(64.17)	13057.27(63.21)
Interest on fixed capital	400.00(1.91)	412.00(2.06)	500.00(2.36)	437.33(2.11)
Cost B ₁	13523.53(64.62)	12896.37(64.78)	14063.92(66.54)	13494.61(65.33)
Rental value of own land	4000.00(19.11)	4000.00(20.09)	4000.00(18.92)	4000.00(19.36)
Cost B ₂	17523.53(83.74)	16896.37(84.88)	18063.92(85.46)	17494.61(84.69)
The imputed value of family labor	1500.00(7.16)	1200.00(6.02)	1150.00(5.44)	1283.33(6.21)
Cost C ₁	15023.53(71.79)	14835.00(74.52)	15740.73(74.47)	15199.76(73.58)
Cost C ₂	19023.53(90.90)	18096.37(90.90)	19213.92(90.90)	18777.94(90.90)
Cost C ₃	20925.89(100.00)	19906.01(100.00)	21135.31(100.00)	20655.73(100.00)

Source: Primary Data (2019-20)

Cost Group

Cost of cultivation of pearl millet in Morena district involved various costs. The Table 3.2 presented various cost in the cost group. Average cost of cultivation (cost C₃) of pearl millet in Morena district was found to be 20655.73 Rs/ha. It was decomposed for different farmers as follows, 20925.89 Rs/ha for small farmers, 19906.01 Rs/ha medium farmers and 21135.31 Rs/ha for large farmers. Cost on fertilizers, seeds and human labors were reported high in large farmers hence the cost of cultivation of pearl millet in Morena district was highest for large farmers followed by small farmers and then medium farmers.

The operational cost found more than overhead cost for all size class of farmers. Share of operational cost found to be 60.92 % that is 12587.28 Rs/ha of the total cost (20655.71Rs/ha) in pearl millet of Morena district. Different cost were represented in the Table 4.1.2, overall average of different cost in the present study area reported to be 13057.27 Rs/ha for cost A₁ 13057.27 Rs/ha for cost A₂, 13494.61 Rs/ha for cost B₁, 17494.61Rs/ha for cost B₂, 15199.76 Rs/ha for cost C₁ and 18777.94 Rs/ha for cost C₂. Cost A₂ and cost A₁ for all sample farmers were same because sample farmers did not leased in any area for pearl millet cultivation in the study region. Cost, A₁, A₂, B₁ and C₁ were found highest in large farmers in the sample.

Table 2: Cost of cultivation per hectare of pearl millet on different cost groups basis (Rs/ ha).

Cost	Small	Medium	Large	Average
Operational cost	12713.53	12034.37	13013.92	12587.28
A ₁	13123.53	12484.37	13563.98	13057.27
A ₂	13123.53	12484.37	13563.98	13057.27
B ₁	13523.53	12896.37	14063.92	13494.61
B ₂	17523.53	16896.37	18063.92	17494.61
C ₁	15023.53	14835.00	15740.73	15199.76
C ₂	19023.53	18096.37	19213.92	18777.94

Components of Overhead Cost

Rental value of owned land, Depreciation and interest on fixed capital were overhead cost or fixed cost incurred in pearl millet cultivation in Morena district. Rent on land was fixed per hectare that was 4000 rs per hectare. The percentage of rental value on land to total cost for different farmers were differ and found highest for medium farmers that is 20.09% of total cost.

Depreciation imputed on overall sample farmers was found to be 370.0Rs/ha (1.79% of total cost). Depreciation and farm size has reported positive relationship in Morena district. Interest on fixed capital registered to be 437.33 Rs/ha for all farmers, it increased with the size class of farmers, it was highest for large farmers (2.36%) followed by medium farmers (2.69%) and small farmers (1.91%).

Returns from cultivation of pearl millet crop

Return gained by pearl millet cultivation in Morena district of Madhya Pradesh has presented in the table 3.3. Gross return obtained by small farmers on pearl millet cultivation was 23848.0Rs/ha, it was 21903.0Rs/ha for medium farmers and for large farmers 24700.0Rs/ha on an average gross return of farmers in Morena district on pearl millet was recorded as 23483.66 Rs/ha. The farm business income from pearl millet cultivation in Morena district was 10426.39 Rs/ha. Farm business income was highest for large farmers with 11136.08 Rs/ha.

Table 3: Returns from the cultivation of pearl millet crop on sample farm farms

Particular	Small	Medium	Large	Average
Value of main product	19964.00	18837.00	22200.00	20333.66
Value of by product	3884.00	3066.00	2500.00	3150.00
Gross Return	23848.00	21903.00	24700.00	23483.66
Yield/ha	14.00	13.00	14.80	13.93
Price/q	1426.00	1449.00	1500.00	1458.33
Farm business income	10724.47	9418.63	11136.08	10426.39
Family labour income	6324.47	5006.63	6636.08	5989.06
Net profit	2922.11	1996.99	3564.69	2827.93
cost of production/q	1217.28	1295.39	1259.14	1257.27
B: C ratio	1.14	1.10	1.17	1.15

Return from main produce was found highest in large farmers Rs.22200.00 per hectare followed by Rs.19964.00 and Rs.18837.00 on small and medium farms, respectively. At overall level, it was Rs.20333.67. In regard to return from by produce, it also has negative relationship with size of holding. By product generated 3150.00Rs/ha in average in the present study area. Farm business income at overall level was found 10426.36 which is highest on large farm size followed by Rs 10724.00, Rs 9418.00 on small and medium farm size respectively. Family labor income was highest Rs6636.08 followed by Rs 5006.63, Rs 6324.47 and 5006.63 on medium and small farm size respectively, farmers. Net profit of Morena farmers increased with increase in the farm size. For every one rupee invested on pearl millet cultivation small farmers earned 14 paisa, medium farmers earned 10 paisa and large farmers earned 17 paisa. In an average the farmers of pearl millet cultivation in morina district earned 15 paisa profit for every one rupee they invested. Cost incurred per quintal of pearl millet was lowest in small farmers and hence the profit share would be highest for small farmers of Morena than other farmers of sample under study.

Table 4: Marketable and Marketed surplus (Per farm)

Particular	Small	Medium	Large
Production in QTL	14.00	13.00	14.80
Consumptionqtl	3.85	5.23	8.26
Marketable Surplus	10.15	7.77	6.54
Marketed Surplus	4.00	3.00	2.66

The average production was found in small, medium and large size group in quintal 14.00,13.00, 14.8 respectively. While average consumption in these categories was observed 3.85 quintal (small,) 5.23 quintal (medium), and 8.26 quintal (large,). The average marketable surplus of small farmer category was10.15 quintal and marketed surplus was 4.00 quintal. This was because of distress sale, the urgency to money and lack of storage facilities. The average marketable surplus of medium farmer category was 7.77 quintal and average marketed surplus was 3.00 quintal. This was because of holding capacity of few farmers of this category.

The average marketable surplus of large farmer category was 6.54 quintal and average marketed surplus was 2.66 quintal. This was because most of the farmers of this sample category were rich and resourceful enough to hold the produce to watch out for the price hike and to grab the highest price possible.

Conclusion

It is concluded from aforesaid study that, average cost of cultivation (cost C₃) of pearl millet in the study area was

found to be 20655.73 Rs/ha, which was highest on Rs21135.31 /ha on large, Rs20925.89 /ha on small farmers and Rs19906.01 /ha on medium farmers. The operational cost on small farms was higher due to more intensive use of human and fertilizer, FYM as properly as. Thus, the value C_3 was highest on small farms followed by, medium and large sized farms. It is clear from the table that cost of cultivation of pearl millet reduced with the increase in size of land holdings. An average, the share of operational costs was 60.92 per cent of the total cost (cost C_3) for the sample farms. The operational cost was 12587.28 for the sample farms of the selected villages. Cost, A_1 , A_2 , B_1 and C_1 were found to decrease with the increase in farm size. overall gross income per hectare of pearl millet cultivation was 23483.6667 on different size groups of farms, it was 23848.00, 21903.00, and 24700.00, respectively, on small, medium and large size farms. Thus, the gross income per hectare from pearl millet cultivation was higher on large farms as compared to medium and small sized farms. It was increased with the increase in size of farms. Thus, gross return was highest on large farm Rs.24700.00 followed by Rs.23848.00 on small farm and Rs.2193.00 on large farm. In general, gross return was Rs. 23483.66.(B: C Ratio) Input output ratio was highest as 1.17 on large farm followed by 1.14 and 1.10 on small and medium farm, respectively. On an average output input ratio was 1.15. Per quintal cost of production of pearl millet was minimum on small farm compared to medium and large farm and at overall level it was 1257.27 per quintal. It inferred that cost minimization was higher on small farm; hence it would lead to give the highest profit on small farm as compared to other farms. The marketable surplus of small farmer category was 10.15 quintal and marketed surplus was 4.00 quintal. The average marketable surplus of medium farmer category was 7.77 quintal and average marketed surplus was 3.00 quintal. This was because of holding capacity of few farmers of this category. The average marketable surplus of large farmer category was 6.54 and average marketed surplus was 2.66 quintal.

References

1. Anonymous. Published in Agricultural Statistics at a Glance, Ministry of Agriculture, GOI, (New Delhi), 2019, 19.
2. Chauhan, Chhabra A. "Marketable Surplus and Price-Spread for Maize in Hamirpur District of Himachal Pradesh" Agriculture Economics Research Review. 2005;18:39-49.
3. Deshmukh DD, Pauer BR, Landge VV, Yeware PP. "Marketed surplus and price spread in different channels of pearl millet marketing" International Journal of Commerce and Business Management. 2010;3(1):41-44.
4. Kumar Rahul, Pandey Prem Ratan, Bisarya Satwik Sahay Sharma Kiran. estimation of cost and return of mustard production under different size of farm in Bhind district of Madhya Pradesh. Multilogic in science. 2022;12:31.
5. Kumar Raj, Chahal SS. An economic analysis of maize marketing in Punjab, International Research journal agricultural Economics and Statistics. 2011;2(1):79-86.
6. Srivastava SC, Gupta BS, Tomar Sudeep Singh, Singh HP. Economics of production and Resource use efficiency of soybean production in India Economic Affairs. 2015;60(2):347-354.
7. Srivastava SC, Gupta BS, Singh HP. "Economic analysis of marketing of soybean in Mandsaur District of Madhya Pradesh." Indian Journal of Agricultural Marketing. 2010;24(1):110-118.
8. Sharma Shirish, Singh IP, Parthasarthy Rao P, Basavaraj G, Nagaraj N. An Economics analysis of pearl millet marketing in Rajasthan. Internet Journal Com. And Bus. Manage. 2013;6(1):66-75.
9. Sharma Kiran, Jaulkar AM, Kumar Rahul. Factor Influencing Marketable and Marketed Surplus of Major Crops in Morena District. Int. J Curr. Microbiol. App. Sci. 2020;9(11):1582-1587.
10. Shekhawat BS. Marketing costs, margins and price spread for major Agricultural commodities of Rajasthan, Indian Journal of Agricultural. Marketing. 2009;12(3):124-125.
11. Surywanshi RR, Panwar NP, Kochar BN. "Marketable surplus and marketing cost of cluster bean in western Rajasthan. Journal of Agricultural Marketing. 2009;3(2):201-204.
12. Thombre AP, Ghulghule JN, More SS. Constraints faced by pulse growers in production and marketing and suggestions made by them in Marathwada region of Maharashtra. Agriculture Update. 2009;4(1/2):73-75.
13. Verma PK, Banafar KNS. "Economics analysis of minor millets in Bastar district of Chhattisgarh. African Journal Agricultural Research. 2013;8(39):4928-4931.