

RESOURCE ECONOMICS OF WHEAT CULTIVATION IN CHHINDWARA DISTRICT OF MADHYA PRADESH

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Abstract: An attempt has been made in this study to examine the resource economics of wheat cultivation in Chhindwara district of Madhya Pradesh state. The present study was based on the data collected from a random sample of forty farmers who were selected randomly from four villages. Ten wheat growers from each of the selected village considered to collect the required information on the cost of cultivation aspects of this crop for the present study. The simple mean and average method was used to work out the cost of cultivation of wheat crop. The per hectare cost of cultivation was worked out as Rs.19452.28, Rs.20125.54, Rs. 21722.86 and Rs. 22731.61 per hectare at marginal, small, medium and large farms respectively in the district. The average cost of cultivation was estimated as Rs. 20997.56 per ha. Among the different item of resources used in the cultivation of wheat crop, the share of input and labour cost was accounted 78.51 per cent (Rs. 16485.63) and 21.49 per cent (Rs. 4511.93) of total cost respectively in the study area. Per hectare application of NPK was observed as 143.86 kg; 73.61kg. and 28.53 kg. in the district respectively. The average net return was estimated as Rs. 24863.21 per ha. in the district. The input-output ratio was observed as 1:2.03, 1:2.23, 1:2.26 and 1:2.18 at the different farms respectively with an average of 1:2.18.

Keyword: Input cost, Labour cost, Cultivation, Wheat, Madhya Pradesh

INTRODUCTION

Wheat is one of the foundation crops of India and has got prestigious place in India sub-continent from time immemorial plays the crucial role in food economy and food security system of India. It is the most important staple food crop for one third of the world of the population and contributes more calories and proteins to the world diet than any other cereal crop. It can be processed in to various types of foods. Wheat is cultivated in about 120 countries of the world. China is the largest producer of wheat with annual production of 115.10 million tons during 2009 followed by India with a production of 80.80 million tons. Out of total (685.80 million tons) world's wheat production, 16.79 per cent is contributed by China followed by India (11.78 per cent) (Anonymous 2009-10). The major wheat growing states of India are Uttar Pradesh, Madhya Pradesh, Punjab, Haryana and Rajasthan. These five states contribute about 90 per cent of total wheat production of country. India is the world's biggest consumer of wheat after China with annual domestic demand of about 70 million tons. Export of wheat in India is in terms of quantity showed a sharp fluctuation. Sometimes India used to have large surplus for wheat export depending on the domestic production and stock management. Country exported 26.49 lakh tones of wheat during 2001-02 which remained highest till 2003-04 (40.93 lakh tons of wheat of a value of Rs. 2391.25 Crore). Thereafter, the export of wheat showed a sharp decline up to the year of 2006-07. Wheat trade was inversely affected in India due to violent fluctuations in area under and productivity of crop during the year of 2004-05 to 2006-07 (Anonymous 2006-07). One of the main objectives of a production unit is to co-ordinate and

utilize resources or factors of production in such a manner that together the yield the possible highest net return. Increasing cost of agricultural inputs is contributed in to higher cost of production. In view of this, it is necessary that available scarce inputs should be used as economically and efficiently as possible. Therefore, the present study aims to examine the economics of resources used in the cultivation of wheat at different size group of farms.

MATERIAL AND METHODS

The area under wheat in Chhindwara district is 0.11 million ha. which is about 2.50 per cent of the total area under wheat cultivation in the state. Out of nine tehsils of Chhindwara district, Chourai and Amarwara tehsils are combinedly constitute 0.042 million ha. of area (37.78 per cent) and 0.099 million tone (42.68 per cent) production of the total district. Therefore, one of them i.e. Chourai tehsil was selected randomly for present study. The Chourai tehsil has 195 numbers of villages, out of these, a sample of two per cent village is considered randomly for this study purpose. Therefore, four villages namely Bamhinilala, Bariwara, Chand, and Rajalwadi are selected randomly for the study purpose, in order to collect the primary information related to this study. There are large numbers of wheat growers in these selected villages. From each of these selected villages, a proportionate sample of respondents is considered in order to make a number of respondents equal to forty. These farmers are classified into different categories based on their land holding i.e. marginal (up to 1.00 ha.), small (1.01 to 2.00 ha.), medium (2.01 to 4.00 ha.) and large (above 4.00 ha.).

RESULT AND DISCUSSION

(I) Cost of cultivation of wheat at sampled farms

The cost comparison within the important operations of the crop in the study areas is presented in Table 01. It is clear from this table that total cost of cultivation of wheat was estimated as Rs.20997.56. It is interesting to note that total cost is increasing along with size of holdings in the study area. Looking to different operations, the average expenditure on harvesting, threshing, winnowing and transportation is also considerably higher (Rs.4731.92 per hectare) at the different farms of which shows that the cost involved in these operations mainly due to more production of crop at farms of study area. The seed and sowing is also playing an important role in obtaining the better yield. The expenditure incurred on this operation was observed as Rs.4153.09 per hectare on an average at sampled farms. Cost of seed material and sowing method are mainly responsible for this cost of seed and sowing operation. Farmers generally purchase the seed each year for sowing of wheat crop. Manures and fertilizers is an operation which has large difference in the cost of cultivation. The average cost incurred on this operation was computed as Rs.4149.43 per ha. This wide variation is mainly due to higher price and more quantity of fertilizer applied by the farmers in the study area only. Another difference in expenditure was

observed in irrigation. Farmers spent Rs. 3156.44 per hectare on irrigation. More number of irrigation (5 No) provided by the farmers in the wheat is the main reason of this large cost of irrigation in study area.

(II) Cost of labour at sampled farms:

Cost of labour at different operations like field preparation, intercultural & plant protection and harvesting & threshing are some operations in which considerable cost of labour was observed at different farms of study area. The share of labour cost in total cost of cultivation of wheat of different operation at sampled farms is presented in Table 02. On an average the cost of labour was estimated as Rs. 4511.93 per hectare at sampled farms which is about 22 per cent of the total cost of cultivation. Looking to different operations, it is clear from this table that the labour cost incurred on harvesting & threshing was considerably more at the sampled farms. Across the categories, this difference varies from about 55 per cent to 40 per cent these operations. On an average the total labour cost was estimated on this operation Rs. 2188.53 per ha (48.51 per cent). Labour cost on irrigation was considerably more at the sampled farms. Across the categories, this difference varies from about 33 per cent to 68 per cent on irrigation operation. Probably, more number of irrigation at the farms of MP may be the appropriate reason of this high labour cost incurred at different farms of the study area.

Table: 1 Cost of cultivation of wheat at sampled farms (Rs. / ha.)

| S. No. | Category | Field preparation | Manure and fertilizer | Seed and sowing | Pre-sowing irrigation+ irrigation | Intercultural+ plant protection | Harvesting + Threshing+ Transportation | Fixed cost | Total cost (Rs. /ha.) |
|--------|----------|--------------------|-----------------------|--------------------|-----------------------------------|---------------------------------|----------------------------------------|------------------|-----------------------|
| 1. | Marginal | 2241.11 (11.52) | 3280.72 (16.87) | 3222.56 (16.57) | 3004.62 (15.44) | 1754.24 (9.01) | 5510.99 (28.33) | 438.04 (2.26) | 19452.28 (100.0) |
| 2. | Small | 2443.78 (12.14) | 3912.40 (19.43) | 4036.67 (20.05) | 2951.46 (14.67) | 1418.93 (7.05) | 4909.44 (24.40) | 452.86 (2.26) | 20125.54 (100.0) |
| 3. | Medium | 2727.56 (12.56) | 4759.82 (21.91) | 4318.89 (19.89) | 3240.14 (14.91) | 1850.21 (8.51) | 4338.24 (19.98) | 488.00 (2.24) | 21722.86 (100.0) |
| 4. | Large | 2710.49 (11.92) | 4510.11 (19.85) | 5177.84 (22.78) | 3440.77 (15.13) | 2184.13 (9.61) | 4198.07 (18.47) | 510.20 (2.24) | 22731.61 (100.0) |
| | Average | 2538.68 (12.09) | 4149.43 (19.77) | 4153.09 (19.78) | 3156.44 (15.03) | 1795.96 (8.56) | 4731.92 (22.53) | 472.04 (2.24) | 20997.56 (100.0) |

Table:2. Cost of labour at sampled farms (Labour cost/ha.)

| S. No. | Category | Field preparation | Manure and fertilizer | Sowing | Pre-sowing irrigation + irrigation | Intercultural + plant protection | Harvesting + transport. from field to threshing place+ field to home | Total cost (Rs. /ha.) |
|--------|----------|-------------------|-----------------------|------------------|------------------------------------|----------------------------------|----------------------------------------------------------------------|-----------------------|
| 1. | Marginal | 185.47 (3.29) | 334.83 (5.93) | 200.93 (3.57) | 1010.81 (17.91) | 803.70 (14.25) | 3105.29 (55.05) | 5641.03 (100.0) |
| 2. | Small | 82.84 (1.69) | 253.25 (5.20) | 78.10 (1.60) | 1010.64 (20.73) | 691.12 (14.18) | 2758.57 (56.60) | 4874.52 (100.0) |
| 3. | Medium | 32.28 (0.83) | 256.29 (6.67) | 160.09 (4.17) | 1151.70 (29.96) | 759.19 (19.75) | 1484.81 (38.62) | 3844.36 (100.0) |

| | | | | | | | | |
|----|---------|-----------------|------------------|------------------|--------------------|-------------------|--------------------|--------------------|
| 4. | Large | 36.01 (0.95) | 244.03 (6.46) | 27.01 (0.71) | 1257.07 (33.29) | 669.05 (17.71) | 1544.34 (40.88) | 3777.51 (100.0) |
| | Average | 82.69 (1.83) | 272.79 (6.04) | 125.23 (2.78) | 1105.81 (24.51) | 736.98 (16.33) | 2188.43 (48.51) | 4511.93 (100.0) |

Table: 3. Cost of inputs at sampled farms (Input cost / ha.)

| S. No. | Category | Field preparation (Machineries) | Manure and fertilizer | Seed | Pre-sowing irrigation+ irrigation | Intercultural+ plant protection | Harvesting + Threshing + Transport. | Fixed cost | Total cost (Rs./ha.) |
|--------|----------|---------------------------------|-----------------------|--------------------|-----------------------------------|---------------------------------|-------------------------------------|------------------|----------------------|
| 1. | Marginal | 2055.63 (14.89) | 2945.89 (21.32) | 3021.63 (21.88) | 1993.81 (14.43.) | 950.54 (6.89) | 2405.71 (17.41) | 438.04 (3.18) | 13811.25 (100.0) |
| 2. | Small | 2360.94 (15.48) | 3659.15 (23.99) | 3958.57 (25.96) | 1940.82 (12.72) | 727.81 (4.78) | 2150.87 (14.10) | 452.86 (2.97) | 15251.02 (100.0) |
| 3. | Medium | 2695.28 (15.08) | 4503.53 (25.19) | 4158.80 (23.27) | 2088.44 (11.68) | 1091.02 (6.10) | 2853.43 (15.96) | 488.00 (2.72) | 17878.50 (100.0) |
| 4. | Large | 2674.48 (14.11) | 4266.08 (22.50) | 5150.83 (27.18) | 2183.70 (11.52) | 1515.08 (7.99) | 2653.73 (14.00) | 510.20 (2.70) | 18954.10 (100.0) |
| | Average | 2455.98 (14.90) | 3876.64 (23.51) | 4027.86 (24.43) | 2050.62 (12.44) | 1058.98 (6.42) | 2543.51 (15.42) | 472.04 (2.87) | 16485.63 (100.0) |

Table 4: Fertilizer consumption pattern in wheat cultivation at sampled farms

| S. No. | Name of fertilizer | Fertilizer (in Kg.) | | Nutrients (in Kg.) | | |
|--------|--------------------|---------------------|---------|--------------------|-------------------------------|------------------|
| | | Per farm | Per ha. | N ₂ | P ₂ O ₅ | K ₂ O |
| 1. | DAP | 723.44 | 130.82 | 23.54 | 60.17 | - |
| 2. | UREA | 1446.75 | 261.61 | 120.34 | - | - |
| 3. | SSP | 464.68 | 84.02 | - | 13.44 | - |
| 4. | MOP | 262.96 | 47.55 | - | - | 28.53 |
| Total | | | | 143.88 | 73.61 | 28.53 |

Table: 5: Economics of wheat production at sampled farms

| S. No. | Particulars | Marginal | Small | Medium | Large | Average |
|--------|--------------------------------|-----------|-----------|-----------|-----------|-----------|
| 1. | Cost of cultivation (Rs. /ha.) | 19,452.28 | 20,125.54 | 21,722.86 | 22,731.61 | 20,997.56 |
| 2. | Production (Qu. /ha.) | | | | | |
| a. | Main product | 32.45 | 34.91 | 37.11 | 36.60 | 35.34 |
| b. | By-product | 57.18 | 60.94 | 65.70 | 66.60 | 62.67 |
| 3. | Cost of production (Rs. /qtl.) | | | | | |
| a. | Main product | 599.45 | 576.49 | 585.36 | 621.08 | 594.03 |
| 4. | Price (Rs. /qtl.) | | | | | |
| a. | Main product | 1044.00 | 1115.55 | 1150.00 | 1160.00 | 1117.93 |
| b. | By-product | 100.00 | 100.00 | 100.00 | 100.00 | 100.0 |
| 5. | Return (Rs. /ha.) | | | | | |
| a. | Main product | 33877.80 | 38943.85 | 42676.50 | 42456.00 | 39592.87 |
| b. | By-product | 5718.00 | 6094.00 | 6570.00 | 6660.00 | 6267.90 |
| 6. | Gross return (Rs. /ha.) | 39,595.80 | 45,037.85 | 49,246.50 | 49,116.00 | 45,860.77 |
| 7. | Net return (Rs. /ha.) | 20,143.52 | 24,912.31 | 27,523.64 | 26,384.39 | 24,863.21 |
| 8. | Net return (Rs. /qtl.) | 620.75 | 713.61 | 741.67 | 720.88 | 698.46 |
| 9. | Input-output ratio | 1:2.03 | 1:2.23 | 1:2.26 | 1:2.16 | 1:2.18 |

The expenditure incurred on intercultural and plant protection is too much high at marginal, small and medium farms of the study area. The expenditure

estimated on an average Rs.736.98 per ha. (16.33 per cent). Other operations like field preparation, seed and sowing and manure & fertiliser application are

some other operations in which considerable difference of labour cost at different farms of study area was not observed.

(III) Cost of inputs at sampled farms

The cost of input used in wheat crop in the study area is presented in Table 03. It is clear from this table that total input cost of wheat in MP is estimated as Rs.16485.63 per ha. Per hectare expenditure incurred on seed was observed as Rs.4027.86 per ha. Constituted 24.43 per cent of the total cost of inputs which shows that farmers are spending more amount on this input. New seed purchased by farmers each year may be an appropriate reason of this phenomenon. It is observed from the table that on an average per hectare manures and fertilizers cost was estimated as Rs.3876.64 per ha. at farms constituted 23.51 per cent of total input cost. Thus, it is clear that the relatively higher doses of the fertilizer used by the farmers are the main reason behind this high cost. Another difference in expenditure was observed in field preparation in the study area. Farmers of study area spent Rs.2455.98 per hectare on this operation. More number of ploughing done by the farmers of MP before sowing the seed may be a reason of this difference at the farms.

(IV) Estimation of fertilizer use at sampled farms

The fertilizer consumption pattern at sampled farms is presented in Table 04. The table reveals that the DAP, urea, SSP and MOP are four major fertilizers which are used by the farmers for wheat cultivation. The application of these fertilizers was observed as 130.82 Kg., 261.61 Kg., 84.02 Kg. and 47.55 Kg. per hectare respectively which provide 143.88 Kg. Nitrogen, 73.61 Kg. Phosphorus and 28.53 Kg. Potash to the wheat crop at the farms of study area respectively.

(V) Economics of wheat production at sampled farms

The economics of wheat production at sampled farms is presented in Table 05. The per hectare cost of cultivation was estimated as Rs.19425.28, Rs. 20125.54, Rs. 21722.86 and Rs. 22731.61 at marginal, small, medium and large farms of Chhindwara district respectively along with Rs. 20997.56 as an average. It shows that the cost of cultivation is increasing as the size of holding increased. The higher cost of cultivation in the study area attributes to high productivity of the crop. Consequently, the average yield was observed as 35.34 quintal at farms of Chhindwara district. It is interesting to note that the yield has, generally, positive relation with the size of holding in the study area with few exceptions. The per quintal cost of production was ranges from Rs. 576.49 at small farms to Rs.621.08 at large farms having an average of Rs.594.03 per quintal at sampled farms. The

higher yield at the different farms was the main reason of less cost of production at these farms. The average price of the produce was observed as Rs.1117.93 per quintal in the study area. Variety and quality of wheat is playing important role to decide the per quintal price. The average gross return was observed as Rs. 45860.77 per hectare which ranges from Rs. 39595.80 at marginal farms to Rs. 49246.50 at medium farms of the area. Per hectare net return depends on per hectare yield and price of this produce. The net returns of this crop was observed highest at medium farms i.e. Rs. 27523.64 followed by Rs. 26384.69 at large farms, Rs. 24912.31 at small farms and Rs. 20143.52 at marginal farms. The average input-output ratio was estimated as 1:2.18 which varied from 1:2.03 at marginal farms to 1:2.26 at medium farms. It clearly shows that the input-output ratio at sampled farms is more favorable to the producers due to higher yield and price received by the farmers of the study area.

CONCLUSION

The forgoing study indicates that the per hectare cost of cultivation was worked out as Rs.19452.28, Rs. 20125.54, Rs. 21722.86 and Rs. 22731.61 per hectare at marginal, small, medium and large farms respectively in the district. The average cost of cultivation was estimated as Rs. 20997.56 per ha. Among the different item of resources used in the cultivation of wheat crop, the share of input and labour cost was accounted 78.51 per cent (Rs. 16485.63) and 21.49 per cent (Rs. 4511.93) of total cost respectively in the study area. Per hectare application of NPK was observed as 143.86 kg; 73.61kg. and 28.53 kg. in the district respectively. The average net return was estimated as Rs. 24863.21 in the district. The input-output ratio was observed as 1:2.3, 1:2.23, 1:2.26 and 1:2.18 at the different farms of respectively.

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