Cost and income structure of wheat cultivation in Vindhyan Plateau of Madhya Pradesh

R.F. Ahirwar[1✉], Ashok Kumar Verma[2] and L.S. Shekhawat[3]

[1]Department of Agricultural Economics and Farm Management, J.N.K.V.V., College of Agriculture Ganj Basoda, Madhya Pradesh-464221, India.
[2]Head Office, District Central Cooperative Bank, Vidisha, Madhya Pradesh-464001, India.
[3]College of Agriculture, J.N.K.V.V. Ganj Basoda, Vidisha, Madhya Pradesh-464221, India.

✉Corresponding author: ramahirwar@yahoo.co.in

ABSTRACT

The present study has been made to work out the cost of cultivation, profitability and production as well as marketing constraints of wheat cultivation faced by farmers. The primary data were collected from 105 sample respondents (40 small, 40 medium and 25 large) through pre-tested interview schedule. The cost of cultivation was found to be highest on large farm (₹ 29379.88/ha) as compared to medium farm (₹ 26155.99/ha) and small farm (₹ 21942.80/ha). The gross income received from wheat cultivation was to be ₹ 50166.54 per hectare on overall farms, while gross income was found to be maximum in case of large farm (₹ 55817.55/ha) followed by medium farm (₹ 50191.20/ha) and small farm (₹ 44490.87/ha). The net income, farm business income, family labour income and farm investment income were found to be ₹ 24340.32, ₹ 35779.93, ₹ 27969.70 and ₹ 34498.43 per hectare, respectively on overall farms. The benefit cost ratio was to be highest on small farm (1:2.027) as compared to medium (1:1.918) and large farm (1:1.899). The wheat cultivators reported that potential yield could not be achieved due to various production constraints viz. lack of soil testing facilities, lack of knowledge of plant protection measures, lack of knowledge of recommended package of practices, unavailability of hired human labour, irregularity of electricity supply, lack of capital, lack of proper training, disease problems, unavailability of high yielding variety seed and unavailability of fertilizers at operation period.

Keywords: Cost, benefit cost ratio, gross income, family labour income, farm business income

Wheat (*Triticum Aestivum* L.) is the most widely cultivated cereals crop which is extensively used for human consumption in the form of chapaties, puries, paratha, dalia, halwa, and upma etc. Recently wheat is being used for processed food products like baked leavened breads, biscuits, cakes, pastries, flakes and noodles (Singh 2013). The China ranks first in the total production of wheat in the world which accounted for 16.74% followed by India (12.39%), Russian Federation (8.02%), U.S.A. (7.76%), France (5.42%), Australia (3.91%) and Canada (3.60%). The area, production and productivity of wheat in India were 29.90 million hectare, 94.90 million tonnes and 3177 kg/ha, respectively. The area of wheat in Madhya Pradesh was 4.89 million hectare which accounted for 16.38% as well as production of 11.54 million tonnes which accounted for 12.16% of the country with productivity of 2360 kg/ha The major producing states are Uttar Pradesh, Punjab, Haryana and Madhya Pradesh which contributed about 75.66% production of the country (GOI 2011-12). The problems in wheat cultivation are due to poor resource base of the farmers and non-adoption of recommended production techniques. The specific objectives of the study are given below:

1. To estimate the costs and profitability structure of wheat cultivation at different size of farms.
2. To work out the various production and marketing constraints of wheat cultivation faced by farmers.

Materials and Methods

The present study was conducted to Vindhyan plateau of Madhya Pradesh, which covers six districts namely, Sehore, Bhopal, Raisen, Vidisha, Sagar and Damoh. On the basis of homogeneity with respect of agro-climatic development, the Vidisha district was randomly selected for the study. Three stage random sampling design, i.e. block, village and cultivators. The Vidisha block from Vidisha district was selected randomly and in which two villages of this block were further selected randomly for collection of primary data from wheat cultivators. A list of all the wheat growers of these two selected villages was prepared and categorized into small (< 2 ha), medium (2 to 4 ha) and large (> 4 ha) based on the operational holding (Ahirwar *et al* 2014). Thus, the sampling unit comprised of 105 wheat cultivators in which 40 small, 40 medium and 25 large cultivators were selected for interview. The primary data were collected from sample cultivators through pre-tested interview schedule for the agricultural year 2012-13. The different cost components, viz. hired human labour, family labour, machine labour, seed, plant protection materials, fertilizer, interest on working capital, land revenue, rental value of owned land, depreciation and interest on fixed capital were taken into consideration for the study. The cost of cultivation of wheat was estimated under various cost concepts. Cost A_1 = Value of hired human labour, hired bullock labour, owned bullock labour, hired machine labour, owned machine labour, value of seed (both farm produced and purchase), value of insecticide and pesticides, value of manure (owned and purchased) , value of fertilizer, depreciation on implements and farm buildings, irrigation charges, land revenue and other taxes, interest of working capital and miscellaneous expenses (artisans etc.).

Cost A_2 = Cost A_1 + rent paid for leased in land

Cost B_1 = Cost $A_{1 +}$ interest on value of owned fixed capital assets (excluding land).

Cost B_2 = Cost B_1 + rental value of owned land and rent paid for leased- in land.

Cost C_1 = Cost B_1 + imputed value of family labour.

Cost C_2 = Cost B_2 + imputed value of family labour.

Cost C_3= CostC_2 + value of management input at 10% of cost C_2 (*http://eands.dacnet.nic.in*). The cost concepts were used for estimation of wheat cultivation, which are adopted by Directorate of Economics and Statistics, Department of Agriculture and Cooperation, and Commission for Agricultural Cost and Price, Ministry of Agriculture, GOI. The gross income, net income, farm business income, family labour income, farm investment income and benefit cost ratio were also worked out using different profitability concepts. The collected data were processed to work out the various costs, profitability and identify the production as well as marketing constraints restricting the enhancement of income of wheat cultivators.

Results and Discussion

Cost of cultivation

The different cost components viz. hired human labour, family labour, machine labour, seed cost, plant protection materials, fertilizer, interest on working capital, land revenue, rental value of owned land, depreciation and interest on fixed capital were taken into consideration for the study. I is observed from the Table 1 revealed that the cost of cultivation of wheat was estimated under various cost concepts like as Cost A_1, Cost A_2, Cost B_1, Cost B_2, Cost C_1, Cost C_2 and Cost C_3. The cost of cultivation of wheat in case of large farms was found to be highest (₹ 29379.88/ha) followed by medium (₹ 26155.99/ha) and small farm (₹ 21942.80/ha). As regard to Cost A_1 of wheat cultivation in case of large farms was found to be highest (₹ 17047.45/ha) as compared to medium (₹ 14161.51/ha) and small farms (₹ 11950.73/ha). The cost of fertilizer in case of overall farms was highest (₹ 3045.49/ha) followed by seed (₹ 2923.13/ha), hired human labour (₹ 2543.92/ha) and machine labour (₹ 2463.71/ha) in cultivation of wheat. The cost A_2, B_1, B_2, C_1, C_2 and C_3 were used ₹ 14386.57/ha, ₹ 16043.16, ₹ 22196.84/ha, ₹ 15722.57/ha, ₹ 23532.84/ha and ₹ 25886.12/ha respectively in wheat cultivation on overall farm size. The cost C_3 was found to be more

Table 1. Cost of cultivation of wheat at different size of farm (₹ /ha)

Cost concept	Cost items	Size of Farms			Overall
		Small	Medium	Large	
Cost A_1	Hired Human labour	2184.25	2327.36	3120.15	2543.92
	Machine labour	2453.26	2516.72	2421.14	2463.71
	Seed	2672.384	2898.32	3198.696	2923.13
	Fertilizer	2758.932	2785.17	3592.372	3045.49
	Plant Protection Chemicals	69.528	100.704	125.46	98.56
	Depreciation	1010.16	2586.39	3563.25	2386.60
	Land Revenue	14.21	14.21	24	17.47
	Interest on working capital @7%	788.0067	932.6372	1002.385	907.68
Cost A_2	Cost A_1	11950.73 (54.46)	14161.51 (54.14)	17047.45 (58.02)	14386.57 (55.58)
	Rent paid for leased in land	0	0	0	0.00
	Cost A_2	11950.73	14161.51	17047.45	14386.57
Cost B_1	Cost A_1	11950.73	14161.51	17047.45	14386.57
	Interest on Fixed capital	756 (3.45)	1890.804 (7.24)	2322.98 (7.91)	1656.59 (6.40)
	Cost B_1	12706.73	16052.32	19370.43	16043.16
Cost B_2	Cost B_1	12706.73	16052.32	19370.43	16043.16
	Rental value owned value	5491.27 (25.03)	6657.54 (25.45)	6312.23 (21.48)	6153.68 (23.77)
	Cost B_2	18198	22709.85	25682.66	22196.84
Cost C_1	Cost B_1	11950.73	14161.51	17047.45	14386.57
	Imputed value of family labour	1750 (7.97)	1068.32 (4.08)	1026.32 (3.50)	1336.00 (5.16)
	Cost C_1	13700.73	15229.83	18073.77	15722.57
Cost C_2	Cost B_2	18198	22709.85	25682.66	22196.84
	Imputed value of family labour	1750	1068.32	1026.32	1336.00
	Cost C_2	19948	23778.17	26708.98	23532.84
Cost C_3	Cost C_2	19948	23778.17	26708.98	23532.84
	Cost C_2 of 10%	1994.8 (9.09)	2377.82 (9.09)	2670.90 (9.09)	2353.28 (9.09)
	Cost C_3	21942.8 (100)	26155.99 (100)	29379.88 (100)	25886.12 (100)

Figures in parentheses indicate percentage of cost C_3

(₹/ha)

S. No.	Particulars	Size of farms			Overall
		Small	Medium	Large	
1	Main Product (q/ha)	24.57	28.16	29.13	27.29
2	Price (₹ /q)	1591.00	1620.00	1785.00	1665.33
3	Value of main product (Rs/ha)	39090.87	45619.2	51997.05	45569.04
4	By Product (Q/ha)	12.00	10.16	8.49	10.22
5	Price (₹ /q)	450	450	450	450.00
6	Value of by product (₹ / ha)	5400	4572	3820.5	4597.50
7	Gross Income	44490.87	50191.2	55817.55	50166.54
8	Net Income	22548.07	24035.21	26437.67	24340.32
9	Farm Business Income	32540.10	36029.70	38770.10	35779.93
10	Family Labour Income	26292.90	27481.30	30134.90	27969.70
11	Farm Investment Income	30790.10	34961.40	37743.80	34498.43
12	B:C ratio	2.027	1.918	1.899	1.938

on large farms (₹ 29379.88/ha) as compared to medium size of farms (₹ 26155.99/ha) and small size of farms (₹ 21942.80/ha).

Income structure

As regards to the income structure from wheat cultivation at different size of farms were concerned in the study area it is observed from the table 2 that an overall farmer gained yield of 27.29q/ha at their farm, which was found to be maximum on large farms (29.13 q/ha) followed by medium farms (28.16q/ha) and small farms (24.57q/ha). The large farmers were found to sell his produce at highest rate (₹ 1785/q) as compared to medium farmers (₹ 1620/q) and small farmers (₹ 1591/q) as they had more technical knowledge and possessed marketing facilities such as storage etc. and were able to created more time utility in their product as compared to small and medium farmers.

The gross income, net income, farm business income, family labour income, farm investment income and benefit cost ratio in case of overall farms were found ₹ 50166.54, ₹ 24340.32, ₹ 35779.93, ₹ 27969.70, ₹ 34498.43, and 1:1.938 respectively from the cultivation of wheat. The gross income from wheat

cultivation was found to be maximum on large farms (₹ 55817.55/ha) as compared to medium farms (₹ 50191.20/ha) and small farms (₹ 44490.87/ha). It is also observed from the data that net income from cultivation of wheat was found to be highest on large farms as compared to other farm as well as farm business income family labour income and farm investment income were also found to be highest on large farms. The benefit cost ratio was found to be highest on small size of farm (1: 2.027) as compared to medium farms (1: 1.918) and large farms (1: 1.899). Similar study has also been done by Raghuwanshi *et al* (1999), Gurjar and Varghese (2005) and Chandra (2006).

Production and marketing constraints

The constraints related to production and marketing of wheat cultivation are presented in Table 3. It is observed from the data that lack of soil testing facilities were observed major constraints in the cultivation of wheat as reported by 93% cultivators followed by lack of knowledge of plant protection measure (83%), lack of knowledge of recommended package of practices (75%), unavailability of hired human labour at peak operation time (67%), low price (64%), lack of knowledge of minimum support price (60%), irregularity of electricity supply (55%), lack of capital (53%), lack of knowledge of mandi charges (47%), lack of proper training for wheat growers (42%), unavailability of high yielding variety seed (40%), high cost of input (40%), lack of fertilizer (36%), more transportation charges (33%), disease problems (27%), lack of knowledge about warehouse facilities (26%), and lack of marketing news (25%). Similar study was conducted by Niranjan et *al* (2011).

Conclusion

It is concluded the cost of wheat cultivation as quoted earlier cost C_3 was noted highest in case of large farms (₹ 29379.88/ha) followed by medium farms (₹ 26155.99/ha) and small farms (₹ 21942.80/ ha) in which cost A_1 was also found highest on large farms (17047.45/ha) in comparison to medium farms (₹ 14161.51/ha) and small farms (₹ 11950.73/ ha). The productivity was to be found highest in case of large farms (29.13q/ha) as compared to medium farms (28.16q/ha) and small farms (24.57q/ ha). The gross income was observed highest from the cultivation of wheat on large farms (₹

Table 3. Production and marketing constraints of wheat cultivation at different size of farms

| S. No. | Constraints | Size of farms | | | | Rank |
		Small 40	Medium 40	Large 25	Total 105	
A.	Production constraints					
1	Lack of soil testing facilities	38 (95)	37 (92)	23 (90)	98 (93)	I
2	Lack of knowledge of plant protection measurement	36 (91)	32 (79)	19 (77)	87 (83)	II
3	Lack of knowledge of recommended package of practices	36 (89)	27 (67)	16 (65)	79 (75)	III
4	High cost of input materials	22 (55)	16 (40)	4 (15)	42 (40)	XII
5	Unavailability of hired human labour at peak operational season	24 (60)	30 (75)	16 (65)	70 (67)	IV
6	Irregularity of electricity supply	26 (65)	22 (54)	10 (38)	58 (55)	VII
7	Lack of capital	28 (70)	22 (55)	6 (25)	56 (53)	VIII
8	Unavailability of high yielding variety seed	22 (56)	18 (45)	3 (11)	43 (40)	XI
9	Lack of fertilizer at operation time	19 (48)	14 (34)	5 (20)	38 (36)	XIII
10	Disease problems	12 (29)	10 (25)	6 (23)	28 (27)	XV
11	Lack of proper training for wheat growers	22 (55)	15 (37)	7 (27)	44 (42)	X
B.	Marketing constraints					
12	Low price of grain	28 (71)	24 (61)	16 (65)	68 (64)	V
13	Lack of knowledge of minimum support price	28 (70)	22 (54)	13 (50)	63 (60)	VI
14	Lack of knowledge of mandi charges	26 (64)	19 (48)	4 (15)	49 (47)	IX
15	More transportation charges	22 (55)	10 (25)	3 (10)	35 (33)	XIV
16	Lack of marketing news	13 (33)	10 (24)	3 (11)	26 (25)	XVII
17	Lack of knowledge about facilities of warehouse	14 (35)	10 (25)	3 (10)	27 (26)	XVI

Figures in parentheses indicate percentage

55817.55/ha) as compared to medium farms (₹ 50191.20/ha) and small farms (₹ 44490.87/ha). The net income, farm business income and farm investment income was noticed high on large farms as compared to medium and small farms while benefit cost ration was found to be highest in case of small farms (1:2.027) followed by medium farms (1:1.918) and large farms (1: 1.937). The small farmers used their scare resources optimally as compared to medium and large farms in wheat cultivation. The 93% farmers reported that the soil testing facility was not available followed by lack of knowledge of plant protection measures, lack of knowledge of recommended package of practices, unavailability

of hired human labour at peak operation time, low price, lack of knowledge about minimum support prices, irregularity of electricity supply, lack of capital, lack of knowledge of mandi charges, lack of proper training for wheat growers, unavailability of high yielding variety seed and high cost of input, lack of fertilizer etc. Looking to the above research findings it can be concluded that not only wheat is a profitable crop in the study area but still there is a scope to generate further income and employment.

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