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A study of input utilization pattern, cost structure, returns and constraints of *rabi* maize in relation to its competing crops in Banswara district of Rajasthan

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Abstract
Present study was formulated to examine the scope and prospects of *rabi* maize in Banswara district of Rajasthan. For this purpose, input utilization pattern, cost structure and returns of the crop were analyzed using the CACP concepts in relation to its two most important competing crops (i.e. *kharif* maize and wheat) during the year 2017-18. A total sample of 45 farmers cultivating all three crops was selected randomly from three villages of Banswara tehsil. The results of the study revealed that the total cost of cultivation was reported higher in case of *rabi* maize (₹ 55946.02 per hectare) as compared to *kharif* maize (₹ 33937.97 per hectare) and wheat crop (₹ 49778.93 per hectare). This is mainly because of the higher total variable cost reported in case of *rabi* maize (₹ 44685.20 per hectare) than wheat (₹ 26690 per hectare) and *kharif* maize (₹ 39259.26 per hectare). Higher cost have been observed mainly because of the intensive input application found in *rabi* maize like higher use of seeds (24.6 Kg/ha), fertilizer application (374.77 kg per hectare) and farm yard manure (165.6 Q/ha); were found substantially high in comparison to the other two crops. All this contributed towards the higher yield resulted in *rabi* maize (73.17 quintals per hectare) as against 27.44 and 38.6 quintals per hectare for *kharif* maize and wheat crop, respectively. Gross and net income were also found higher in case of *rabi* maize *viz*., ₹ 102424.60/ha and ₹ 46478.56/ha, respectively. Also, the constraints faced by the farmers in rabi maize cultivation were analysed to overcome the obstacles in production. This climatic suitability coupled with emerging immense irrigation capabilities due to "Mahi Bajaj Sagar Project" in Banswara district contributed towards the higher B:C ratio of *rabi* maize (1.83) in comparison to *kharif* maize (1.38) and wheat crop (1.55); indicating bright future of the crop in the study area.

Keywords: *Rabi* maize, input, cost structure, returns, constraints etc.

Introduction
Maize is considered as a staple food of many people in different parts of the world. Maize grain consists of 10 per cent protein, 4 per cent oil, 70 per cent carbohydrate, 2.3 per cent crude fibre, 10.4 per cent albuminoides and 1.4 per cent ash. It has a nutritional value for both animals and humans. India ranks fifth in terms of global production, contributing only 2.53 per cent of this production with a quantum of 27 million MT (2018-19). Importantly, maize contributes more than 2 per cent to the total value of output from all agricultural crops (Maize Vision 2022 Report, 2018). In India, maize crop occupies an area of 9.2 million hectares with a production and productivity of 27.23 million tonnes and 29.65 quintal per hectare, respectively during 2018-19. Out of the total production of maize, *rabi* maize was grown in an area of 1.65 million hectare with the grain production of 6.76 million tonnes and average productivity of 4.09 tonnes per hectare and *kharif* maize was grown in an area of 7.42 million hectare with the grain production of 17.07 million tonnes and an average productivity of 2.30 tonnes per hectare (Agricultural Statistics at a Glance, 2018). Karnataka is the leading producer of maize in India followed by Madhya Pradesh and Bihar (Ministry of Agriculture & Farmers Welfare, GOI, 2019).
Rajasthan ranks second in terms of area and fifth in terms of production among all the maize producing states in the country. The state accounts for 9.31 per cent of the total area and 7.27 per cent of the total production of maize in India. The crop is being cultivated in 857 thousand

hectare area with total production of 1.98 million tonnes and productivity of 2.28 thousand Kg per hectare in the year 2018-19. Out of this; *Rabi, Kharif* and summer maize were grown in an area of 12 thousand hectares, 844 thousand hectares and 8 hectares, respectively with the grain production of 66 thousand tonnes, 1.89 million tonnes and 29 tonnes, respectively and average productivity of 5.37 thousand Kg per hectare, 2.24 thousand Kg per hectare and 3.62 thousand Kg per hectare, respectively (Department of Agriculture, Government of Rajasthan, 2019-20). Major districts producing *rabi* maize are Dungarpur, Banswara, Pratapgarh, Chittorgarh and Jalore. The crop shares 1.4 per cent of total area and 3.33 per cent of total production of maize in Rajasthan. Banswara is one of the districts in southern Rajasthan which qualifies the climatic requirements for *rabi* maize cultivation as winter season remain frost free and temperature usually does not fall below 13ºC. This climatic suitability coupled with emerging immense irrigation capabilities due to "Mahi Bajaj Sagar Project" provides bright future for *rabi* maize cultivation in Banswara district. Due to all these conditions, Banswara ranks first in terms of both area and production under *rabi* maize where it is grown in an area of 11.9 thousand hectares with a production and productivity of 65.8 thousand MT and 5.7 tonnes per hectare respectively (Land Revenue Department, Banswara, 2018-19).

The present scenario of agricultural development efforts in the country encompasses evaluation of strategies related to input supply and strengthening of the input supply system. Adequate knowledge of input utilization pattern, cost structure and returns of *rabi* maize in relation to its competing crops (*kharif* maize and wheat) is essentially significant for making necessary adjustment towards the input based strategies for enhancing its production. Keeping the above background in mind, the present study was conducted on comparison of input utilization pattern, cost structure and returns of *rabi* maize, *kharif* maize and wheat crops with the identification of constraints faced by farmers in *rabi* maize cultivation in Banswara district of Rajasthan.

Materials and Methods

The present study pertaining to the agricultural year 2017-18; comprises of both the primary and secondary data. Primary data were collected through personal interviews with the help of suitably structured and pretested schedules. The detailed information about the cropping pattern followed, back ground of family, holding area, value of different farm assets, input used and output obtained along with their prices were collected. The opinions of farmers regarding the constraints in the production of *rabi* maize were also collected. On the other hand, secondary data on area under cultivation of *rabi* maize were collected from land revenue department, Banswara for past three years (2015-16, 2016-17 and 2017-18).

The study had been conducted in Banswara district which was purposively selected for its dominance in area under *rabi* maize. There are 11 tehsils in Banswara district namely Banswara, Bagidora, Ghatol, Garhi, Kushalgarh, Gangadtalai, Aanadpuri, Chotisarvan, Ganoda, Abapura and Sajjangarh. Three year average of area under r*abi* maize was calculated for all tehsils from 2015-16 to 2017-18. Among all, Banswara tehsil was found to have the highest area under *rabi* maize (4055 hectares); covering approximately 30 per cent of the total area of Banswara district. Hence, Banswara tehsil was selected for the study. For the purpose of sampling, a list of villages cultivating r*abi* maize was obtained from tehsil head quarter of Banswara tehsil. From the list, three villages were selected randomly; Borwat, Bodla and Palodra. Then, a list of farmers growing all the three crops (r*abi* maize, *kharif* maize and wheat) in the selected villages was obtained from the respective village patwaries. It was observed from the list that majority of the farmers fall under the small farmers' category and hence, no separate classification was made for the study. A total of fifteen farmers were selected from each village; thus altogether 45 farmers were selected randomly from the three selected villages on the basis of size of land holding.

Statistical Analysis

Tabular analysis was employed to study the cropping pattern, cost of cultivation, input utilization pattern, profitability of *kharif* and *rabi* maize in relation to wheat in the study area. The cost concepts namely Cost A_1, Cost A_2, Cost B_1, Cost B_2, Cost C_1 and Cost C_2 as employed in "All India Farm Management Studies", were used for the present analysis. Following cost groups were used to analyze the data:

Cost Concepts

Cost A_1:

1. Value of hired human labour
2. Value of hired bullock labour
3. Value of owned bullock labour
4. Value of owned machinery labour
5. Value of Hired machinery charges
6. Value of seed (both farm produced and purchased)
7. Value of insecticide and pesticides
8. Value of manure (owned and purchased)
9. Value of fertilizer
10. Depreciation on implement and farm buildings
11. Irrigation charges
12. Land revenue
13. Interest on working capital
14. 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 (net of land revenue) 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

Operational Cost

It is the variable cost which varies with the level of production.
O.C. = Cost A_1- (land revenue) – (depreciation) + (imputed value of family labour)

Overhead Cost

It is the fixed cost incurred irrespective of the quantum of the production.
Overhead Cost = Cost C_2 - Operational Cost

Income Concepts

The income concepts are helpful in finding the aggregate financial efficiency of *kharif* maize, *rabi* maize and wheat cultivation in the study area.

Gross Income

It is the total value of main product as well as of by product.
GI = Value of main product (quantity of main product x price of main product) + value of by product (quantity of by product x price of by-product)

Net Income
It is residue over the gross income, after deducting total cost (Cost C_2).
Net income = Gross income - Cost C_2

Farm Business Income
The farm business income is more practical income efficiency measure as it indicates the return to the interest on fixed capital, rental value of owned land and imputed value of family labour. Thus, it is disposable income out of the maize and wheat farming in the present study.
Farm business income = Gross income - Cost A_2

Family Labour Income
It is return to family labour.
Family labour income = Gross income - Cost B_2

Net Return on Variable Cost
It will be worked out after deducting all items of variable cost from the gross output. It will be also used in judging the relative importance of each component of variable cost.
Net return on variable cost = Gross income – Total variable cost

Constraint analysis
The major constraints identified in the production of *rabi* maize *viz*. technological, infrastructural, institutional and socio-economic were analyzed on the basis of extent of adoption of recommended technology and detailed constraints analysis was carried out by using tabular analysis for all the three selected villages.

Results and Discussion
Rabi maize is a promising crop of Banswara district with higher productivity but it has been noticed that its area changed drastically from year to year. With an attempt to study about the probable reasons behind the inter year variation in area, the present study examines the input use pattern and cost structure of wheat (which was main competing crop of *rabi* maize in the area) and also of *kharif* maize in the study area.

Comparative input utilization pattern of *rabi* maize, *kharif* maize and wheat in Banswara: The quantities of various inputs directly affect the cost of cultivation; therefore, use of different inputs like human labour, bullock labour, seeds, manures, fertilizers etc. have been studied both in quantitative and monetary terms. Table 1 revealed that human labour under *rabi* maize was higher (502.24 hours/ha) as compared to *kharif* maize and wheat because of more labour intensive practices involved in *rabi* maize cultivation like frequent irrigation, fertilizer application, monitoring of crop due to wild animals, etc. However, human labour hours were found the least in *kharif* maize (296.08 hours/ha). This was mainly due to less weeding practices and other inter-cultural operations because of continuous rainfall during *kharif* season. On the other hand, machine labour hours were found highest in wheat crop (15.6 hours/ha). It was mainly due to the use of harvester for harvesting and fertilizer application by seed cum fertilizer drill by some farmers. The machine labour hours required for a hectare of *rabi* and *kharif* maize cultivation were found 13.75 and 12.09 hours. Bullock labour was not used in study area.

Table 1: Input utilization pattern in *rabi* maize, *kharif* maize and wheat cultivation

S. No.	Particulars	Rabi maize	Kharif maize	Wheat
A.	**Labour Input**			
	Human labour (hrs/ha)	502.24	296.08	410.96
	Machine labour (hrs/ha)	13.75	12.09	15.6
B.	**Material Input**			
	Seed (kgs/ha)	24.6	18.2	146
	Manures (qtls/ha)	165.6	150.9	170
	Fertilizers (kgs/ha)	374.77	270.6	298.6
	No. of irrigation	7.5	0	5.5
	Plant protection chemical(lit/ha)	1.86	2.5	1.7
C.	**Output**			
	Main product (qtls/ha)	73.17	27.44	38.6
	By–product (qtls/ha)	82.3	60.44	52.4

Seeds, farm yard manures and fertilizers were the major material inputs. Table 1 indicates that seed rate is found higher in *rabi* maize (24.6 kg per hectare) as compared to *kharif* maize (18.2 kg per hectare) because of the use of hybrid seeds and maintenance of proper spacing between the plants. Whereas, it was found highest in case of wheat crop (146 kg per hectare). Manure application was found higher in wheat crop (170 qtls/ha) and fertilizers application was found higher in *rabi* maize crop (374.77 kg per hectare). Higher dose of fertilizer application was applied in *rabi* crop because proper fertilizer management is possible in that case. In *kharif* season, leaching losses are more pronounced because of excess rainfall during the season. Irrigation was applied 7.5 times in *rabi* maize as compared to 5.5 times in wheat. In *kharif* season, farmers have no need of irrigation. However, application of plant protection chemicals was found highest in *kharif* maize (2.5 lit/ha) followed by *rabi* maize (1.86 lit/ha) and wheat (1.7 lit/ha).
The data from table 1 revealed that on an average, the output from *rabi* maize was found 73.17 quintal per hectare as against 27.44 quintal per hectare in case of *kharif* maize. The most important reason behind the lower yield obtained in case of *kharif* maize was the use of local or desi seeds for cultivation. Other major reason behind this is untimely excess rainfall that creates the problem of water logging. Maize plant is highly sensitive to water logging condition, and because of heavy rainfall it becomes even more vulnerable to the incident of insects and pests, which ultimately cause reduction in the yield. However, the major reason behind the higher yield of *rabi* maize is the suitability of crop to the climatic conditions of Banswara. Further, use of hybrid seeds and facility of canal irrigation favoured the *rabi* maize production in the area. Therefore, the prospects of *rabi* maize are highly extensive in Banswara district of Rajasthan.

Comparative cost structure of *rabi* maize, *kharif* maize and wheat in Banswara

A comparative analysis of cost structure of *rabi* maize, *kharif* maize and wheat cultivation in Banswara district of Rajasthan had been presented in table 2. The results revealed that the total cost of cultivation of *rabi* maize was found highest (₹ 55946.02 per hectare) as compared to the *kharif* maize (₹ 33937.97 per hectare) and wheat crop (₹ 49778.93 per hectare). The higher cost of cultivation in *rabi* maize was mainly attributed to the high cost of hybrid seed varieties, more number of hired labour employed, higher imputed value of owned land, etc. The labour component which included the cost due to family labour, hired human labour, bullock labour and machine labour constituted 20 to 25 per cent of the total cost in both maize and wheat crops. The cost of family labour (imputed value) was found ₹ 7816, ₹ 4470 and ₹ 7815.01 per hectare in *rabi* maize, *kharif* maize and wheat crop, respectively. However, the cost of both the hired human labour and machine labour were found higher in *rabi* maize; ₹ 4740 and ₹ 8948.50 per hectare, respectively.

It was observed from the table that the share of seeds in total cost was remarkably higher in *rabi* maize (₹ 7386.9 per hectare i.e. 13.20 per cent of the total cost); mainly due to use of hybrid seeds. In case of manures, wheat and *rabi* maize incurred almost same cost that was ₹ 6205 (12.46 per cent of total cost) for wheat and ₹ 6044.40 (10.80 per cent of total cost) for *rabi* maize. It was comparatively less for *kharif* maize (₹ 5475 per hectare which was 16.13 per cent of the total cost). The percentage share of fertilizer cost was 7.67, 8.98 and 8.13 per cent in *rabi* maize, *kharif* maize and wheat crop. The higher expenditure on *rabi* maize was attributed to the better resources position of farmer. Whereas, cost of insecticides and pesticides was reported higher in kharif *maize;* due to the greater incidence of insects, pests and diseases on kharif maize. Due to the more frequent irrigation needed in case of *rabi* maize, irrigation charges were reported higher in *rabi* maize (₹ 946 per hectare) than wheat cultivation (₹ 856 per hectare). On the whole, total variable cost was computed higher in the cultivation of *rabi* maize than wheat and *kharif* maize crops because of higher cost of hybrid seeds, more number of hired human labour in weeding operation etc.

Table 2: Cost structure of *rabi* maize, *kharif* maize and wheat in Banswara

S. No.	Particulars	Rabi maize	Kharif maize	Wheat
I	Variable cost (Rs/ha)			
(i)	Human labour			
a.	Family	7816 (13.97)	4470 (13.17)	7815.01 (15.69)
b.	Hired	4740 (8.47)	2932 (8.63)	3107.92 (6.24)
	Total	12556 (22.44)	7402 (21.81)	10922.93 (21.94)
(ii)	Machine labour			
a.	Owned	-	-	-
b.	Hired	8948.5 (16.00)	7067.91 (20.82)	8547.24 (17.17)
	Total	8948.5 (16.00)	7067.91 (20.82)	8547.24 (17.17)
(iii)	Seed	7386.9 (13.20)	492.12 (1.45)	4600.9 (9.24)
(iv)	Manures	6044.4 (10.80)	5475 (16.13)	6205 (12.46)
(v)	Fertilizers	4291.11 (7.67)	3050.6 (8.98)	4048.17 (8.13)
(vi)	Plant protection chemicals	450 (0.80)	776 (2.28)	510 (1.02)
(vii)	Irrigation charges	946 (1.69)	0	856 (1.71)
(viii)	Interest on working capital @10 per cent	4062.30 (7.26)	2426.36 (7.14)	3569.02 (7.16)
	Total variable cost	44685.20 (79.87)	26690 (78.64)	39259.26 (78.86)
II	Fixed cost			
(i)	Rental value on owned land	10477.85 (18.72)	6366.9 (18.76)	9648.90 (19.38)
(ii)	Rent paid for leased in land	0	0	0
(iii)	Land revenue	13.77 (0.02)	13.77 (0.04)	13.77 (0.02)
(iv)	Depreciation on implements and farm buildings	368.8 (0.65)	466.9 (1.37)	456.6 (0.91)
(v)	Interest on fixed capital	400.40 (0.71)	400.40 (1.17)	400.40 (0.80)
	Total fixed cost	11260.82 (20.12)	7247.97 (21.35)	10519.67 (21.13)
III	Total cost of cultivation	55946.02	33937.97	49778.93

A critical appraisal of the table 2 reveals that the percentage share of total fixed costs in total cost of cultivation was almost 20 per cent. Total fixed cost of *rabi* maize and wheat crop was more than *kharif* maize because rental value of owned land was more in *rabi* maize and wheat than *kharif* maize. Total fixed cost of *rabi* maize, *kharif* maize and wheat was ₹ 11260.82 (20.12 per cent share of total cost), ₹ 7247.97 (21.35 per cent share of total cost) and ₹ 10519.67 (21.13 per cent share of total cost), respectively. Land revenue on *rabi* maize, *kharif* maize and wheat cultivation was 0.02, 0.04 and 0.02 per cent of total cost, respectively. Depreciation cost was higher in *kharif* maize and wheat than *rabi* maize and having a share of 0.65, 1.37 and 0.91 per cent of total cost for *rabi* maize, *kharif* maize and wheat, respectively. We calculated interest on fixed capital that was 0.71, 1.17 and 0.80 per cent of total fixed cost in rabi maize, kharif maize and wheat crop, respectively.

Further, these cost items had been grouped under different cost categories. Using different cost groups, it is possible to find out different types of income measures. These include farm business income which denotes the disposable income. The family labour income which is the residue of gross income over cost explains the returns to family labour and has a lot of relevance under Indian conditions. The comparative estimates of cost groups on the basis of cost of cultivation for *kharif* maize, *rabi* maize and wheat for the year 2017-18 had been presented in Figure 1. Among the different cost concepts, Cost A_1 includes the land revenue and depreciation on implements and farm building. Cost B_1 and cost C_1 are important since gross output; after deducting the costs gives return to family labour and return to owned land separately. Cost C_2 is the final cost and gross output less of cost C_2 gives the net income over total cost.

Cost A_1 which covers the cash and kind requirements of cultivators; was found higher in *rabi* maize (₹ 37251.77 per hectare) than wheat (₹ 31914.63 per hectare) and *kharif* maize (₹ 22700.67 per hectare). The cost B_1 for *rabi* maize, *kharif* maize and wheat were reported 67.20, 68.06 and 64.91 per cent of the total cost, respectively. The cost B_2 was also found highest in *rabi* maize (₹ 48130.02 per hectare) followed by wheat (₹ 41963.93 per hectare) and *kharif* maize (₹ 29467.97 per hectare). The cost B_1 and cost B_2 incurred by farmers on wheat crop was almost 64.91 per cent and 84.29 per cent of total cost, respectively. The cost C_1 for *rabi* maize, *kharif* maize and wheat crop were to the tune of 81.17, 81.23 and 80.61 per cent, respectively. It was ₹ 45468.17, ₹ 27571.07 and ₹ 40130.04 per hectare in *rabi* maize, *kharif* maize and wheat crop, respectively. The total cost represented by C_2 for *rabi* maize, *kharif* maize and wheat crop was reported ₹ 55946.02 per hectare, ₹ 33937.97 per hectare and ₹ 49778.94 per hectare, respectively.

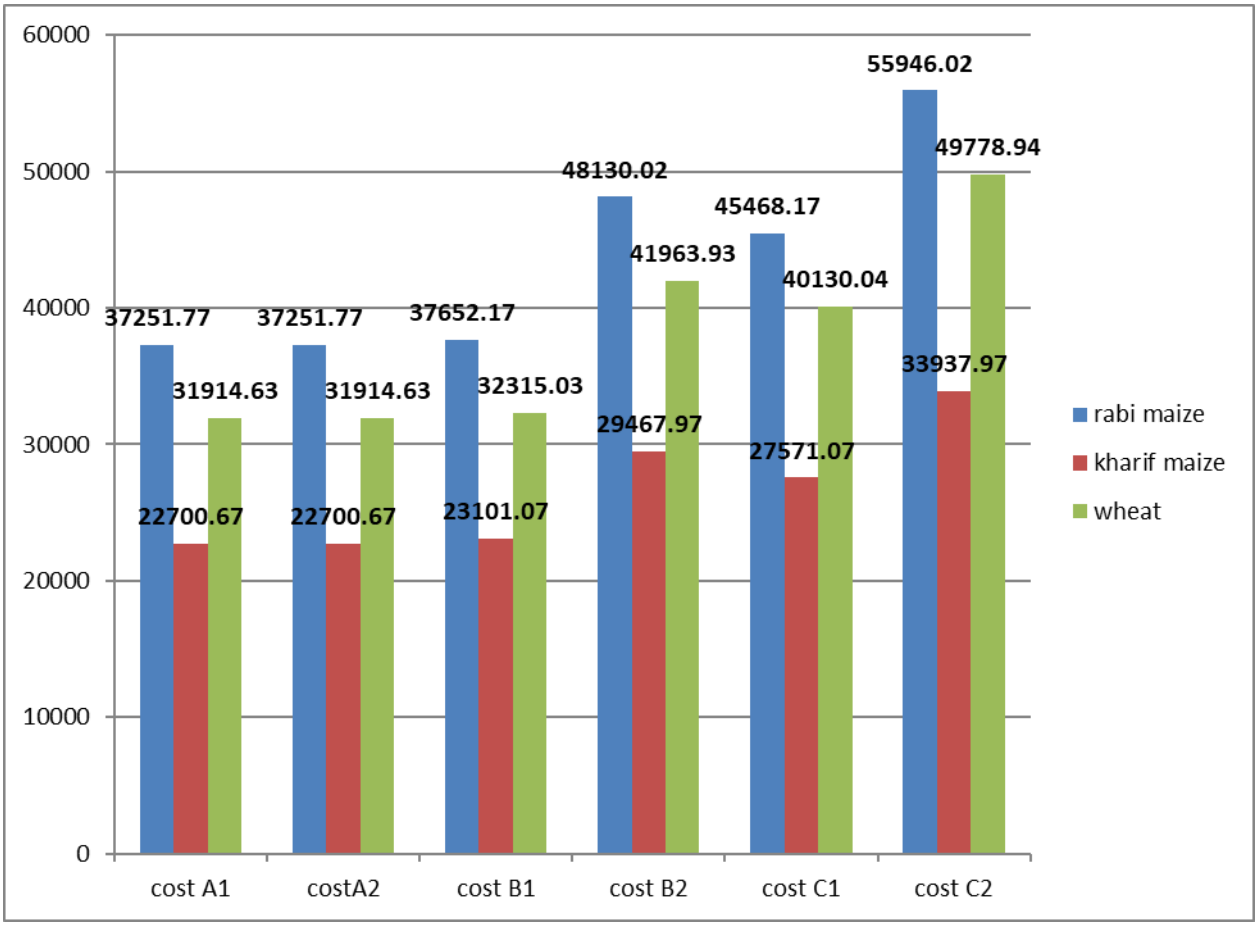

Fig 1: Comparative cost groups of *rabi* maize, *kharif* maize and wheat

Income Measures

Comparative income measures have been computed for *rabi* maize, *kharif* maize and wheat crop and are presented in table 3. A close perusal of the table revealed that gross income obtained from *rabi* maize (₹ 102424.60 per hectare) was higher than wheat (₹ 77581.30 per hectare) and *kharif* maize (₹ 47015.92 per hectare). Higher gross income from *rabi* maize cultivation is attributable to the higher productivity of the crop in the study area. *Rabi* maize incurred higher cost of cultivation (₹ 55946.02 per hectare) as compared to wheat (₹ 49778.93 per hectare) and *kharif* maize (₹ 33937.97 per hectare).

The major reason behind higher cost of cultivation was higher level of input and labour use in *rabi* maize and wheat. The growers practice more adoption of modern inputs in *rabi* maize and wheat crop, which is evidenced by the higher cost of cultivation in them. Gross income as well as net income; both were found less in *kharif* maize and higher in *rabi* maize and wheat crop. Net income was calculates as ₹ 46478.56, ₹ 13077.95 and ₹ 2702.36 in *rabi* maize, *kharif* maize and wheat crop, respectively. The B:C ratio of *rabi* maize (1.83) was higher than wheat (1.55) and *kharif* maize (1.38).

Table 3: Income measure estimates of *rabi* maize, *kharif* maize and wheat crop

Particular	*Rabi* Maize	*Kharif* Maize	Wheat
Gross income (₹/ha)	102424.60	47015.92	77581.30
Cost of cultivation (₹/ha)	55946.02	33937.97	49778.93
Net income (₹/ha)	46478.56	13077.95	27802.36
B:C ratio	1.83	1.38	1.55
Farm business income	65172.83	24315.25	45666.67
Family labour income	54294.58	17547.95	35617.37
Return to management	40883.98	9684.16	22824.47

Constraints in the production of *rabi* maize in Banswara district of Rajasthan

Rabi maize cultivation depends upon various factors which may either accelerate or decline the yield of crop. It is highly important to identify such factors so as to make the dissemination of technology in line with the farmer's expectations and need. Therefore, the constraints which hinder the *rabi* maize production in all the three selected villages were analyzed and have been presented as in table 4.

A close perusal of the table 4 revealed that higher cost of inputs was found to be the major constraint hindering the production of *rabi* maize in the two selected villages, *viz*. Borwat and Palodra. On the other hand, destruction of crop by wild animals was the major constraint in Bodla village. High cost of inputs ranks second in Bodla village followed by weed infestation, mismanagement of canal water, untimely rainfall, pests and diseases incidence and others as mentioned in the table. In Borwat village, lack of own capital ranks second and shortage of credit facilties ranks third. Wild animals' menace, lack of canal water management, weed infestation, irregular supply of inputs, crop failure and pest and diseases incidence were other constraints found in Borwat village. Crop destruction by wild animals ranks second in village palodra followed by lack of own capital, lack of credit facilities, weed infestation, lack of technical knowledge, untimely rainfall and others.

Table 4: Village-wise analysis of the constraints faced in *rabi* maize production

S. No.	Constraints	Bodla	Borwat	Palodra
1.	Lack of own capital	VII	II	III
2.	High cost of inputs	II	I	I
3.	Crop destroyed by wild animals	I	IV	II
4.	Untimely rainfall	V	X	VII
5.	Non availability of input in time	VIII	VII	X
6.	Not interested to high investment	XIV	XIII	XVI
7.	Lack of canal water management	IV	V	VIII
8.	Soil fertility variation	XV	XVI	XII
9.	Lack of credit facilities	XIII	III	IV
10	Continue crop failure	XII	VIII	XI
11	Weed infestation	III	VI	V
12	Incidence of pest & diseases	VI	IX	IX
13	Traditional belief	XVI	XII	XV
14	Lack of technical knowledge	IX	XV	VI
15	Lack of trained skilled labor	XIV	X	XIII
16	Lack of training and guidance	XI	XI	XIV

Conclusion

It can be concluded from the above discussion that comparison of cost structure among the three crops revealed that the total cost of cultivation was higher for *rabi* maize (₹ 55946.02 per hectare) as compared to *kharif* maize (₹ 33937.97 per hectare) and wheat crop (₹ 49778.93 per hectare). This higher cost was mainly attributed to the higher cost of seed, more number of hired labour, higher imputed value of owned land, etc. employed in *rabi* maize. Similarly, output was found higher in *rabi* maize *viz*., 73.17 quintal per hectare as against 27.44 quintal per hectare in case of *kharif* maize. Total variable cost was higher in *rabi* maize (₹ 44685.20) than wheat (₹ 26690) and *kharif* maize (₹ 39259.26). Operational cost (including total cost of family labour, hired human labour, machine labour, seeds, manures, fertilizers, plant protection chemicals and irrigation charges) of *rabi* maize, *kharif* maize and wheat were reported as ₹ 40622.90, ₹ 24263.64 and ₹ 35690.24 per hectare, respectively. Total fixed cost for *rabi* maize, *kharif* maize and wheat were found ₹ 11260.82, ₹ 7247.97 and ₹ 10519.67 per hectare, respectively. The similar results have been reported for both the gross and net income; which were found higher for *rabi* maize *viz*., ₹ 102424.60 and ₹ 46478.56 per hectare, respectively. Likewise, the B:C ratio of *rabi* maize was reported higher than wheat and *kharif* maize. The higher net income incurred from *rabi* maize indicated the suitability of crop to the climatic conditions of Banswara; thus, indicating the higher prospects of the crop in the study area.

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