RESEARCH ARTICLE Legume Research- An International Journal, Volume 47 Issue 10: 1770-1775 (October 2024)

Cost of Cultivation is Rising or Profitability Rising for Major Pulse Crop? A Case from Rajasthan, India

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10.18805/LR-5298

ABSTRACT

Background: The basic challenge every farmer in India faces is to increase profitability level and minimize the cost. For this, it is essential to know how the cost of cultivation and profitability is changing of crops over a period of time. The present study attempted to estimate the cost of cultivation, cost of production and returns of major pulse crops in the Rajasthan state. For workout the economics of pulses crop, secondary data was collected from 2000-01 to 2021-22 which is compiled from various sources and publications for profitability analysis of pulse crop.

Methods: The study was conducted in Rajasthan state and analysis done for 22 years used the "Cost of Cultivation of Principal Crops in Rajasthan" by DES, New Delhi uses different cost concepts for estimating costs and returns. In the present study, the cost C_2 was considered for computing profitability. Cost C_2 in CCPC data covers all the variables and fixed costs.

Result: The actual cost of production of gram crop increased from Rs. 1772.32 per quintal in TE 2003 to Rs. 3650.5 per quintal in TE 2021. Return per rupee invested increased from 2.52 to 3.01 during TE 2003 to TE 2021. Cost of production of urad crop had increased from Rs. 2520.63 per quintal in TE 2003 to Rs. 7385.45 per quintal in TE 2021. The return per rupee invested in cost A_2 had reduced from 2.14 in TE 2003 to 1.99 in TE 2021. Moong crop also showed increasing trend for cost of production from Rs. 2696.08 per quintal in TE 2003 to Rs. 7385.45 per quintal in TE 2021. Return for each rupee invested a increased from 2.10 in TE 2003 to 2.14 in TE 2021. Return per rupee invested was not profitable for the farmers for urad. Therefore, proper processing and procurement policy for these crops grown by the farmers should be implemented. Urad crop need more efficiently technological breakthrough to reduce cost of production and proper price incentive to pace with other pulses crops in the state.

Key words: Cost, Crops, Profitability, Return.

INTRODUCTION

Agriculture sector in India contributes as the most strategic component in the country's economy. Agricultural research plays a crucial role in refining production of crops and livestock as the agricultural research system has extended research productivity and research resource allocation, which are the issues of major concern (Sahu *et al*., 2018).

Chickpea (gram) is major pulse crop in India contributed about 49 per cent of total production. Madhya Pradesh is the highest producer of gram contributing around 35 per cent in the national production, followed by Rajasthan and Maharashtra. Rajasthan contributes 13.19 per cent of total gram production in India (Abid *et al*., 2017). Black gram (urad) is one of the important pulse crop grown throughout India. It is consumed in the form of 'dal' (whole or split, husked and un-husked) or perched. Urad differs from other pulses in its peculiarity of attaining a mucilaginous pasty character when soaked in water. It is consumed variety of ways across the north to south in preparation of different regular and popular like vada, idli, dosa, halwa, imrati in combination with other food grains. Also used as a nutritive fodder for miltch cattle. Green gram (moong) is good source of fine protein with easy digestibility, consumed as whole grains, dal and sprouted in variety of ways. Maharashtra is the largest producer of green gram accounting nearly for 23.05 per cent of the total production

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How to cite this article: Verma, D.K., Bhagat, V., Khoisnam, N., Maisnam, G., Subba, R., Awatade, S.C. and Dulal, J.P. (2024). Cost of Cultivation is Rising or Profitability Rising for Major Pulse Crop? A Case from Rajasthan, India. Legume Research. 47(10): 1770-1775. doi: 10.18805/LR-5298.

Submitted: 30-01-2024 **Accepted:** 22-08-2024 **Online:** 18-09-2024

followed by Karnataka (17.46 per cent), Andhra Pradesh (17.39 per cent), Bihar (14.69 per cent) and Rajasthan (7.50 per cent) (Devegowda *et al*., 2018).

The cost of cultivation of crops can vary widely depending on factors such as the type of crop, the region where it's grown, the scale of cultivation, input prices (seeds, fertilizers, pesticides), labor costs, irrigation expenses, land rent or ownership costs, machinery usage and various other factors. It's essential to calculate these costs accurately to ensure profitability for farmers. Agricultural extension services, government agencies and agricultural economists often provide guidance and tools for estimating the cost of cultivation for different crops in specific regions.

Farmers are facing the higher cost of production and cultivation of crops due to various factors such as: prices of inputs, seeds, fertilizers, pesticides and herbicides can fluctuate based on market demand, supply and availability. If input costs rise, it directly impacts the cost of cultivation and labor-intensive crops require more human resources for activities like planting, weeding and harvesting. Increases in minimum wage rates or scarcity of labour can lead to higher labour costs. Limited availability of arable land and increasing land prices or rental rates can significantly add to the cost of cultivation. While machinery can improve efficiency and productivity, initial investment costs, as well as maintenance and fuel expenses, can be high. Adopting modern agricultural technologies and practices such as precision farming, drip irrigation and genetically modified seeds may require investments in infrastructure, equipment and training, thereby increasing cultivation costs.

Apart from high cost of production, low return of crops also has adverse effect on farmer life and due to low returns and high cost of production, farmers net profit of crop is continuously decreasing. Low returns of crop due to market prices of crop, farmers often face volatile and unpredictable market prices for their crops. Fluctuations in demand, oversupply and competition can lead to lower prices, reducing farmers' returns despite high cultivation costs. The cost of inputs such as seeds, fertilizers, pesticides and machinery has been rising, outpacing increases in crop prices. This imbalance between input and output prices squeezes farmers' margins and reduces profitability, Farmers often have limited bargaining power in the market due to the dominance of middlemen and intermediaries. These intermediaries may exploit their position to offer low prices to farmers while selling at higher prices to consumers, further reducing farmers' returns. Climate change and extreme weather events pose significant risks to agricultural production. Droughts, floods, pests and diseases can damage crops, leading to yield losses and increased production costs for farmers.

MATERIALS AND METHODS

Profitability analysis

The study used the cost of cultivation data for the period from 2000-01 to 2021-22 compiled from various sources and publications for profitability analysis of selected crops. The "Cost of Cultivation of Principal Crops in Rajasthan" by DES, New Delhi uses different cost concepts for estimating costs and returns. In the present study, the cost C_2 was considered for computing profitability. Cost C_2 in CCPC data covers all the variables and fixed costs (Sood *et al*., 2018).

(i) Profitability = Gross value of output - Cost C_2.

(ii) The income measures: The following measure were worked out to compute profitability.

1. Farm business income = Gross return - Cost A_2.
2. Family labour income = Gross return - Cost B_2.
3. Net income = Gross return - Cost C_2.
4. Farm investment income = Farm business income - Imputed value of family labour.

The items of cost of cultivation cover both paid out cost and the imputed costs. The item covered under these costs were Perke *et al.* (2017).

Paid out costs

1. Hired labour (human, animal and machinery).
2. Maintenance expenses on owned animals and machinery.
3. Expenses on material inputs such as seed (home grown and purchased), fertilizer, manure (owned and purchased), pesticides and irrigation.
4. Depreciation on implements and farm buildings (such as cattle sheds, machine sheds and storage sheds).
5. Land revenue.
6. Rent paid for leased-in land.

Imputed costs

Value of family labour/managerial input of the farmer, rent of owned land and interest on owned fixed capital for which farmer does not incur any cash expenses. Costs were generated following certain cost concepts. These cost concepts and the items of costs included under each concept are given below (Pushpa *et al*., 2017).

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) Hired machinery charge.
(6) Value of insecticides and pesticides.
(7) Value of seed (Both farm produced and purchased).
(8) Value of fertilizer.
(9) Value of manure (Owned and purchased).
(10) Depreciation on implements and farm building.
(11) Irrigation charges.
(12) Interest on working capital.
(13) Land revenue, cesses and other taxes.
(14) Miscellaneous expenses.

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.
Cost C_3: Cost C_2*+ 10 per cent of Cost C_2* to account for managerial input of the farmer (Verma *et al*., 2022).

RESULTS AND DISCUSSION

Cost of cultivation of gram

Cost of cultivation indicates total expenses incurred on gram cultivation in one hectare of land. Table 1 indicated that during TE 2003 and TE 2021 direct cost, cost A_1 which covered all expenses paid by the farmer in cash and kind, accounted for Rs. 4460.45/ha and Rs. 20039.69/ha, respectively. Out of pocket cost of farmer, rent paid for leased - in land value included in cost A_2 showed 348.67per cent increase during the study period. In TE 2003, cost B_1 was Rs.5528.26/ha and Rs. 23675.81/ha in TE 2021. Between TE 2003 to TE 2021, cost B_2 showed 351.84 per cent increase which included direct cost plus interest on working capital (excluding land). Cost of cultivation had increased due to increase in level of adoption of new technology (*viz.* machinery, family and hired labour, seeds and fertilizer) and increased input prices. Cost C_2 showed 370.76 per cent increase during the study period. Total cost, cost C_3 covered all the component of cost C_2 and plus 10 per cent of cost C_2 on account of managerial functions performed by farmer. It was increased from Rs. 11102.92 per hectare to Rs. 52268.29 per hectare *i.* 370.76 per cent. It calls for concerted collaborative effort in Rajasthan state to decrease the cost of cultivation. tmplementation of advanced extension service and timely input supports to the gram growers can reduce cost of cultivation of gram.

Cost of production per quintal calculation was done by using material cost, rent cost, wage cost, interest cost and normal profit of the entrepreneur as per different cost concepts. Table 1 revealed that Rs. 646.07 in TE 2003 and Rs. 1506.3 in TE 2021 were spent as cash expenses (cost A_1) for producing one quintal of gram. The cost of production found to increase from Rs. 1772.32 per quintal in TE 2003 to Rs. 3650.5 per quintal in TE 2021. The cost of production of gram showed increasing trend during the study period due to varying climatic condition, lack of adequate availability of certified seed and lack of awareness of high yielding variety seed developed, low incidence of mechanized farming, poor farm realization, shortage of farm labour.

Income measures of gram cultivation

Gross and net income per hectare from gram cultivation to the producer farmer are shown in Table 2. Due to use of improved technology in gram (timely sowing, quality seed and use of machinery *etc*.) gross income, main product value, by product value and net income over cost C_2 increased by 433.78%, 440.04%, 367.79% and 944.35%, respectively during the study period. Thus, the study concludes that the gram crop is profitable crop in Rajasthan state during the study period. The results were in accordance with the findings of Thombare *et al.* (2022) in maize cultivation in Aurangabad district of Maharashtra.

Income measures comparison of gram cultivation in Rajasthan is given in Table 3. Income measures states correct income expenditure statement of the crop and reveals its profitability to the farmer. Return over variable cost, farm business income, family labour income and

Table 1: Cost of cultivation and cost of production of gram.

Costs	Cost of cultivation (Rs./ha)			Cost of production (Rs./Quintal)		
	TE 2003	TE 2021	Per cent change	TE 2003	TE 2021	Per cent change
Cost A_{-1}	4460.45	20039.69	349.27	646.07	1506.3	133.15
CostA_2	4525.58	20304.92	348.67	655.35	1524.3	132.60
Cost B_1	5528.26	23675.81	328.27	795.75	1734.7	117.99
Cost B_2	7450.78	33665.75	351.84	1051.17	2475.8	135.53
Cost C_1	8019.41	37527	367.95	1188.94	2571.7	116.30
Cost C_2	10093.57	47516.93	370.76	1611.20	3312.8	105.61
Cost C_3	11102.92	52268.29	370.76	1772.32	3650.5	105.61

Table 2: Gross and net income per hectare from gram cultivation.

Particulars	TE 2003	TE 2021	Per cent change
Value of main product (Rs./ha)	10355.88	55926.05	440.04
Value of byproduct (Rs./ha)	983.36	4600.07	367.79
Gross income (Rs./ha)	11339.24	60526.12	433.78
Net income over **c**ost A_2 (Rs./ha)	6813.66	40221.2	490.30
Net income over **c**ost C_2 (Rs./ha)	1245.67	13009.19	944.35

farm investment income showed increment of 488.57%, 490.30%, 590.77% and 510.06, respectively during the study period. Return per rupee invested at (A_2 cost) increased from 2.52 in TE 2003 to 3.01 in TE 2021 which showed 19.53 per cent increase. Thus, on all kind of parameters the gram crop was profitable to the farmers. It is indicated that proper knowledge of plant protection measures and recommended package of practices used by urad growers in Rajasthan state, high market price, minimum support prices and proper training for gram growers is benefitted to achieve profitability condition of gram crop in different income measures in Rajasthan. Similar result observed by (Sharma, 2016) in soybean crop in Rajasthan.

Cost of cultivation of moong

Cost of cultivation indicates total expenses incurred on moong cultivation in one hectare of land. Table 4 revealed that during TE 2003 and TE 2021 direct cost, cost A_1, cost A_2, cost B_1, cost B_2 and cost C_2 recorded 134.49, 128.72, 104.97, 125.27 and 172.86 per cent increase during the study period. All cost parameters increased during the study period due to adoption of improved technologies like hybrid seed and various technique of production. Consistent increase in the cost of cultivation of moong was a notable feature which shows that rapidly increased the prices of inputs including labour charges during the period of study. These results were confirming the findings of (Avinsah and Patil, 2018) in various study of moong in Rajasthan state.

To estimate cost of production per quintal calculation was done by using material cost, rent cost, wage cost, interest cost and normal profit of the entrepreneur as per different cost concepts. Table 4 revealed that Rs. 1184.60 in TE 2003 and Rs. 2777.72 in TE 2021 were spent as cash expenses (cost A_1) for producing one quintal of moong. The cost of production at cost C_3 found to increase from Rs. 2696.08 per quintal in TE 2003 to Rs. 7385.45 per quintal in TE 2021 if all the imputed and actual cost were considered for hired and owned resources together.

Income measures of moong cultivation

Gross and net income per hectare from moong cultivation to the producer farmer are shown in Table 5. Due to use of improved technology in moong (timely sowing, quality seed and use of machinery *etc*.) gross income increased from Rs. 5395.88/ha to Rs. 26028.47/ha between TE 2003 to TE 2021 which showed 469.40 per cent increase in gross returns. During TE 2003 to TE 2021 net income over cost A_2 showed 331.47 per cent increase and net income over cost C_2 showed 534.19 per cent change. Net income of farmer at cost A_2 and at cost C_2 showed that farmers' income was increasing during the study period.

Income measures comparison of moong cultivation in Rajasthan is given in Table 6. Return over variable cost (seed, fertilizer, manure and irrigation charges *etc*.) increased from Rs. 2907.86/ha to Rs. 12895.12/ha during the study period. Farm business income, family labour income, farm investment income and return per rupee invested was increased by 343.46 per cent, 331.47 per cent, 868.78 and 1.90 per cent, respectively. Similar result observed by Shelke *et al*., (2016) in Bt-cotton production in beed district. Boost up growth in returns for moong was due to adoption of improved technologies like hybrid seed and various technique of production. Government of India had implemented so many programme's on pulse development *viz;* intensive pulse development programme,

Table 3: Return from cultivation of gram crop. (Rs./ha)

Particulars	TE 2003	TE 2021	Per cent change
Returns over variable cost	6878.79	40486.43	488.57
Farm business income	6813.66	40221.2	490.30
Family labour income	3888.46	26860.37	590.77
Farm investment income	4322.52	26370	510.06
Return per rupee (Cost A_2)	2.52	3.01	19.53

Table 4: Cost of cultivation and cost of production of moong.

Costs	Cost of cultivation (Rs./ha)			Cost of production (Rs./Quintal)		
	TE 2003	TE 2021	Per cent change	TE 2003	TE 2021	Per cent change
Cost A_1	2488.02	16081.45	546.36	1184.60	2777.72	134.49
Cost A_2	2559.33	12737.58	397.73	1218.30	2786.54	128.72
Cost B_1	3274.05	17507.3	434.73	1536.06	3148.44	104.97
Cost B_2	4211.99	23854.94	466.36	1849.25	4165.87	125.27
Cost C_1	5016.80	26267.65	423.59	2097.35	5670.35	170.36
Cost C_2	6019.79	32615.28	441.80	2450.99	6687.77	172.86
Cost C_3	6621.76	35876.8	441.80	2696.08	7385.45	172.86

technology mission of pulses and national food security mission which aims to improve the moong returns.

Cost of cultivation of urad

Table 7 showed that during TE 2003 and TE 2021 direct cost, cost A_1 which covered all expenses paid by the farmer in cash and kind, accounted for Rs. 3173.63/ha and Rs. 14484.28/ha, respectively. Cost A_2, Cost B_1, Cost B_2 and cost C_2 which showed 408.59, 342.44, 357.22 and 305.87 per cent, respectively increase during the study period.

Cost of production per quintal calculation was calculated by using material cost, rent cost, wage cost, interest cost and normal profit of the entrepreneur as per different cost concepts. Table 7 revealed that Rs. 867.36 in TE 2003 and Rs. 2777.72 in TE 2021 were spent as cash expenses (cost A_1) for producing one quintal of urad. The cost of production at cost C_2 found to increase from Rs. 2520.63 per quintal in TE 2003 to Rs. 7385.45 per quintal in TE 2021 if all the imputed and actual cost were considered for both hired and owned resources together. The cost of production increased during the study period, indicating that input-use and input price had increased continuously. It implies that urad production was increasingly becoming input intensive with higher cost.

Income measures of urad cultivation

Gross and net income per hectare from urad cultivation to the producer farmer are shown in Table 8. Gross income increased from Rs. 7092.01/ha to Rs. 28976.6/ha between TE 2003 to TE 2021 which showed 308.58 per cent increase in gross returns. During TE 2003 to TE 2021 net income over cost A_2 showed 221.99 per cent increase and net income over cost C_2 showed 3 86.98 per cent change increase. Net income of farmer at cost A_2 showed that farmer's income increased and at cost C_2 it was decreased. Results so obtained are in close conformity with the finding of Kaushal and Choudhary, (2020) of finger millet in Bastar district of Chhattisgarh.

Income measures comparison of ura cultivation in Rajasthan is given in Table 9. Return over variable cost (seed, fertilizer, manure and irrigation charges *etc.*) increased from Rs. 3918.38/ha to Rs. 18189.26 /ha during the study period. Farm business income, family labour income and farm investment income was positive which showed increment of 378.53 per cent, 279.85 per cent and 789.00 per cent, respectively over the study years. Return per rupee invested showed decreeing trend with per cent and 23.69 per cent, respectively during the study period.

Table 5: Gross and net income per hectare from moong cultivation.

Particulars	TE 2003	TE 2021	Per cent change
Value of main product (Rs./ha)	4571.21	26028.47	469.40
Value of byproduct (Rs./ha)	824.67	2948.10	257.49
Gross income (Rs./ha)	5395.88	28976.57	437.01
Net income over Cost A_2 (Rs./ha)	2836.55	12238.99	331.47
Net income over Cost C_2 (Rs./ha)	-623.90	2708.92	534.19

Table 6: Return from cultivation of moong crop. (Rs./ha)

Particulars	TE 2003	TE 2021	Per cent change
Returns over variable cost	2907.86	12895.12	343.46
Farm business income	2836.55	12238.99	331.47
Family labour income	1183.89	11469.27	868.78
Farm investment income	1093.81	843.03	22.93
Return per rupee (Cost A_2)	2.10	2.14	1.90

Table 7: Cost of cultivation and cost of production of urad.

Costs	Cost of cultivation (Rs./ha)			Cost of production (Rs./Quintal)		
	TE 2003	TE 2021	Per cent change	TE 2003	TE 2021	Per cent change
Cost A_1	3173.63	14484.28	406.72	867.36	2777.72	220.25
Cost A_2	3290.96	14484.28	408.59	881.06	2786.54	216.27
Cost B_1	3956.97	16008.41	342.44	1119.13	3148.44	181.33
Cost B_2	5217.42	21455.09	357.22	1417.74	4165.87	193.84
Cost C_1	6588.86	30978.83	298.67	1926.13	5670.35	194.39
Cost C_2	8035.94	36425.51	305.87	2291.48	6687.77	193.00
Cost C_3	8839.53	40067.7	305.87	2520.63	7385.45	193.00

Table 8: Gross and net income per hectare from urad cultivation. (Rs./ha)

Particulars	TE 2003	TE 2021	Per cent change
Value of main product (Rs./ha)	6018.23	39762.5	560.70
Value of byproduct (Rs./ha)	1073.78	2412.6	124.68
Gross income (Rs./ha)	7092.01	28976.6	308.58
Net income over Cost A_2 (Rs./ha)	3801.05	12239.0	221.99
Net income over Cost C_2 (Rs./ha)	-943.93	2708.9	386.98

Table 9: Return from cultivation of urad crop. (Rs./ha)

Particulars	TE 2003	TE 2021	Per cent change
Returns over variable cost	3918.38	18189.26	364.20
Farm business income	3801.05	18189.26	378.53
Family labour income	1874.59	16665.14	789.00
Farm investment income	1789.75	3218.84	279.85
Return per rupee (Cost A_2)	2.14	1.99	23.69

Looking to the above research findings it can be concluded that urad is not a profitable crop in the study area but still there is a scope to generate further income and employment.

CONCLUSION

The cost of cultivation of gram crop, moong and urad crop significantly increased during study period which is indicate the cost of inputs continuously increasing with the time. Gram and moong crops was profitable for farmers due to hike in price, input subsidy and government support like minimum support price while farmers received loss condition with the urad crop during the study period. It is indicated that 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 urad growers, unavailability of high yielding variety seed and high cost of input, lack of fertilizer *etc.* Proper management of costly inputs needs strengthening the extension services. Judicious use of inputs like pesticides and fertilizers not only help in keeping low production costs but will also increase income of urad growers farmers.

Conflict of interest

All authors declare that they have no conflicts of interest.

REFERENCES

Abid, S., Shah, N. A., Hussain, A. and Farooq, A. (2017). Growth and trend in area, production and yield of major crops of khyber Pakhtunkhwa, Pakistan. Asian Journal of Agriculture and Rural Development. 4(2): 149-155.

Avinash, C.S. and Patil, B.L. (2018). Trends in area, production and productivity of major pulses in Karnataka and India. Journal of Pharmacognosy and Phytochemistry. 7(4): 2097-2102.

Devegowda, S.R., Singh, O.P. and Kumari, K. (2018). Growth performance of pulses in India. The Pharma Innovation Journal. 7(11): 394-399.

Kaushal, R. and Choudhary, V.K. (2020). An economic analysis of costs and return of finger millet in Bastar district of Chhattisgarh. Journal of Pharmacognosy and Phytochemistry. 9(5): 33-36.

Perke, D.S., Puri, R.V. and Karnawar, G.H. (2017). Economics of Soybean production in Hingoli district of Maharashtra. Bulletin of Environment, Pharmacology and Life Sciences. 6(3): 106-107.

Pushpa, Srivastava, S.K. and Agarwal, P.K. (2017). Comparative study on cost of cultivation and economic returns from major crops in eastern region of Uttar Pradesh. International Journal of Agriculture, Environment and Biotechnology. 10(3): 387-399.

Sahu, P.K., Kant, K., Choudhry, H.P.S. and Singh, G.P. (2018). Cost of cultivation of mustard crop in Fatehpur district of Uttar Pradesh. International Journal of Current Microbiology and Applied Sciences. 7(8): 3356-3361.

Sharma, P. (2016). Costs, returns and profitability of soybean cultivation in India: Trends and prospects. Economic Affairs. 61(3): 413-425.

Shelke, R.D., Bhogaonkar, M.M. and Chavan, R.V., (2016). Cost, returns and profitability of Bt-cotton production in beeddistrict. International Journal of Commerce and Business Management. 9(1): 56-81.

Sood, S., Singh, H. and Soumya, C. (2018). Temporal changes in economics of pulses and their comparative advantage in Rajasthan. Agricultural Science Digest. 38(4): 241-247. doi: 10.18805/ag.D-4828.

Thombare, R.K., Tawale, J.B., Shelke, R.K. and Kamble, S.H. (2022). Cost, returns and profitability of maize cultivation in Aurangabad district of Maharashtra. The Pharma Innovation. 11(12): 2817-2819.

Verma, D.K., Singh, H., Khoisnam, N. and Maisnam, G. (2022). Cost, return and profitability structure of Barley and maize production in Rajasthan, India. Economic Affairs. 67(5): 753-759.