ECONOMIC ANALYSIS OF MAIZE PRODUCTION IN HARDOI DISTRICT OF UTTAR PRADESH

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Abstract: Maize (Zea mays L.) is one of the most important cereal crops in the world agricultural, both as food for man and feed for animals. It is a miracle crop and it has very high yield potential. There is no cereal on the earth which has so immense potentiality and also known as "**Queen of Cereals**". Purposive-cum-multi stage stratified random sampling technique was used for the selection of district, block, villages and farmers. Hardoi district of Uttar Pradesh was selected purposely because of convenience of investigator and to avoid difficulties for collection of data due to shortage of time and budget constraints. The data were collected during the agricultural year 2021-22 for this study. The study indicates that calculated value of cost C_3 came to Rs.43025.52, 44924.02 and 45055.56 on marginal, small and medium size group of farms; respectively along with average value i.e. Rs.43460.90. On average cost A_1, B_1, B_2, C_1, and Cost C_2 worked out were Rs.19993.09, 21194.58, 31851.32, 28853.17 and 39509.90 per ha., respectively. The gross income per hectare was observed maximum under marginal farms i.e. Rs. 71977.00 followed by small farms (Rs.69009.00) and medium farms Rs.(66948.00), respectively. On an overall average, gross income came to Rs.71180.38 where as average net income was Rs.27719.49 per hectare. Cost of production per quintal of maize was computed to be Rs.1317.78, Rs.1486.89 and Rs.1486.89 on marginal, small and medium farms, respectively with an average of Rs. 1349.70. Benefit-Cost ratio related to cost C_3 was highest on marginal farms (1:1.67) followed by small farms (1:1.53) and medium farms (1:1.48) with an Average Benefit-Cost ratio on cost A_1, cost B_1, cost B_2, cost C_1, cost C_2 and cost C_3 were worked out and came to 1:3.59, 1:3.38, 1:2.27, 1:2.46, 1:1.80 and 1:1.63, respectively.

Keywords: Maize, cost of cultivation, cost of production, cost concepts, farm income measures and Benefit-Cost ratio.

Maize (Zea mays L.) is one of the most important cereal crops in the world agricultural, both as food for man and feed for animals. It is a miracle crop and it has very high yield potential. There is no cereal on the earth which has so immense potentiality and also known as "**Queen of Cereals**". Maize crop is utilized in many ways like other grain crops. Over 85 percent of maize produced in the country is consumed as human food. Several food dishes including "Chapattis" are prepared out of maize flour and grains. Green corns are roasted and eaten by people with great interest. The special variety called the 'pop corn' the grains of which are converted into the popped form which is the favourite's food for children in cities. It is also a good feed for poultry, piggery and other animals. It's rank below wheat and sorghum but considerably above than rice in nutrition. Maize grain contains about 10% protein, 4% fat, 70% carbohydrate, 2.3% crude fiber, 10.4% albuminides and 1.4% ash. Maize grain has significant quantities of vitamin A, nicotinic acid, riboflavin and vitamin E. Maize is low in calcium, fairly high in phosphorus. Maize crop furnishes huge quantities of green fodder for cattle. Several industries like starch, milling etc., are based on maize products and by-products. Maize is a major source of starch. Corn starch is a major ingredient in home cooking and in many industrialized food product. Maize is also a major source of cooking oil (corn oil) and maize gluten. Maize starch can be hydrolyzed and enzymatically treated to produce syrup, particularly high fructose corn syrup, a sweetener, and also fermented and distilled to produce grain alcohol. Grain alcohol from maize is traditional the source of bear. Within the united states the uses of maize for human consumption constituents about 1/40th of the amounts grown in the country. In United States and Canada, maize is mostly grown to feed livestock as forage, silage or grain. Maize meal is also a significant ingredient of some commercial animal food products such as dog food. In addition to big industries, several cottage industries are also flourishing on the by-product of maize. Maize is

one of the world's leading crop cultivated over an area of about 197.19 million hectare with a production of about 1134.75 million tonnes and productivity 5755 kg/ha .of grain (FAOSTAT, 2020). Among the maize growing countries, USA has the largest area followed by China, Brazil, India and Mexico. In respect of production also USA stands first followed by China. In India, it is grown over an area of 9.22 million hectares with total production of about 28.72 million tonnes and productivity 3115 kg./ha.(FAOSTAT, 2020). Uttar Pradesh, Madhya Pradesh, Bihar, Maharashtra, Karnataka and Andhra Pradesh are the leading states growing maize on large scale. Though, the maximum acreage and production of maize is in Uttar Pradesh but Andhra Pradesh gives highest acreage, production and productivity i.e. 1.34 million ha., 3.73 million tonnes and 2777 kg./ha., respectively followed by Karnataka, Maharastra , Bihar and Madhya Pradesh. In Uttar Pradesh, it is grown over an area of 0.73 million hectare with total production of about 1.53 million tonnes and productivity 2090 kg./ha. (Directorate of Economics and Statistics, Govt. of Uttar Pradesh,2020). In Hardoi district maize is grown in 55.90 thousand hectare with a production 118.06 thousand tonnes, while productivity 2112 kg./ha.(Sankhyiki Patrika Zanpad Hardoi, 2019). Maize stands on second place among the entire kharif crop after rice with the view of area production and productivity. Since, it is a miracle crop which can be grown during all seasons i.e. Kharif, Rabi and Zaid. It is also offers the opportunity of income and employment to the farmers and farm labourers as compared to other crops. In Uttar Pradesh underground water is depleting very fast needs diversification of crop like maize in place of rice and wheat which can successfully be grown comparatively better in water stress condition.

RESEARCH METHODOLOGY

Purposive-cum-multi stage stratified random sampling technique was used for the selection of district, block, villages and farmers. Hardoi district of Uttar Pradesh was selected purposely because of convenience of investigator and to avoid difficulties for collection of data due to shortage of time and budget constraints. A list of all the 19 Blocks of Hardoi district was prepared and one Block namely Behandar was selected randomly for the study. A list of all the villages of the selected block was prepared separately along with the area under maize cultivation with the help of block and revenue personnel. 5 villages from the block were selected randomly. A list of all maize growers of the 5 selected villages was prepared and classified according to size of holding into three size groups i.e. marginal (below 1.0 ha), small (1.0-2.0 ha) and medium (2.0 to 4.0 ha), 80 growers from the block were selected randomly in proportion to their number in universe in the each size group.

RESULTS AND DISCUSSION

Table indicate that calculated value of cost C_3 came to Rs.43025.52, 44924.02 and 45055.56 on marginal, small and medium size group of farms, respectively along with an average value i.e. Rs.43460.90. On an average cost A_1, B_1, B_2, C_1, and Cost C_2 worked out were Rs.19993.09, 21194.58, 31851.32, 28853.17 and 39509.90 per ha., respectively.

Table-1: Measures of per hectare cost and profit of maize (Rs./ha.)

S. No.	particulars	Cost and farm profit			
		Marginal	**Small**	**Medium**	**Average**
1	Cost A_1/A_2	18994.82	22565.92	25682.55	19993.09
2	Cost B_1	20020.03	24382.36	27471.20	21194.58
3	Cost B_2	30613.25	35204.87	38484.41	31851.32

4	Cost C_1	28520.88	30017.51	29946.40	28853.17
5	Cost C_2	39114.10	40840.02	40959.61	39509.90
6	Cost C_3	43025.52	44924.02	45055.56	43460.90

Productivity (qt./ha)

A	Main product [qt./ha]	32.65	31.20	30.30	32.26
B	By product (qt./ha)	40.45	39.50	38.10	40.15
8	Grass income	71977.00	69009.00	66948.00	71180.38
A	Main product	61055.50	58344.00	56661.00	60340.22
B	By-product	10921.50	10665.00	10287.00	10840.15
9	Net return over costC_1	43456.12	38991.49	37001.60	42327.21
10	Net return over costC_2	32862.90	28168.98	25988.39	31670.46
11	Net income	28951.48	24084.98	21892.44	27719.49
12	Family labour income	41363.75	33804.13	28463.59	39329.04
13	farm investment income	44481.33	39907.93	38790.25	43382.46
14	Farm business income	52982.18	46443.08	41265.45	51187.27
15	Cost of production (Rs./q)	1317.78	1449.16	1486.89	1349.70
16		**Benefit-Cost Ratio**			

A	On the basis of cost A_1	1:3.78	1:3.06	1:2.60	1:3.59
B	On the basis of costB_1	1:3.59	1:2.83	1:2.43	1:3.38
C	On the basis of cost B_2	1:2.35	1:1.96	1:1.94	1:2.27
D	On the basis of cost C_1	1:2.52	1:2.29	1:2.23	1:2.46
E	On the basis of cost C_2	1:1.84	1:1.68	1:1.63	1:1.80
F	On the basis of cost C_3	1:1.67	1:1.53	1:1.48	1:1.63

Per hectare gross income was observed maximum under marginal farms i.e. Rs. 71977.00 followed by small farms (Rs.69009.00) and medium farms Rs.(66948.00), respectively. Per hectare gross income was highest on marginal farms due to maximum use of family labour resulted higher productivity. Productivity on these farms might be due to better management followed by the other farmers. On an average, gross income came to Rs.71180.38 where as an average net income was Rs.27719.49 per hectare. On an average, farm business income, family labour income and farm investment income were worked out to be Rs. 51187.27, Rs.39329.04 and Rs.43382.46 per hectare, respectively. Cost of production per quintal of maize was computed to be Rs.1317.78, Rs.1486.89 and Rs.1486.89 on marginal, small and medium farms, respectively with an average of Rs. 1349.70.

Average Benefit-Cost ratio on cost A_1, cost B_1, cost B_2, cost C_1, cost C_2 and cost C_3 were worked out and came to 1:3.59, 1:3.38, 1:2.27, 1:2.46, 1:1.80 and 1:1.63, respectively. Benefit-Cost ratio related to cost C_3 was highest on marginal farms (1:1.67) followed by small farms (1:1.53) and medium farms (1:1.48). In respect of cost C_2, Benefit-Cost ratio was highest on marginal farms (1:1.84) followed by small farms (1:1.63) and medium farms (1:1.63). In respect of Cost C_1, Benefit-Cost ratio (1:1.89) was observed highest on marginal farms (1:2.52) followed by small farms (1:1.29) and small farms (1:1.63). In respect of cost B_2, Benefit-Cost ratio was found highest on marginal farms (1:2.35) followed by small farms (1:1.94) and medium farms (1:1.94) whereas, in cost B_1 the Benefit-Cost ratio was highest on marginal farms (1:3.59) followed by small farms (1:2.83) and medium farms (1:2.43). In respect to Benefit-Cost ratio of Cost A_1, was highest on marginal farms (1:3.78) followed by small farms (1:3.06) and medium farms (1:2.60), respectively.

SUMMARY AND CONCLUSIONS

Per hectare cost C_3 (cost of cultivation) maize was shows positive relation with size of holding as it was highest under medium size of sample farms which was mainly due to heavy investment towards fixed capital as compared to the other size group of farms. On an average, cost of cultivation of maize was observed to be Rs.43460.90. Incomes from maize production were calculated and per hectare gross income was observed maximum under marginal farms i.e. Rs. 71977.00 followed by small farms (Rs.69009.00) and medium farms Rs.(66948.00), respectively. Per hectare gross income was highest on marginal farms due to maximum use of family labour resulted higher productivity. Productivity on these farms might be due to better management followed by the other farmers. On an overall average, gross income came to Rs.71180.38 where as average net income was Rs.27719.49 per hectare. On an overall average, farm business income, family labour income and farm investment income were worked out to be Rs. 51187.27, Rs.39329.04 and Rs.43382.46 per hectare; respectively Cost of production per quintal of maize was computed to be Rs.1317.78, Rs.1486.89 and Rs.1486.89 on marginal, small and medium farms, respectively with an average of Rs. 1349.70. Benefit-Cost ratio related to cost C_3 was highest on marginal farms (1:1.67)

followed by small farms (1:1.53) and medium farms (1:1.48) with an Average Benefit-Cost ratio on cost A_1, cost B_1, cost B_2, cost C_1, cost C_2 and cost C_3 were worked out and came to 1:3.59, 1:3.38, 1:2.27, 1:2.46, 1:1.80 and 1:1.63, respectively.

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