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Economic analysis of maize cultivation in Begusarai district of Bihar

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Abstract

The research entitled “Economic analysis of maize cultivation in Begusarai district of Bihar was conducted in Begusarai district of Bihar with a sample size of 100 respondents who was chosen through stratified sampling. The farmers were categorized as marginal, small and medium size group of the basis of the size of the farms each farmer had. Survey was conducted by personal interview method with use of pre – structured schedule questionnaire. After the analysis of the data it was found that maize cultivation was profitable at all categories of farm. The total costs of cultivation & gross income per hectare was positively related with size of farms and was negatively related to trend of net income. By the study it can be concluded that according to the farm size of the farmers resources were not efficiently used in maize cultivation. Technical, managerial & financial problem were also noticed as major constraints.

Keywords: maize cultivation, economics, size of farms, income of farmer

Introduction

Maize (*Zea mays* L.) is a one of the most important cereal crop in the world agricultural economy both as food for man and feed for animals. It is a miracle crop and very high yield potential. There is no cereal on the earth which has so immense potentiality and that is why it is called ‘Queen of Cereals’.

In India, it is grown over an area of 9.43million hectares with total production of about 24.35million tonnes and productivity 2583kg/ha. Uttar Pradesh, Madhya Pradesh, Bihar, Maharashtra, Karnataka and Andhra Pradesh are the leading states growing maize on large scale. Andhra Pradesh gives highest production i.e. 4.97million tones having an acreage of 1.06 million hectares, with an average yield 4673kg/ha followed by Karnataka acreage, production and productivity of 1.38million hectare, 3.98million tonnes and 2883kg/ha. Maharashtra acreage, production and productivity of 1.21million hectares, 3.08million tonnes 2544kg/ha respectively, Bihar acreage production productivity of 0.75million hectare, 2.02million tonnes and 2684kg/ha respectively, Madhya Pradesh acreage, production and productivity of 1.00 million hectare, 1.51million tonnes 1506 kg/ha. In Uttar Pradesh, it is grown over an area of 0.74 million hectare with total production of about 1.24 million tonnes and productivity 1671 kg/ha.

Maize is grown on a commercial scale in Begusarai district in 56443ha with a production 211403m.t. while productivity 37.45q/ha. (Statistic Bulletin, District Begusarai, 2016-17). There has been large scale increase in area under Maize in recently during lockdown effect to create the problems relating to production and marketing aspects. Consequently, the rationality of the pattern of existing resource allocation has to be evaluated to find out the best combination that could be suggested to maximize the yield. In the cultivation of Maize farmers face many problems like transfer of technology, supply of quality seeds, arrangement of industrial credit, fertilizers and other inputs, market arrangements, frequent price fluctuations in markets, lack of transport facilities during peak periods, etc. For solving such problems, it is necessary to first identify the problems and reasons thereof so that corrective measures may be resorted to tackle them. The present study will be an effort in the direction of study in all aspect of cultivation of Maize and to identify the problem faced by Maize cultivators in its cultivation and marketing with an overall view of exploring the possibilities and potentialities for bring about the require improvement. The result obtained from this study would be useful to overcome present limitation in the cultivation of Maize keeping in view the importance of the crop supported with above mentioned facts the present study entitled, “Economic analysis of maize cultivation in Begusarai district of Bihar” was conducted with following specific objectives:

1. To study the socio-economic profile of Maize growers of different farm group.
2. To analyze cost of cultivation, and different profit measure on different size of sample farm and to identify various constraints.

Material and Method

The research was conducted in Begusarai district of Bihar with a total sample size was 100 respondents. Purposive and stratified sampling was used opted as a sampling method. Pre structured and pre tested close ended questionnaire was used to collect data from the respondents manually. The data collected was analyzed with the help of Microsoft excel by finding out the frequency, percentage and arithmetic mean that was worked out for the purpose of comparison among different size of holdings.

Analytical tools

The data collected from the sample farmers were analyzed and estimated with certain statistical techniques.

Descriptive statistics

Frequency, percentage and arithmetic mean were worked out for the purpose of comparison among different size of holdings.

$$A = \frac{X_1+X_2+X_3+\dots+X_n}{n}$$

Where, A = Arithmetic mean

X₁, X₂, X₃.....X_n are the value of individual item

n = number of individuals

Average

The simplest and important measures of average which have been used into statistical analysis were the weighted average. The formula used to estimate the average is:

$$\text{Weighted average} = \frac{\sum W_i X_i}{\sum W_i}$$

Where,

W. A. = Weighted average

X_i = Variable

W_i = Weights of X_i

Cost concepts

The cost concepts and the items of cost included under this

study are given below:

Cost A₁

This cost approximates and actual expenditure incurred in cash and kind.

Values of hired /owned human, bullocks and machineries & implements laborers.

Value of seed (both farm produced and Family labour income:

Value of manure (owned and purchased)

Value of insecticides and pesticides and chemical fertilizers

Depreciation on implements and farm buildings

Irrigation charges

Land revenue, assets and other taxes

Interest on working capital

Miscellaneous expenses (artisans, etc.)

Cost A₂: Cost A₁ + rent paid for leased in land

Cost B₂: Cost A₂ + interest on value of owned fixed capital assets (Excluding land)

Cost B₂: Cost B₁ + rental value of owned land Cost of concentrates (net land revenue) and rent paid for leased in land.

Cost C₁: Cost B₁ + imputed value of family Labour

Cost C: Cost B₂ + Imputed value of family labour

Cost C₃: Cost C₂ + 10% of C (managerial cost).

Income concepts

Gross Income: Value of farm output (main product and by product) whether sold or utilized by the farm family.

Net income: It is the different between gross income and total cost i.e. gross income e minus cost C₁ or cost C₂ or cost C₃.

Family labour income: Gross income minus costB₂.

Farm business income: Gross income minus cost A₁or cost A₂in case of land, leased in farm.

Farm investment income: Net income over cost C₂ plus rental value of owned land plus interest on owned fixed capital.

Imputation procedures: Some of the inputs used in the production process come from family sources. The procedures adopted for deriving imputed values are as given under:

Family labour: On the basis of wages paid to attached from servant.

Owned animal labour: On the basis of maintenance which includes the following:

Cost of green and dry fodder

Cost of concentrates

Depreciation on animals and cattle sheds.

Labour charges

Other expenses, if any

Result and Discussion

Table 1: Socio demographic Profiles of the Respondents
a) Age of the respondents

Particulars	Young (<35years)		Middle (35-50years)		Old (>50years)		Total
	Frequency	%	Frequency	%	Frequency	%	
Marginal	5	7.44	26	32.24	19	60.34	50
Small	3	3.70	15	65.62	18	31.26	36
Medium	2	0.00	6	80.00	6	20.00	14
Aggregate	9	3.70	47	55.29	43	37.18	100

b) Educational level of sample farmers

Particulars	Illiterate		Up to High school		Intermediate		Graduation & above	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Marginal	22	19.84	49	42.14	16	14.04	27	23.96
Small	12	34.37	19	56.26	12	3.14	3	6.26
Medium	4	60.00	3	40.00	0	0.00	0	0.00
Aggregate	38	19.37	71	40.00	18	11.24	31	19.35

c) Family Size of the farmers

Particulars	Children(<18yrs)		Adult(18-50yrs)		Old (>50yrs)		Total	
	Male	Female	Male	Female	Male	Female	Male	Female
Marginal	190	140	226	183	44	39	460	362
Small	50	38	59	50	26	20	135	108
Medium	10	13	11	8	3	2	24	23
Aggregate	250	191	296	242	73	61	619	493

d) Average Land Holdings

Sl. No.	Size groups of farmers	No. of farmers	Net cultivated area (ha)	Average size of farms
1.	Marginal	50	38.740	0.774
2.	Small	36	50.405	1.400
3.	Medium	14	33.974	2.42
Grand Total		100	123.119	1.231

Table No.1 depicts the socio demographic profile of the respondents. The age of an individual has a great influence on his/her ability to take part in economic activities and of course chances of benefiting from the ongoing enterprise. Age-wise distribution of farmers in the study area is shown in table 1. It is evident from the table that on overall basis, 55 per cent of maize growing farmers were in the middle age group (35-50 years). Around 37 per cent farmers were in the old age group (> 50 years) and only 4 per cent farmers were in the young age group (<35 years). It can be inferred that most of the maize growing farmers in the study area were mature and they were in middle age group, who generally possesses risk taking attitude. The education level is a basic key factor for the development of an individual society and the nation as a whole. It equips the individual with the skill to read write

record receive training and seek information. The educational qualification of marginal farmer is the average number of family members in marginal farmers group was found to be highest 460 member in male and 362 female and 135 male and female 108 in small farmers group and medium 24 male and 23 female respectively of the sample farmers. The details of land holding area under different size group of sample farms are given in table 4. Distribution of cultivated land owned by different size group of sample farms revealed that 31.46 per cent of cultivated land was owned by 50.00 per cent of marginal size of farms whereas 50.40 and 36.00 per cent of this area were owned by 34.00 and 14.00 per cent of small and medium size group of farms. It shows that land and human labour combination on sample farm are not appropriate.

Table 2: Per hectare costs and income measures from maize production on various costs concept (Rs.)

Sl. No.	Particulars	Size group of farms			Overall average
		Marginal	Small	Medium	
1.	Cost A1/A2	28248.50	36460.58	38586.33	34431.80
2.	Cost B1	28626.22	36738.00	38774.61	34712.97
3.	Cost B2	34626.20	42738.06	44773.61	40712.62
4.	Cost C1	36815.82	39350.61	40424.00	38863.47
5.	Cost C2	42815.66	45355.61	46424.02	46531.59
6.	Cost C3	47087.34	49891.18	51064.44	49347.65
7.	Yield q/ha.				
a.	M.P	41.00	42.20	44.99	42.73
b.	B.P	71.00	70.68	74.50	72.06
8.	Grass Income	60340.00	61920.30	62975.00	61745.00
a.	M.P (Main product)	54590.00	56176.00	57170.00	55978.66
b.	B.P (By product)	5750.00	5730.40	5790.00	5756.8
9.	Net return over cost C3	13261.46	12029.10	11905.54	12398.70
10.	Family Income	25732.68	19181.22	18198.17	21037.35
11.	Farm Business income	32110.36	25458.74	24385.64	27318.24
12.	Farm investment income	23920.74	22840.11	22736.43	23165.76
13.	Cost of production (Rs./q.)	1023.60	1047.47	1054.11	1035.92
14.	Input-Output ratio				
a.	On the basis of cost A1	1:2.11	1:1.60	1:1.61	1:1.80
b.	On the basis of cost B1	1:2.8	1:1.66	1:1.60	1:1.82
c.	On the basis of cost B2	1:1.72	1:1.44	1:1.38	1:1.51
d.	On the basis of cost C1	1:1.63	1:1.55	1:1.53	1:1.55
e.	On the basis of cost C2	1:1.39	1:1.34	1:1.33	1:1.36
f.	On the basis of cost C3	1:1.24	1:1.22	1:1.21	1:1.24

The Table no.2 revealed that, on an average cost A_1/A_2 , cost B_1 , cost B_2 , cost C_1 , cost C_2 and cost C_3 came to Rs.34431.80, Rs.34712.97, Rs.40712.62, Rs. 38863.47, Rs.46531.59 and Rs. 49347.65 respectively.

On an average, gross income was recorded Rs.61745.00 and net income came to Rs.12398.70. On medium farms, gross income was highest, which was recorded Rs.62975.00, followed by small farms Rs.61920.30 and lowest on marginal farms i.e. Rs.60340.00 respectively.

The net income was highest on marginal farms Rs.13261.46, followed by small farms Rs. 12029.10 and medium farms Rs.11905.54. On an average family labour income, farm business income and farm investment income were observed to Rs.21037.35, Rs.27318.24 and Rs.23165.76, respectively.

Family labour income was highest on medium farms followed by small and marginal farms & farm investment income was highest on marginal farms followed by small farm and medium farms and farm business income was highest on marginal farms, followed by small farms and medium farms. On an average, cost of production per quintal and yield per hectare were estimated to Rs.1041.72/q and 42.73/q respectively.

On an average input output ratio regarding costs C_3 , C_2 , C_1 , B_2 , B_1 , and A_2/A_1 were recorded 1:1.24, 1:1.36, 1:1.55, 1:1.51, 1:1.82 and 1:1.80 respectively. On the basis of cost C_3 input output ratio was highest on marginal farms (1:2.11), followed by small (1:1.60) and medium (1:1.61) respectively.

Table 3: Constraints/Problem of maize cultivation on different size of sample farms

Sl. No.	Particular	Size of sample farms									Total	Rank
		Marginal			Small			Medium				
		A	N	D	A	N	D	A	N	D		
1.	Technical problem	106	15	11	61	21	6	25	7	3	255	I
2.	Managerial problem	80	29	9	44	25	8	18	11	3	227	III
3.	Financial problem	95	25	6	53	15	8	20	9	2	233	II
4.	Miscellaneous problem	79	27	14	40	23	10	15	11	5	224	IV
	Grand total	360	96	40	198	84	32	78	38	13	939	

(Figures in parenthesis indicates the percentage)

Major problems and constraints faced by the maize growers of the district were basically divided in four part i.e. (i) Technical knowledge and skill (ii) Management problem (iii) Financial problem and (iv) Miscellaneous problem (risk and uncertainty) table 3. As per the average score found against the respective problems, technical knowledge was ranked 1st followed by managerial, financial and miscellaneous problems ranked as 2nd, 3rd and 4th respectively.

Major suggestions were received from the respondent side to overcome the mentioned problems were to strengthen the extension services improvement of input supply system and financial support from financial institution. Detail knowledge about decision making crops planning and budgeting as well as disposal of farm produce along with market information should be extended.

Conclusion and Recommendation

On the basis of the findings in the research it was concluded that the highest number of respondents in terms of socio demographic profile were marginal size farmers. Talking about the profit in the maize cultivation among different group of farmers the most benefited was the medium size farmers that had the total profit of Rs.62975 followed by small size farmers that was Rs.61920 and the least benefited was the marginal size farmers that was Rs.60340 Problem of technical knowledge and skills, managerial, financial problem along with miscellaneous problem including risk and uncertainty were faced by the sample farms. Which were suggested to overcome by strengthening farmer’s situation by Government agencies and financial institution.

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