

Economic Analysis of Hybrid Maize Cultivation in Distt; Naushahro Feroze, Sindh, Pakistan

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Abstract: The purpose of this study was to investigate economic analysis of hybrid maize cultivation in distt; Naushro feroze Sindh .This study was based on primary data which was collected from a total of 105 farmers selected by random sampling. Simple descriptive statistical tools like Means, Percentages and Frequencies were applied to analyze the data. The results of this study revealed that the total fixed cost was reported as Rs, 18225.0 per acre, the variable cost consists on labor, capital, Rs: 31800 respectively. The total cost of production was estimated as Rs. 50000 per acre. The physical productivity was calculated as 104.5 mnds per acre. Furthermore, the revenue productivity, which is measured as income, received by the farmer in term of money was estimated as Rs. 118607.5 per acre. The net return as found to be Rs. 68607.5 per acre, the cost of production ratio and cost of benefit ratio were calculated as 1:2.37 and 1:1.37 respectively, Therefore our study suggest that Sindh Seed Corporation should produce hybrid varieties of seed in sufficient quantity to meet the increase demand of farmers on regular basis to provide them, Government should develop go-downs for the storage of maize grins for long term and institutional Banks should provide loans at low interest rates.

INTRODUCTION

Agriculture is the mainstay of Pakistan's economy. It accounts 20.9 percent to the GDP, 43.5 percent total labour force engaged this sector (GoP 2014-15). Agriculture sector provide raw material to domestic agro based industries and it is also a prime source of foreign exchange earnings. Almost 68% of population lives in rural areas, directly or indirectly engaged in agricultural activities. Such as crop cultivation, livestock rearing, labour in agriculture, agriculture input supply, transportation of agricultural output to the market etc. Maize (*Zea mays* L.) being the highest yielding cereal crop in the world is a significant importance for countries like Pakistan, where rapidly increasing population has already out stripped the available food supplies. Maize ranks third most grown crop in the world with an area of more than 118 million hectares with an annual production of about 600 million metric tons. In Pakistan, maize is the fourth largest grown crop after wheat, cotton and rice. Maize, an important food grain and produces an array of products as raw material for multi products. It contributes 2.1 percent to the value added in agriculture and 0.4 percent to GDP. It was cultivated on an area of 1117 thousands hectares, showing a 5.4 percent increase over last year's area of 1060 thousands hectares. The estimated production of the maize was 4527 million tones which was 7.3 percent more than of the last year (GOP, 2014). The area under maize here is over one million hectares and production 3.5 million metric tons. Punjab contributes 39 per cent of the total area under maize and 30 per cent of total production; KPK contributes 56 per cent of the total area and 63 per cent of the production while five per cent of the total area and three per cent of the total production is contributed by Sindh and Baluchistan. Maize grain contains about 72% starch, 10% protein, 4.8% oil, 5.8 % fiber, 3.0% sugar and 1.7% ash (Chaudhary, 1993).

Maize is grown twice a year in Pakistan (spring, autumn). Since the introduction of spring maize cultivation in Pakistan, there is gradual increase in planting of maize during spring season in the irrigated low land areas. Cultivation of spring maize has been increased specially since the active involvement of multinationals in Pakistan.

Maize crop bears high yield potential and responds to various agro-management practices. Low yield of maize is due to many constraints but among them, imbalanced use of fertilizers, traditional sowing methods and lack of optimal crop stand are the factors of prime importance.

Response of maize hybrids to various agro-management practices especially; fertilizers, sowing methods and plant population are different. This variable response is mainly due to differences in plant morphology (Benga *et al.*, 2001), intraspecific competition in maize plants (Maddoni and Otegui, 2006), crop growth rate (Maddoni and Otegui, 2004), crowding stress tolerance (Tollenaar and Lee, 2002), of different maize hybrids. Soils of Pakistan are generally deficient in nitrogen and phosphorus. Now deficiency of potassium is also being reported, therefore application of adequate amount of nitrogen, phosphorus and potassium fertilizers is considered imperative under irrigated conditions. Nitrogen, phosphorus and potassium are essential nutrients for plant growth and development. They play a fundamental role in metabolism and energy producing in plants and significantly increase the grain yield. Leaf area index (LAI), leaf area duration, and crop photosynthetic rate decreased under nitrogen stress (Sinclair and Horie, 1989; Uhart and Andrade,1995a). Crop growth rate decreases under N stress that led to decrease in kernel number and grain yield (Uhart and Andrade, 1995a)

Objectives.

- To Examine the Socio economic characteristics of Maize growers in the Study Areas
- To Study the status of maize production in the Study Area,.
- To estimate per unit (acres/40kg) production cost physical and revenue productivity, net return and input and output ratio realized by maize growers in the Study area.
- To suggest policy recommendation for enhancement of Maize production and to suggest resolution measures on issues faced by the Hybrid maize growers in the study areas.

METHODOLOGY

Study area

The present study was conducted through the questionnaire in District Naushahro Feroze and its surrounding area it is major growing area in Kandiaro Taluka, It is about 22 kilometers away from Naushahro Feroze city.



Data source

The data source of the study consists of both primary and secondary sources. The primary data was collected from the hybrid maize Growers through the well-structured pre- tested questionnaire. The interview with growers was carried out personally, through face to face. Data was collected during the crop 2014 year with the

questionnaire of hybrid maize growers; information was collected about, inputs and output cost, and hybrid maize production by the growers.

Data collection procedure

The data was collected from hybrid maize growing area of District Naushahro Feroze which was selected and identified with the help of local hybrid maize growers. A total 105 sample selected through the simple random sampling techniques.

Data analysis procedure

The data was categorized according to the study objectives, analyzed statistically and represented in tabular form. Statistical techniques were used during data analysis was given below:

Averages

Percentages

Averages

Average were calculate by applying following formula:

$$\text{Average} = \frac{\sum Xi}{n}$$

Where,

$\sum Xi$ = Sum of independent variable.

Percentage:

Percentage is the quantity of fraction expressed in hundredth. It was computed by

$$\text{Percentage} = \frac{F}{N} * 100$$

Where,

F = Respondents of chosen class

N = Total number of respondents

Net farm income (NFI) analysis

The net farm income analysis was used to determine the profitability of maize production in the study area. The net farm income analysis is given by

$$\text{NFI} = \text{GM} - \text{TFC}$$

$$\text{GM} = \text{TR} - \text{TVC}$$

Where

GM = Gross margin (N)

TR = Total revenue (N)

TVC = Total variable cost (N)

$$\text{TR} = \text{Py} \cdot \text{Y}$$

Where

Py = Price per unit output (N)

Y = Total quantity of output (Kg)

$$\text{TVC} = \sum P_{xi} X_i$$

Where

P_{xi} = Price per unit of output (N)

X_i = Quantity of input used per unit

Net Return (NR)

$$\text{NR} = \text{GM} - \text{TFC}$$

Where TFC = Total cost of production per hectare (N)

(Average annual depreciation cost for all input will be used)

Cost-Benefit Ratio

Cost-Benefit Ratio was estimated by using the following formula:

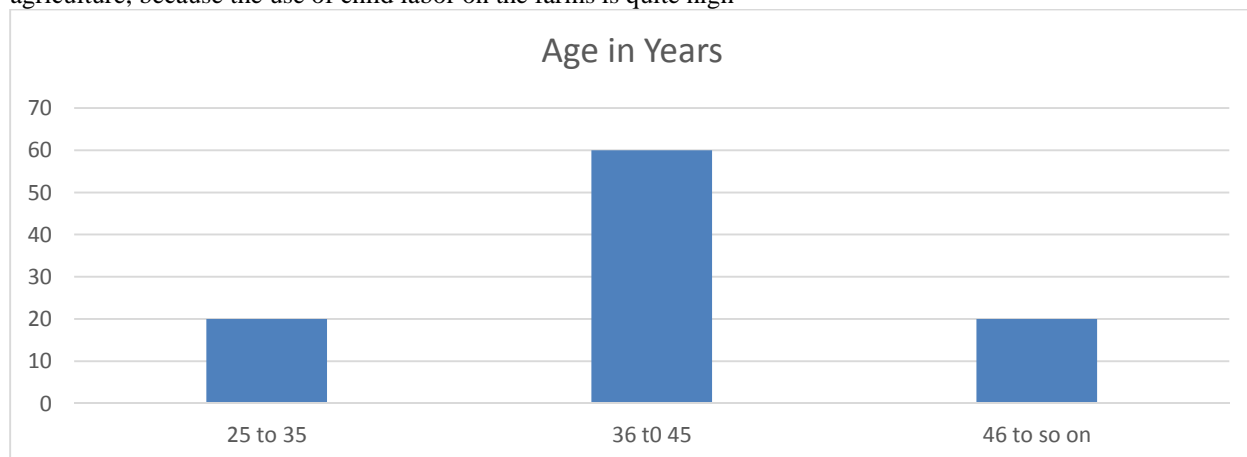
$$\text{CBR} = \frac{\text{NR}}{\text{TC}}$$

RESULTS AND DISCUSSIONS

Socio- Economic Characteristics of Respondents

Age is one of the important characteristics of the Young community. It reflects on the productivity of the population as it has on the overall situation within the commodity. In developing countries, aged members are more prone to diseases and thus are or less productive. It has a bearing on the employment pattern, spatial

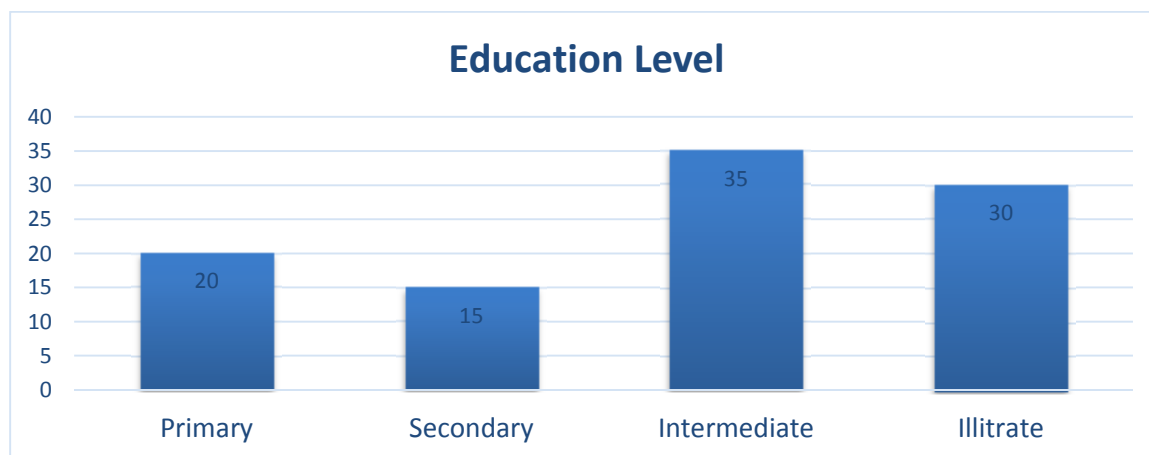
mobility and quality of work done. Age plays a significant role in any kind of business, particularly in agriculture, because the use of child labor on the farms is quite high



In this graph data showed that majority of the respondent (60 percent) were from age group of 36 to 45 years while 20.0 percent of age group was from 25 to 35 years and the 20 percent of grower age were above 46 years.

Education Level

Education is always considered as an important factor of understanding and learning skills. It is education which changes the behavior of human beings in particular and living beings in general. Education changes moral character, thinking pattern and make learn how to talk and behave with other people. It helps in making the decisions on right direction. Following data shows education level of the growers.



Farm Size

Information regarding the education level of selected growers was analyzed. It was founded that majority 35 percent of the respondents were intermediate educated whereas 30 percent of respondent were illiterate while 20 percent educated at primary level, and 15 percent were secondary educated

Table#:1 Farm Size

Descriptive Statistics	Minimum	Maximum	Mean
Land holding / acre	10.0	70.0	40
Rea under cultivation maize	5.00	47.00	26

Results shows that in Table#:01. land holding of the growers was minimum 10 acres and maximum 70 acre the area under hybrid maize cultivated minimum 5 acres and maximum 47 acres respectively.

fixed cost

Fixed costs are those costs which remain the same regardless of the volume of output actually achieved. The cost which does not vary according to the magnitude of production and remains the same, whether the output is large or small is known as fixed costs.

Table#:2 Fixed cost;

Land inputs	Minimum	Maximum	Mean
Land rent	18000	18000	18000.00
Water charges	200.0	200.0	200.00
Total	18200	18200	18200

Data presented in table#2. Shows that fixed cost of hybrid maize production including land rent and water charges of hybrid maize was Rs: 18000/acre land rent and Rs: 200/acre water charges.

Variable cost and labor input

Labor inputs include all the expenses incurred by the growers on employing labor and machine for ploughing, planting, making bunds & channel making, sowing and harvesting, shelling/threshing, application of irrigation & fertilizer etc.

The expenses on labor inputs incurred by the selected maize growers has been collected and shown in appendix table where as consolidated average per acre labor input are given table#6.

Table#3;Variable and Labor cost

Labor inputs	Minimum	Maximum	Mean
charges for sowing labor	2000.0	2500.0	2250.000
labor charges for ploughing	2000.0	2500.0	2250.000
labor charges for making bunds	2000.0	2500.0	2250.000
labor charges for fertilizing	300.0	500.0	400.000
labor charges for harvesting & threshing	3000s	4000	3500.000
Capital inputs			
Cost of seed	6600	6700	6650.000
Cost of fertilizer	11000	13000	12000.000
Cost of pesticides	2000	3000	2500.000
Total	28900	34700	31800

Table#3. Depict that the Grower spend on Hybrid Maize Rs: 2250/acre for sowing labor, Rs: 2250/acre for ploughing, Rs: 2250/acre for Band making, Rs: 400/acre for fertilization, Rs: 3500/acre for threshing and harvesting, Rs: 6650/acre for seed, Rs: 12000/acre on fertilization, and Rs: 2500/acre on pesticide. The total variable cost Rs: 31800/acre.

Physical Productivity

The output even expressed in term of physical weight is known s physical productivity it is general expressed in terms of unit weight of production obtain in other words physical productivity of maize from is the same at the total yield obtained of other crop by farmer.

Table#4; Average/acre yield and price

Yield & sale price/acre	Minimum	Maximum	Mean
Yield /acre in (mnds)	100.0	109.0	104.5000
Sales price/ (mnds)	1100.0	1170.0	1135.000
Total revenue RS/ acre	110000.0	127530.0	118765.000

The average per acre physical productivity is represented in table 4. The results revealed that maize farmer

realized average per acre physical productivity was 104.50 mnds per acre. Whereas, the data indicated that the total physical productivity was in the study area ranged between 100 to 109 mnds per acre.

Total cost of production

Total cost is the sum of the fixed cost and variable cost for any given level of production, i.e., fixed cost plus total variable cost. Agriculture cost is often divided into various categories. Some of the more commonly used cost concepts are follows

Table#5; Cost of Production

Cost of production	Average of cost
Fixed cost	18200.0
Variable cost	31800.0
Total cost	50000.0

In the Table No:8 the data shows that the growers spent on Rs18200/acre on fixed cost and Rs:31800/acre spend on variable cost.

Net returns.

Net return refers to the residual which remains for the entrepreneurs after subtracting cost production from gross income net returns was determined by acre cost from average income per acre realized by the growers.

Table#6; Net returns by the selected hybrid maize growers.

Yield price	Average price/ (RS/acre)
Sales price /mnd	1135
Yield mnds/acre	104.5
Total output	118607.5
Total input	50000
Net return	68607.5

Table#6; shows that the grower received the selling price Rs: 1135/mnd when an average yield of maize production was 104.5mnds/acre, the total output received by the grower Rs: 118607.5/acre when the grower spend Rs: 50000/acre inputs, then grower receive net return Rs: 68607.5 respectively.

Input-output ratio of hybrid maize growers

The criteria of input-output ratios, is usually used to examine the production efficiency of some specific enterprise. It indicates the rate of return as compared to cost.

In the present study, input-output ratios were determined to know the income of farm on per rupee expenses. It was calculated by dividing total value of production with the total cost of production.

Table#7; Cost of Production.

Total output	Total input	Input-output ratio
118607.5	50000	1:2.37

Data presented in table shows that input-output ratio of hybrid maize growers the input-output ratio of growers stood at 1:2.37.It means that with the investment of Rs. 1.00 in hybrid maize crop they yielded Rs.2.37.

Cost benefit ratio of hybrid maize growers.

The cost benefit ratio refers to net returns as compared to cost of production it is calculated by dividing net income with cost of production

Table#8; cost benefit ratio of hybrid maize growers.

Net return	Total input	Cost benefit ratio
68607.5	50000	1:1.37

Data presented in table shows that cost benefit ratio of growers the cost benefit ratio of the hybrid maize growers stood at

CONCLUSION AND SUGGESTION

The purpose of this study was to investigate economic analysis of hybrid maize cultivation in distt; Naushro feroze Sindh Pakistan, the study on based on primary data which was collected from hybrid Maize growers in

Distt: Naushahro feroze was carried out to insure the generalization of research finding. Total sample of 105 Hybrid Maize growers, this equally random selected from different areas of Distt: Naushahro feroze,. Analysis was done by using statistical technique like means, comparison of means, percentage and frequency distribution etc. the findings of research study an average of per acre cost of production, physical and productivity, net return input output ratio cost- benefit ratio, issues and constraints faced maize production. The result obtained from the study are concluded here under;

The selected maize growers were owned acres of land overall. The Maine source of irrigation was canals and tube well. The total fixed cost was reported as Rs, 18200.0 per acre, the variable cost include, and labor, capital, Rs: 31650 respectively. The total cost of production was estimated as Rs. 50000 per acre.

The physical productivity, which is also called the yield, was calculated as 104.5 mnds per acre. Whereas, the revenue productivity, which is measured as income, received by the farmer in term of money were estimated as Rs. 118607.5 per acre. The net return as found to be Rs. 68607.5per acre, the cost of production ratio and cost of benefit ratio were calculated as 1:2.37 and 1:1.37 respectively. According to *MA Haque at All* (2012) Net return of hybrid seed production for contract growers was higher under public agency (Tk. 78204/ha) compared to private company (Tk. 39088/ha) and NGO (Tk. 33246/ha). Benefit cost ratio (BCR) was higher for the contract growers of public agency (2.21) Net return of hybrid maize seed production was 50% higher than that of non-seed production.

While study the contrarians faced by the growers in study area, it was reported the major problem of shortage of water, price flection of maize grain in market, lake of modern technology weed lake of shortage facility and higher interest rate of agricultural loan etc.

After the finding our suggestions were made to increase the sustainable maize production in Pakistan you remove water charge. Sindh Seed Corporation should produce hybrid varieties of seed in sufficient quantity to meet the increase demand of farmers on regular basis to provide them latest use of modern technologies in cultivation practices and weedicides should be sale out at lower rates. Government should develop excellent go-downs for the storage of maize grins for long term. The banks should provide loans at low interest rates. The government should very activity procure distribution of maize like other crops.

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