

Research Article

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## Economics of Growing Spring Maize in Cotton Wheat cropping pattern in Vehari Zone of Punjab, Pakistan

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### Abstract

#### Keywords

Maize,  
profitability,  
Benefit Cost Ratio  
(BCR),  
Vehari.

Keeping in view of the changing farming scenario in the country, Maize has been emerging as one of the potential crop that addresses several issues like food and nutritional security, climate change, water scarcity, farming systems and biofuels. Rabi Maize cropping can provide insights on intensive agriculture and other strategies for meeting future food production challenges and will be one of the important cereals in food security of the country. Present study was designed to determine the economics of growing spring Maize in district Vehari. Cross sectional, primary data of 90 respondents were collected through well structured questionnaire after pretesting by purposive sampling technique. Results indicated that farmers had an average increased the area of Maize by 59.18 percent in comparison with previous year. The financial and economic costs for spring maize were calculated and on that basis benefit cost ratio came out to be 1.15. Respondent farmers were growing spring maize mainly due to short duration and easiness to grow/handle maize crop.

### Introduction

The economic prosperity of the people of developing countries like Pakistan is tremendously dependent on the agricultural development. Agriculture supports three fourths of the country's population for its subsistence, employs 42.3 percent of the total labor force, accounts for 19.5 percent of GDP and recorded a growth of 3.46 percent against 3.5 percent growth rate of last year (Govt. of Pakistan., 2017). Although Cotton is a major crop in Pakistan after Wheat, but its area of cultivation is shrinking from past few years which pushed producers away from Cotton to competing parallel crops like Maize and Sugarcane due to pest infestation and low domestic prices (Govt. Of Pakistan., 2017 and Horvath *et al.*, 2007). Maize is an important cereal crop that

provides staple food to large number of human population in world. In developing countries maize is a major source of income to many farmers (Tagne *et al.*, 2008).Maize (*Zea mays* L.) (Which is known in many English-speaking countries such as corn) is a domesticated grass by indigenous people in Central America in prehistoric times. Later, the crop has become popular thanks to America (Khan, 2010). Maize accounted for 0.5 percent to GDP and contributes 2.7 percent to the value addition in agriculture. It is planted on an estimated area of 1334 thousand hectares with an annual production of 6.13 million tonnes showing an increase of 5.271 percent over the last year (Govt. of Pakistan., 2017). Maize has greater nutritional value as it

contains about 72% starch, 10% proteins, 4.8% oil, 8.5% fiber, 3% sugar and 1.7% ash (Chaudhary, 1993). The large production (97 percent of the total production) comes from two major provinces Khyber Pakhtunkhwa and Punjab. Very little maize 2-3 percent is produced in the province of Sindh and Balochistan (Naqvi and Ashfaq, 2013). Potentiality of this crop is represented in the figure 1.1 showing overtime Area and Production of Maize in Pakistan.

Maize is Pakistan’s third most important cereal after Wheat and Rice. The use of maize in Pakistan for direct human consumption is declining (Tahir and

Habib, 2013), but its utilization in the feed and wet milling industry is growing at a much faster pace than anticipated. Maize is grown twice a year in Pakistan (spring, autumn). Since the introduction of spring maize cultivation in Pakistan, there is gradual increase in the planting of maize during spring season in the irrigated low land areas of Punjab (Govt. of Pakistan., 2014). Currently, sufficient maize is grown in Pakistan for domestic needs and there is neither a surplus nor deficit in maize grain supplies. Currently except Potato, Maize is the most profitable, stable and dependable agricultural crop in Pakistan (Tariq and Iqbal, 2010).

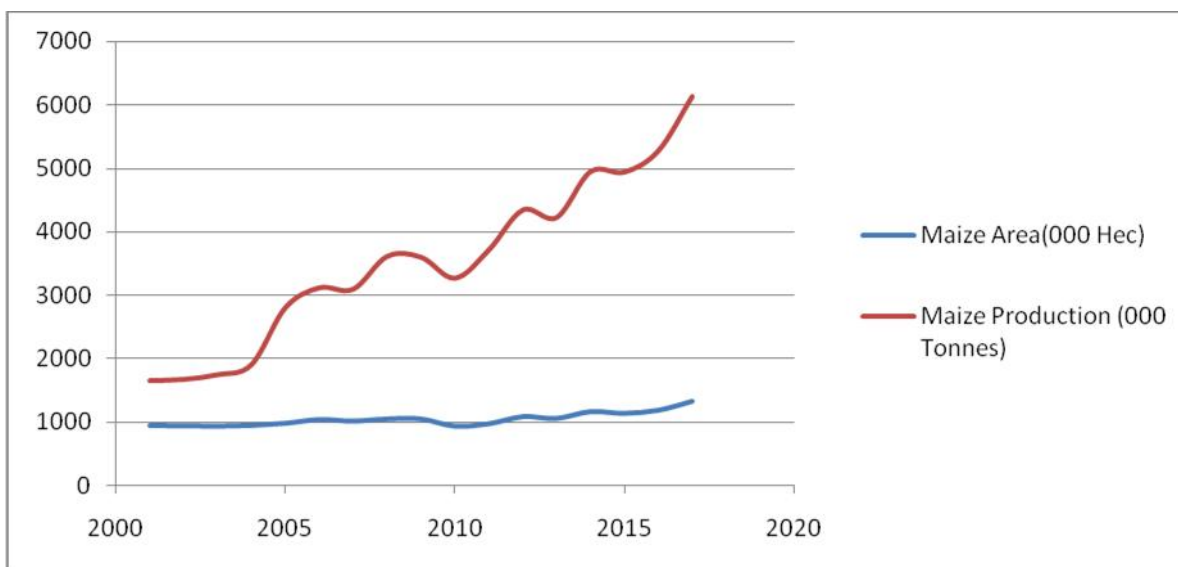


Figure 1.1 Overtime Area and Production of Maize in Pakistan

Keeping in view the potentiality of Maize crop, present study is going to highlight socio-economic status of district Vehari for spring Maize cultivation, profitability analysis (using BCR) and highlighting various costs involves in the production of spring Maize.

## Materials and Methods

Primary data was collected using Purposive sampling technique through well structured questionnaire by the experts of Adaptive Research Farm, Vehari from district Vehari, which lies between 29° 36 and 30° 22 North Latitude and 71° 44 and 72° 53 east longitude (Zafar *et al.*, 2016) during the year 2014-15. All the tehsils of district i.e. Vehari, Mailsi and Burewala were selected. Out of these tehsils, 5 villages of each tehsil were randomly selected and 6 respondents were interviewed from each village by the research team.

Total sample size was 90 farmers. After pre-testing, questionnaire was used to collect information from the selected respondents. The questionnaire included both ended (i.e. close and open) in order to check the positive and negative response of respondents.

## Benefit Cost Ratio (BCR)

For Benefit Cost Ratio, monetary data regarding costs involved in each crop production level and plant protection function to increase the income, yield and profit were collected for Maize crop. Economic ratios like net returns and benefit cost ratios of maize were calculated to find the most profitable crop in terms of total and net revenue. More specifically the Benefit Cost Ratio (BCR) for each variety was calculated by same technique used by Latif *et al.* (2015), Hussain *et al.* (2006) and Abbas *et al.*, (2012) to check the profitability analysis of various crops.

- 1) Gross margin = Total Revenue/ Returns (Rs/acre) – Financial/ Total variable cost
  - 2) Net Margin = Total Revenue/ Returns (Rs/acre) – Economic cost
  - 3) Benefit Cost Ratio = Total Revenue/ Returns (Rs/acre) ÷ Total Cost. i.e.
- BCR = CNR / CTC

Where, CNR = Crop net revenue and CTC = Crop total cost of production

## Results and Discussion

### 3.1. Socio-economic characteristics of the study area

Mostly, Maize producers (33.3 percent) in the study were having age range from 41 years to 50 years. Just 12.2 percent farmers were in the range of 21 to 30 years. While, 27.8 percent of the respondents passed their schooling years up to 5 and only 4.4 percents were graduate. Experienced farmers understand crop management and marketing activities relatively better.

Hence, 26.7 percent of farmers were found with experience regarding farming above 25 years and only 7.8 percent of farmers were in the range of 21 to 25 years.

Among the sampled respondents, mostly all the farmers i.e. 94.4 percent were married and only 5.6 percent of respondents reported to be single. Regarding family size in the study area, 34.4 percent of farmers had family members greater than 8. More than half i.e. 51.1 percent of farmers were found with family members from 5 to 8 (Table 3.1).

**Table 3.1. Socio-economic Profile of the study area**

Particulars		Frequency	Percent
Age of Respondent	21 to 30	11	12.2
	31 to 40	26	28.9
	41 to 50	30	33.3
	Above 50	23	25.6
Education Level	Illiterate	16	17.8
	Primary	25	27.8
	Middle	19	21.1
	Matriculation	19	21.1
	Intermediate	7	7.8
	Graduation	4	4.4
Farming Experience	1 to 5 years	6	6.7
	6 to 10 years	19	21.1
	11 to 15 years	18	20
	16 to 20 years	16	17.7
	21 to 25 years	7	7.8
	Above 25 years	24	26.7
Marital Status	Married	85	94.4
	Single	5	5.6
Family Size	1 to 4	13	14.5
	5 to 8	46	51.1
	Above 8	31	34.4

### 3.2. Tehsil wise cropping Intensity

Table 3.2 shows the tehsil wise cropping intensity of the study area. Cropping intensity was calculated on the basis of farmer categories, viz; small (0-12 acres), medium (12.5 to 25 acres) and large (more than 25 acres) farmers same as used by Abbas *et al.*, 2012;

Khan *et al.*, 2011; Anwar 2009 and Jariko *et al.*, 2011. Results from the analysis depicted that in tehsil Vehari large farmers and medium farmers were at par i.e. 177.7 percent and 178.0 percent while small farmers had crop intensity of 173.1 percent. Same pattern of results were obtained from tehsil Mailsi where both the large farmers and medium farmers were at par i.e.

175.8 percent and medium farmers 176.2 percent and small farmers had crop intensity 174.0 percent. In tehsil Burewala, the results showed variation, where small farmers had more crop intensity i.e. 164.1 percent than medium (162.2%) and large (160.9%)

farmers. The results clearly showed that in terms of crop intensity medium farmers from tehsil Vehari and Mailsi were more efficient than other categories, while in tehsil Burewala small farmers were more efficient than other categories.

**Table No. 3.2: Tehsil wise cropping Intensity**

Category		Crop Intensity (Percentage)
Vehari	Small (0-12.5 acre)	173.1
	Medium (12.5 to 25 acre)	178.0
	Large farmer (More than 25 acre)	177.7
Mailsi	Small (0-12.5 acre)	174.0
	Medium (12.5 to 25 acre)	176.2
	Large farmer (More than 25 acre)	175.8
Burewala	Small (0-12.5 acre)	164.1
	Medium (12.5 to 25 acre)	162.2
	Large farmer (More than 25 acre)	160.9

**3.3. Financial cost of spring Maize**

Basic statistics for the whole farm analysis indicate that mean seed cost for spring maize was 6092 rupees per acre (cost was high due to hybrid seed varieties). While, various other costs includes; treatment, land preparation, irrigation, weedicide, pesticides, fertilizer, Labor cost, Threshing cost and transportation cost which were Rs. 254.4, Rs. 4432.8, Rs. 5450.3, Rs.

630.1, Rs. 594.5, Rs. 17035.3, Rs. 4430.7, Rs. 1705.5, Rs. 707.9 per acre respectively. On an average fertilizer cost was higher than other costs, Govt. of Pakistan., (2017) also illustrated that currently record production in Maize was due to intensive input (Fertilizer) use. All the mean costs of factors of production were added to calculate the financial cost of spring Maize crop which turns out to be Rs. 41334 per acre.

**Table No. 3.3: Financial cost for the spring Maize production**

Factors of Production	Average cost (Acre)
Seed cost(Rs)/Acre	6092
Treatment Cost(Rs)/Acre	254.4
Land Preparation Cost(Rs)/Acre	4432.8
Irrigation Cost(Rs)/Acre	5450.3
Weedicide Cost(Rs)/Acre	630.1
Pesticide Cost(Rs)/Acre	594.5
Fertilizer Cost(Rs)/Acre	17035.3
Labour Cost(Rs)/Acre	4430.7
Threshing/Harvesting Cost(Rs)/Acre	1705.5
Transportation Cost(Rs)/Acre	707.9
<b>Financial Cost (Rs/acre)</b>	<b>41334</b>

**3.4. Economic cost of spring maize productivity**

Table 3.4 illustrates the returns per acre and economic cost of spring Maize cultivation. The farmers were getting more returns from spring Maize i.e. their gross margins per acre were Rs. 27677. The average yield (kg/acre) and total revenue/ returns (Rs/acre) for spring Maize were found to be 3442 kg/acre and Rs.

69011 per acre respectively. The economic/ total cost of spring Maize crop was calculated by adding financial cost, management charges, investment incentive 9% and land rent, which was found out to be Rs. 59752.5 per acre. The benefit cost ratio for spring maize was calculated by dividing the total revenue/ returns (Rs/acre) by the total cost of respective yield level and it came out to be 1.15

Table No. 3.4 : Economic cost of spring Maize Productivity

Items	Spring maize
Yield (kg/acre)	3442
Total Revenue/ Returns (Rs/acre)	69011
Financial/ Variable Cost (Rs/acre)	41334
Management charges	550
Investment incentive 9%	3711.5
Land rent	14157
<b>Economic/ Total cost (Rs/acre)</b>	<b>59752.5</b>
Gross Margin	27677
Net margin	9258.5
<b>Benefit cost ratio</b>	<b>1.15</b>

### Conclusion and Recommendations

On the basis of financial and economic costs of spring maize crops, net margins were calculated and it was concluded that respondent farmers were getting more net income from spring maize crop. By disseminating improved technology can increase production up to mark. Mostly farmer were complaining about stagnant output prices and sharp increase in input prices, it is strongly recommended that government should effectively control over input prices. Likewise marketing of Maize produce is also an in-depth problem in the study area which should also be resolved. Being a profitable enterprise it is recommended that production of spring Maize should be undertaken widely in the Punjab for boosting it production and ultimately earning of foreign exchange by its export.

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