



## **Comparative Profitability Analysis of Different Lentil (Masoor) Varieties in Pothwar Region of Pakistan**

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### **Abstract**

The rainfed area of Pothwar region cover about one quarter of total cropped area of the Punjab. Farming in the area is characterized by a complex and diversified set of activities. Most farmers in the area were small farmers. Existing cropping system were wheat, pulses and gram. This study was conducted to find out economic benefit of lentil crop in the districts Chakwal of Pothwar region for the year 2018. Data was collected from 50 respondents. Cost and returns (gross revenues) of lentil producers were estimated. Farm budgeting technique for estimating cost, returns (gross margins) and cost benefit ratio in lentil production was applied. Three types of lentil varieties were compared namely Markaz-09 of NARC, Punjab masoor 2009 of AARI Faisalabad and desi masoor. The per acre yield of Markaz-09, masoor 2009 and desi masoor were 600, 350 and 230kgs respectively. Total cost of lentil production came to be for Markaz-09, masoor 2009 and desi masoor were 21950, 15650 and 9200 rupees per acre respectively. Operations like harvesting and threshing were major cost components in lentil production. The gross revenue from lentil production of Markaz-09, masoor 2009 and desi masoor were 90000, 52500 and 34500 rupees per acre respectively and net revenue were 68050, 36850 and 25300 rupees per acre respectively for each variety. The cost benefit ratios were 3.10, 2.35 and 2.75 per acre respectively. Revenue per crop day of Markaz-09, masoor 2009 and desi masoor were 378, 204 and 140 rupees respectively, which clearly indicated that Markaz variety is more beneficial for farmers for improving their economic condition.

**Keywords:** Lentil, cost, returns, cost benefit ratio, Pothwar region

### **Introduction**

Pulses; one of humanity's oldest food crops and originated in the fertile crescent of the near east (Webb and Hawtin, 1981) [5]. Pulses are the major sources of dietary protein in the vegetarian diet in under developing countries. Besides being a rich source of protein, they maintain soil fertility through biological nitrogen fixation in soil and thus play a vital role in furthering sustainable agriculture (Kannaiyan, 1999 and Asthana and Chaturvedi, 1999) [3, 1]. Pulses are imperative part of food because it provides proteins and vitamins particularly to the vegetarian societies of almost all the developing countries and specifically for Pakistan. Lentil is grown in Pakistan on largest pulses area second to chickpea. Mostly it is grown as a cash crop in summer. Its major concentration is found in the districts of Jhelem, Chakwal, Rawalpindi, Sargodha, Mianwali, Bhakkar etc. In Pakistan minor crops like pulses occupy 0.07 percent of the total cropped area of 22.8 million hectares in 2011-12 (GOP, 2011). Lentil is the major source of livelihood of the rural people in the Pothwar region of Punjab. Its production entirely depends upon the intensity and distribution of rainfall. There are two main types of lentil distinguished by seed size, shape and colour. The first relatively small seeds is called desi and with large seed called improved and in improved major varieties of the area were Markaz-2009 and Masoor 2009. People like desi lentil due to its taste in Pothwar region. The growing pressure on our economy to feed more people has augmented the importance of utilizing the potential rainfed regions of Pakistan to improve food security (Mahmood, *et al*, 1991) [6]. Lentil is the most important pulse crops mainly

grown in the rainfed areas of Pothwar region by resource-poor farmers. Considerable progress has been achieved in developing improved varieties of lentil that fit specific niches in the cropping pattern. Fallow areas were brought under lentil cultivation as the crop could now escape terminal drought. However, large-scale adoption could not be sustained due to several socio-economic and technological constraints. Low productivity growth of lentil has resulted in declining or stagnant per capita availability of this crop in the major producing regions. A significant policy question is whether the decline in per capita availability of pulses is a supply or demand constraint. In the short to medium term, supply would be more constrained than expected demand for lentil.

The focus of research should be on developing production technologies appropriate for diverse environments. Lentil production in Pothwar region has declined severely in recent years. The survey describes the existing production practices, identifies technical and socio-economic constraints of low productivity, and determines average cost of lentil's production and returns at farm level.

### **Materials and Methods**

This part summarizes the methodology for the research study. It briefly describes the selection of the study area; sampling technique, selection of farmers. It also gives source of sample data, method of data collection and analysis. The Pothwar region, especially Chakwal district of northern Punjab was selected. A

semi-structured questionnaire was prepared to gather information from the lentil producers in the study area. A total of 50 respondents were interviewed purposively. The survey team was comprised of agricultural economists and also accompanied the local extension agents. The information gathered pertains to Rabi 2018 crop season. Data were collected from lentil growers who have grown different lentil varieties on their fields. Villages as well as farmers were selected randomly.

### Estimation of Costs and Incomes

The net value of the produced cost and returns of lentil crop were estimated. To compute the cost of variable inputs such as labour, ploughing, seed, fertilizer, harvesting and threshing were computed. For estimation of gross income, the value of lentil grain was taken in to the account to compute the net income. To calculate the net incomes of selected lentil varieties the following formula was used and this method was adopted by Shah *et al.*, (2007).

#### I. Net Return

NR = GR – TVC Whereas  
 NR = Net return  
 GR = Gross return  
 TVC = Total variable costs

#### II. Cost Benefit Ratio

It is defined as the amount of profit received on the costs of one rupee. The CBR was computed by employing the methods adopted by Siddiqui *et al.*, 1983.

CBR = NR/TVC Whereas  
 CBR = Cost benefit ratio  
 NR = Net returns  
 TVC = Total variable cost

### Results and Discussion

This section presents the analysis and discussion of results in the light of the objectives of the study.

#### Socioeconomic Characteristics

The respondents belong to different age groups with mean age of 42.35 years with standard deviation of 11.11 years. The percentage of mean education is 6 years with standard deviation of 5.4. On the average farmers in the study area has 10.19 years of mean experience with standard deviation of 10.9. Average household size is 7.50 numbers with standard deviation of 4.78. Details are given in table 1.

**Table 1:** Socioeconomic Characteristics

| Variable                 | Mean  | St. Deviation |
|--------------------------|-------|---------------|
| Age (years)              | 42.35 | 11.11         |
| Education (years)        | 6.00  | 5.40          |
| Experience (years)       | 10.19 | 10.90         |
| Household size (Numbers) | 7.50  | 4.78          |

*Source:* Field Survey, 2018

#### Tenancy Status

The data reveals that a vast majority of the people (80 percent) are owner cultivators. Very few farmers worked as tenants; mainly they are landless and belong to very poor category of the people. About 8 % farmers were working as owner cum tenants

table 2. They are also poor farmers and own very few kanals of agricultural lands. So to meet their family requirements they hired some agricultural land from large farmers on share basis. Culturally, working as tenants or as owner cum tenants is an issue of social status. Therefore, in rural areas people avoid to work as tenant. They just go out of the villages and prefer to perform other laborious jobs. Details are given in table 2.

**Table 2:** Tenancy Status

| Tenancy           | Frequency | Percentage |
|-------------------|-----------|------------|
| Owner             | 40        | 80         |
| Tenants           | 6         | 12         |
| Owner-Cum-Tenants | 4         | 8          |
| Total             | 50        | 100        |

*Source:* Field survey, 2018

#### Average Farm Size

The average farm size of the participating household was ranged between 4 to 8 kanals. It shows that the selected families are really poor and needy. The erratic and uneven rainfall made their life more miserable. So in the unpredictable conditions, they cannot depend only on agricultural crops. These poor families mainly relayed on both crops and small ruminants. Almost every household kept 2 or 3 goats to fulfill their domestic milk and cash needs.

#### Major Crop Rotations

Two types of fallow systems are prevalent in barani areas. First was one-year fallow system, land is fallowed for one year in drier areas to conserve moisture and the other is seasonal fallow system. The major reasons for fallowing land were lack of moisture and risk due to drought. Continuous cropping produces lower yield and is not economically viable.

#### Comparative Economic Analysis of Lentil

To have a better picture of returns per unit area, net returns per acre was calculated. Lentil is the only significant Rabi crop in the Pothwar region. Land preparation for lentil usually starts in the last week of September. In general, two ploughing are given.

#### Economic Analysis of Markaz-09 NARC Lentil Variety

In case of NARC lentil variety Markaz-09 cost of land preparation by mechanical method, sowing/planting and seed per acre were 3400, 600 and 2400 rupees respectively. While fertilizer and weedicide per acre cost were 4500 and 2000 rupees respectively. The harvesting cost was 6000 and threshing by thresher cost per acre was 2800 rupees. The total cost of cultivating per acre of lentil in Pothwar region was computed to be 21950 rupees with gross revenue of 90000 rupees. The net income of lentil per acre was 68050 rupees. The benefits costs ratio was 3.10. The revenue per crop day was 378 rupees. These results implied that lentil cultivation is very profitable enterprise in the study areas. Details are given in table 3.

#### Economic Analysis of Masoor-2009

In case of Masoor 2009 variety cost of ploughing and sowing was 4200 rupees. The Cost of seed, fertilizer and weedicide were 1650, 4500 and 1500 rupees respectively. The harvesting by manual cost was 1800 rupees. The threshing by thresher per acre cost was 2000 rupees. Total cost of Masoor 2009 variety was

15650 rupees per acre with gross revenue of 52500 rupees. The net benefit was 36850 rupees per acre. The cost benefit ratio and revenue per crop day were 2.35 and 204 rupees respectively. Details are given in table 4.

**Economic Analysis of Desi Lentil Variety**

In case of desi lentil variety cost of ploughing and sowing were 3000 rupees. The cost of seed was 1500 rupees. Weeding cost was 900 rupees and Harvesting and threshing per acre costs were 1800 and 2000 rupees respectively. Total cost of desi lentil variety was 9200 rupees per acre with gross revenue of 34500 rupees. The net benefit was 25300 rupees per acre. The cost benefit ratio and revenue per crop day were 2.75 and 140 rupees respectively. Details are given in table 5.

The results of the study suggested that there are still some technical problems, which must be resolved for increase in lentil crop production and net returns.

**Comparative Profitability Analysis of Varieties**

Markaz-09 variety of NARC was producing efficiently by farmers and they were in good economic condition by growing this variety in compare to those farmers who were producing masoor 2009 and desi lentil variety on their farms. Gross returns as well as net returns and farmers’ margin were higher in growing Markaz-09. The cost of production of Markaz-09 was higher expenses on the part of farmers but at the same time it yielded higher. Also, farmers were better off as farmers’ margin was more. The cost benefit ratios of Markaz-09, masoor 2009 and desi masoor were 3.10, 2.35 and 2.75 respectively. Revenue per crop day of Markaz-09, masoor 2009 and desi masoor were 278, 204 and 140 rupees respectively, which clearly indicated that Markaz variety is more beneficial for farmers for improving their economic condition. Details are given in table 6.

**Table 3:** Economic Analysis of Markaz- 09 NARC Lentil Variety (Per Acre)

| Items  | Unit     | Quantity | Rate   | Total (Rs.) |
|--|----------|----------|--------|-------------|
| Inputs side  |          |          |        |             |
| Land preparation (Mechanical)                                      | Hours    | 2        | 1700   | 3400        |
| Sowing/planting (Man days)   | No       | 2        | 300    | 600         |
| Seed for sowing  | Kg       | 16       | 150    | 2400        |
| Fertilizer   | Bag      | 1        | 4500   | 4500        |
| Weedicides and labour cost for controlled manual spray with shield | No       | 1        | 2000   | 2000        |
| Harvesting manual  | Man Days | 20       | 300    | 6000        |
| Threshing by thresher  | Hours    | 2        | 1400   | 2800        |
| Storage  |          | 1        | 250    | 250         |
| Total cost of production   |          |          |        | 21950       |
| Output side  |          |          |        |             |
| Total Production yield   | Kg       | 600      | 150    | 90000       |
| Profitability Analysis   |          |          |        |             |
| Gross benefit  | Rs.      |          | 90000  |             |
| Net benefit  | Rs.      |          | 68050  |             |
| Cost benefit ratio   |          |          | 3.10   |             |
| Revenue per crop day   | Rs.      |          | 378.05 |             |

Source: Field Survey 2018

**Table 4:** Economic Analysis of Lentil Masoor 2009 Variety (Per Acre)

| Items                        | Unit     | Quantity | Rate   | Total (Rs.) |
|------------------------------|----------|----------|--------|-------------|
| Input side                   |          |          |        |             |
| Cost of ploughing and sowing | Hours    | 3.5      | 1200   | 4200        |
| Cost of seed                 | Kg       | 11       | 150    | 1650        |
| Fertilizer                   | Bag      | 1        | 4500   | 4500        |
| Weeding cost                 | Man days | 5        | 300    | 1500        |
| Harvesting cost Manual       | Man days | 6        | 300    | 1800        |
| Threshing cost               | Hours    | 2        | 1000   | 2000        |
| Total cost of production     | Rs.      |          |        | 15650       |
| Output side                  |          |          |        |             |
| Grain yield                  | Kg       | 350      | 150    | 52500       |
| Profitability Analysis       |          |          |        |             |
| Gross benefit                | Rs.      |          | 52500  |             |
| Net benefit                  | Rs       |          | 36850  |             |
| Cost benefit ratio           |          |          | 2.35   |             |
| Revenue per crop day         | Rs       |          | 204.72 |             |

Source: Field Survey 2018

**Table 5:** Economic Analysis of Lentil Desi Variety (Per Acre)

| Items                        | Unit     | Quantity | Rate/Unit | Total (Rs.) |
|------------------------------|----------|----------|-----------|-------------|
| Input side                   |          |          |           |             |
| Cost of ploughing and sowing | Hours    | 2.5      | 1200      | 3000        |
| Cost of seed                 | Kg       | 10       | 150       | 1500        |
| Weeding cost                 | Man days | 3        | 300       | 900         |
| Harvesting cost              | Man days | 16       | 300       | 1800        |
| Threshing cost               | Hours    | 2        | 1000      | 2000        |
| Total cost of production     | Rs./ac   |          |           | 9200        |
| Output side                  |          |          |           |             |
| Grain yield                  | Kg       | 230      | 150       | 34500       |
| Profitability Analysis       |          |          |           |             |
| Gross benefit                | Rs.      |          | 34500     |             |
| Net benefit                  | Rs.      |          | 25300     |             |
| Cost benefit ratio           |          |          | 2.75      |             |
| Revenue per crop day         | Rs       |          | 140.55    |             |

Source: Field Survey 2018

**Table 6:** Comparative Profitability Analysis

| Specification         | Markaz-09 | Masoor-09 | Desi Masoor |
|-----------------------|-----------|-----------|-------------|
| Total Cost (Rupees)   | 21950     | 15650     | 9200        |
| Gross Revenue         | 90000     | 52500     | 34500       |
| Net Revenue           | 68050     | 36850     | 25300       |
| Cost Benefit Ratio    | 3.10      | 2.35      | 2.75        |
| Crop per Day (Rupees) | 378.05    | 204.72    | 140.55      |

### Conclusion and Recommendations

The ultimate objective of this study is to promote lentil crop and increase income of the marginal growers. It is only possible by increasing per acre yield of crops particularly the high value cash crops. It is clearly indicated from the empirical results that lentil crop has potential to improve socioeconomic conditions of the rural masses. The cost benefit ratios of three different varieties such as Markaz-09, masoor 2009 and desi were 3.10, 2.35 and 2.75 per acre respectively. Revenue per crop day of Markaz-09, masoor 2009 and desi masoor were 378, 204 and 140 rupees respectively, which clearly indicated that Markaz variety is more beneficial for farmers for improving their economic condition. Moreover, empirical investigation exposed that presently farmers were not utilizing their natural as well as economic resources efficiently. Most of the farmers were still cultivating their traditional varieties that are vulnerable to diseases and low yielding. Further, inadequate use of farm inputs was adversely affecting land productivity. In view of the farmers, pre and post-harvest management practice of lentil also caused economic losses and reduced profitability of farmers. The current lentil crop management practices needs immediate attention of the stakeholders to popularize use of agriculture machinery at farm level. This intervention will save farmers time, precious resources and ultimately provide them resources to improve their farming activities.

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