ABSTRACT

The present study was designed to analyze the profitability of wheat and berseem during June-July 2010 in district Peshawar. A total of 60 growers of wheat and berseem each were purposively selected from three villages of Union Council Palosi. 20 growers each were interviewed from Palosi Tarlazai, Piran and Regi who grow both the crops. A comprehensive questionnaire was designed to collect data from these farmers. The cost of production of wheat was Rs.27674 acre\(^{-1}\). The land rent was highest (43.3%) in cost of production of wheat followed by fertilizers (19.8%) and labor cost (16.4%). The total gross revenue of wheat was Rs. 44278 acre\(^{-1}\). The total cost of production of berseem was Rs. 23004 acre\(^{-1}\). The rent of land was the highest (52.2%) in cost of production of berseem followed by fertilizer (farm yard manure and chemical fertilizer) (22.4%) and labor cost (14.7%). The gross revenue of berseem was Rs.45036 acre\(^{-1}\). The results reveals that berseem is more profitable in study area than wheat as having more output input ratio, net revenue and revenue per rupee of input cost.

Key Words: Wheat, berseem, comparison, profitability.


INTRODUCTION

Wheat (triticum aestivum) is locally known as ‘Ghundum’. It is grown world wise as Rabi (temperate) and is the leading word food crop so called ‘king of cereals’. It is the major commodity in world food trade as it exceeds all cereals both in area and production. Due to its wide spread dissemination as food aid to developing countries wheat is considered as basic food stuff (Khalil and Jan, 2000).

Wheat is the major food crop in Pakistan and fulfills 76 percent of the food requirements of the country in recent year as against 95 percent in the previous years. Wheat was cultivated on an area of 9042 thousands hectares, showing a decrease of 0.04 percent over last year’s area of 9046 thousands hectares. The impact of water shortages (availability at farm gate) and lower rainfall during the sowing period which may be the main reason for lesser acreage under wheat crop therefore wheat harvest is estimated to be lower than 2009-2010 targets of 25.0 million tons (GoP, 2010).

The production of wheat 2009-2010 decreased by 0.7 % due to the decrease in area by 0.04% as compare to 2008-2009 and per acre yield is increased by 2.1% due to using high yielding varieties, adequate soil moisture and favorable weather conditions (GoP, 2009-2010).

Wheat (triticum aestivum) L.) is an important Rabi legume grown for green fodder. It was probably originated in Egypt. Hence it is also called Egyptian clover. It was first introduce in Sindh in 1904. Later in 1924 it was cultivated in Peshawar, from where it moved to irrigated tracts of Punjab. Now it is a major Rabi fodder crop in Pakistan. It is called the ‘king of fodder’ because it gives the highest fodder yield (100-125t ha\(^{-1}\)) and capable to produce 5-7 cuts of succulent forages. It is also cultivated for reclaiming saline soils, particularly in the rice growing areas of the Punjab (Khalil and Jan, 2000).

Berseem (Trifolium alexandrinum) L. is an important Rabi legume grown for green fodder. It was probably originated in Egypt. Hence it is also called Egyptian clover. It was first introduce in Sindh in 1904. Later in 1924 it was cultivated in Peshawar, from where it moved to irrigated tracts of Punjab. Now it is a major Rabi fodder crop in Pakistan. It is called the ‘king of fodder’ because it gives the highest fodder yield (100-125t ha\(^{-1}\)) and capable to produce 5-7 cuts of succulent forages. It is also cultivated for reclaiming saline soils, particularly in the rice growing areas of the Punjab (Khalil and Jan, 2000).

Berseem provide valuable supplemental nitrogen, energy, minerals and vitamins especially for diets based on low quality lignocellulosic roughage feed such as cereals straw and sorghum Stover. This resulting increase availability in nutrients enables a shift from sub maintenance to production status. The result of forage utilization showed definite improved performance and economic benefits due to the reduced cost feeding. Present feeding system involving green forage supplement are necessary that are demonstrably efficient and more economic than feeding concentrates (Devendra, 1988).
Importance of the Study

The finding was important for various reasons. The review explicitly indicates information on the cost, revenues, production and marketing of Wheat and Berseem. Wheat and Berseem are two competitive crops which are sown in different areas of district Peshawar. Due to the high consumption of dairy products in the study area the demand of Berseem is increasing day by day. Due to inelastic supply of land and high demand of Berseem the price per unit of Berseem is also high. In this regard the research was conducted with the following objectives (i) to analyze cost of production of wheat and Berseem. (ii) to carry out the economic comparison of wheat and Berseem and (iii) to give recommendation based on findings of research.

MATERIALS AND METHODS

Universe of Study

For the present study three villages of district Peshawar namely Palosi Tarlazai, Piran and Regi were selected. 60 growers of Wheat and Berseem were purposively selected from these villages to be interviewed.

Time of Study

The present study was conducted to investigate the cost of production of Wheat and Berseem during June-July 2010.

Data and Data Collection

A comprehensive schedule covering each and every aspect of the study area was designed to draw the information from the growers. Pre testing of the questionnaire was carried out for further improvements. The farmers were assured of confidentiality of the information to persuade them to answer the questions frankly to the best of their knowledge.

Survey

A survey was conducted during June-July 2010. The data was taken from the farmers directly through face to face interview. The interviews were usually conducted at the farmer’s homes and fields.

Analytical Frame Work

The economic comparison of Wheat and Berseem crops was made. Cost of production of wheat and berseem was determined by carrying out all the operations from sowing to harvesting and post harvesting. For profitability comparison the following statistical tools were used.

Estimation of Net Return

According to Debertin (1986) farmer’s profit (net revenue) is equal to total revenue (TR) minus total cost (TC).

\[ \Pi = TR - TC \]

Where

\[ TR = P_1 \times Q_1 + P_2 \times Q_2 \]
\[ TC = V_i \times X_i \]

Where \( V_i \) denotes the price of inputs and \( X_i \) denote the input level.

\( P_1 \) = price of main product and \( Q_1 \) = quantity of main product
\( P_2 \) = price of by-product and \( Q_2 \) = quantity of by-product.

Data regarding average cost, gross revenues and net revenues per acre of both wheat and berseem were analyzed by Microsoft Excel and statistically using paired samples t-test statistics by SPSS package. The three null hypotheses were as under.

i. There is no difference between per acre cost of wheat and berseem.

ii. There is no difference between per acre gross revenues of wheat and berseem.

iii. There is no difference between per acre net revenues of wheat and berseem.
These hypotheses were tested for possible rejection to know whether wheat is profitable or berseem? Average cost of both wheat and berseem included the actual cost paid by the farmers and opportunity cost.

The collected data is analyzed using t-test of independent sample having identical but unknown variances (Chaudhry and Kamal, 1997). For convenience, t-test is defined as:

\[
t = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}
\]

Which under the null hypothesis \(H_0\) follow a t- distribution with \((n_1 + n_2 - 2)\) degrees of freedom.

Where

\[
s_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}
\]

is the pooled variation.

\[
s_1^2 = \frac{1}{n_1 - 1} \sum (X_{1i} - \bar{X}_1)^2
\]

is the variance of first sample.

\[
s_2^2 = \frac{1}{n_2 - 1} \sum (X_{2j} - \bar{X}_2)^2
\]

is the variance of second sample.

\(\bar{X}_1\) and \(\bar{X}_2\) are the means where as \(n_1\) and \(n_2\) are the sample sizes corresponding to first and second sample respectively.

**Revenue per Rupee of Input Cost**

Revenue per rupee of input cost = \[\frac{\text{Gross revenue (Rs./acre)}}{\text{variable cost of inputs}}\]

**Cost Benefit Ratio**

\[\text{Cost Benefit Ratio} = \frac{\text{total gross revenues (Rs./acre)}}{\text{Total Cost}}\]

**RESULTS AND DISCUSSION**

This section deals with total cost; break up of marketing cost, total gross revenue and net revenue of wheat and berseem. Each 20 growers of wheat and berseem were randomly selected from Tarlazai, Piran and Regi of district Peshawar.

| Village | Number of growers growing Wheat and Berseem crops | | | | |
|---------|---------------------------------|-------------------|--------------------------|
| | Wheat | Berseem | Total |
| Tarlazai | 20 | 20 | 40 |
| Piran | 20 | 20 | 40 |
| Regi | 20 | 20 | 40 |
| Total | 60 | 60 | 120 |

Source: Survey

**Wheat and Berseem Cropped Area and Seed Rates**

Mean cropped area under wheat was 13.5 acre while Berseem was 5.6 acre which is relatively less than wheat (Table II). Wheat is a staple food of the area which could be the probable reason for relatively higher cropped area compared to Berseem. Table II, also show that average seed rate of wheat was 43.4 kg acre\(^{-1}\) and for Berseem...
was 8.0 kgacr$^{-1}$. The growers in the study area had used a lesser seed rate for wheat than recommended. The reasons for lower seed rate in case of wheat could be associated to low economic level of the growers (Ali et al., 2005).

### Table II  Area sown and seed rate of Wheat and Berseem

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Wheat</th>
<th>Berseem</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>STD</td>
<td>Mean</td>
</tr>
<tr>
<td>Cropped area (acre)</td>
<td>13.5</td>
<td>7.6</td>
<td>5.6</td>
</tr>
<tr>
<td>Seed (kg/acre)</td>
<td>43.4</td>
<td>7.3</td>
<td>8.0</td>
</tr>
</tbody>
</table>

Source: Survey  
STD = Standard Deviation

### Cost of Production of Wheat and Berseem

The cost of production of wheat was Rs.22674acr$^{-1}$. in wheat cost the rent of land was highest (43.3%) followed by fertilizers cost (19.8%) and labor cost (16.4%) (Table III). The cost of production of Berseem was Rs.23004acr$^{-1}$ (Table III). As shown in Table III, the rent of land has almost half share (52.2%) in total cost of Berseem followed by fertilizer (farm yard manure and chemical fertilizer) cost (22.4) and labor cost (14.7%) respectively. The rent of land is fixed for both the crops as wheat and Berseem are competitive crops grown at the same time however the percentage cost is associated with other costs. Fertilizers increases soil fertility, fulfill the nutritional status of the crops and also increases crop growth, resistances to different environment and productivity of the crops (khan et al. 2005).

### Table III  Per acre average cost of wheat and berseem

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Wheat</th>
<th>Berseem</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed</td>
<td>1214</td>
<td>798</td>
<td>1006</td>
</tr>
<tr>
<td>Tractor</td>
<td>1192</td>
<td>1094</td>
<td>1142</td>
</tr>
<tr>
<td>Bullock</td>
<td>162</td>
<td>392</td>
<td>278</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>5484</td>
<td>5158</td>
<td>5320</td>
</tr>
<tr>
<td>Labor</td>
<td>4538</td>
<td>3384</td>
<td>3960</td>
</tr>
<tr>
<td>Rent land</td>
<td>11982</td>
<td>12000</td>
<td>11990</td>
</tr>
<tr>
<td>Pesticides</td>
<td>338</td>
<td>180</td>
<td>258</td>
</tr>
<tr>
<td>Threshing</td>
<td>2768</td>
<td>14</td>
<td>1390</td>
</tr>
<tr>
<td>Marketing</td>
<td>640</td>
<td>4.8</td>
<td>640</td>
</tr>
<tr>
<td>Total</td>
<td>27674</td>
<td>23004</td>
<td>25338</td>
</tr>
</tbody>
</table>

Source: field survey, 2010

### Comparative Profitability Analysis

Comparative profitability analysis of Wheat and Berseem is shown in Table IV. Cost benefit ratio of Berseem is higher (2.82) than wheat (1.60). Similarly revenue per rupee of input cost was high (4.09) in case of Berseem followed by wheat (1.96).

### Table IV  Comparison of cost benefit ratio and revenue per rupee of input cost of wheat and berseem

<table>
<thead>
<tr>
<th>Items</th>
<th>Wheat</th>
<th>Berseem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost benefit ratio</td>
<td>1.60</td>
<td>1.96</td>
</tr>
<tr>
<td>Revenue per rupee of input cost</td>
<td>2.82</td>
<td>4.09</td>
</tr>
</tbody>
</table>

Source: field survey, 2010

### Out put of Wheat and Berseem

The higher yield depends on various factors such as adequate water availability, improved seed variety, fertilizer application, pesticides application and proper seed technology. In the present study the mean grain yield of wheat was 28 Munds (1400 kg) per acre (Table V) which is less than the average yield of the country. The lower grain yield might be due to unavailability of adequate irrigation water, quality seed and proper management information (Afzal et al. 2006). The Table V also indicates that the average Berseem yield was 1300 Munds (65000 kg) per acre. The yield could be increased by optimum inputs and better practice management (Karim et al. 1999).

The Table V indicates that by-product of wheat which supplement the return of wheat was 28 (1400 Kg) Munds acre$^{-1}$. The seed of the Berseem considered as a by-product supplements the Berseem returns and was 50 kg acre$^{-1}$ in the study area (Table V). The Table V also highlights the gross revenue and net revenue of wheat and Berseem. In the study area the average gross revenue per acre of wheat was Rs.44278 and average net revenue was...
Rs.16605 where as the average gross revenue and net revenue of Berseem was Rs.45036 and Rs.22032 respectively (Table V). The higher gross revenue was accorded for Berseem, the probable reason could the more cuts per season, higher herbage production and higher demand.

Table V  Output of wheat and berseem crops

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Wheat Mean</th>
<th>Wheat STD</th>
<th>Berseem Mean</th>
<th>Berseem STD</th>
<th>Total Mean</th>
<th>Total STD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic yield (Munds/acre)</td>
<td>28</td>
<td>5</td>
<td>1300</td>
<td>154</td>
<td>664</td>
<td>648</td>
</tr>
<tr>
<td>By-product (Munds/acre)</td>
<td>28</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Gross revenues (Rs./acre)</td>
<td>44278</td>
<td>8356</td>
<td>45036</td>
<td>4874</td>
<td>44657</td>
<td>6822</td>
</tr>
<tr>
<td>Net revenue (Rs./acre)</td>
<td>16605</td>
<td>6654</td>
<td>22032</td>
<td>5561</td>
<td>19318</td>
<td>6687</td>
</tr>
</tbody>
</table>

Source: field survey, 2010

Statistical Comparison of Wheat and Berseem

The statistical analysis showed the significant difference (p < 0.01) between wheat and Berseem average total cost per acre by using paired t-test statistic. The high total average cost of wheat might be due to the higher fertilizer cost and high seed rate as compare to Berseem (Khalil and Jan 2000). The average gross revenue of wheat and Berseem is presented in Table VI. The statistical analyses showed the significant difference (p < 0.01) between the gross revenue of Wheat and Berseem. Less chemical fertilizer application, low seed rate and more cutting is the probable reason for high gross revenue of Berseem. Statistical analysis in Table VI also indicates the significant difference (p < 0.01) between the net revenue of Wheat and Berseem by using paired t-test statistic.

Table VI  t-statistics values of total cost, gross revenues, and net revenues of wheat and berseem crops

<table>
<thead>
<tr>
<th>Pair for comparisons</th>
<th>Mean</th>
<th>STD</th>
<th>STE</th>
<th>95% CI of the difference</th>
<th>t-value</th>
<th>df</th>
<th>Sig.(2 tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cost of wheat vs. berseem</td>
<td>-17363</td>
<td>6297</td>
<td>813</td>
<td>-18990 -15737</td>
<td>-21.36</td>
<td>59</td>
<td>0.000</td>
</tr>
<tr>
<td>Gross revenue of Wheat vs. berseem</td>
<td>6400</td>
<td>7537</td>
<td>973</td>
<td>4453 8347</td>
<td>6.58</td>
<td>59</td>
<td>0.000</td>
</tr>
<tr>
<td>Net revenue of Wheat vs. berseem</td>
<td>22246</td>
<td>11312</td>
<td>1460</td>
<td>19324 25168</td>
<td>15.23</td>
<td>59</td>
<td>0.000</td>
</tr>
</tbody>
</table>

STD = Standard Deviation; STE = Standard Error of mean; CI = Confidence interval

CONCLUSION AND RECOMMENDATIONS

Wheat and berseem are two competitive crops grown at the same time. Wheat is grown as a staple food crop in the study area where as berseem is grown for fodder purpose. So more cropped area was given to wheat. Due to the high consumption of dairy products the demand for berseem is higher in the study area. In cost estimation the land rent, fertilizer cost, pesticide cost and other input cost are the main factors contributing the cost of production which was higher for wheat as compared to berseem. The gross revenue of wheat was less than berseem and had resulted lower net revenue of wheat. The net revenue of berseem was 32.7% higher than wheat which is quite reasonable increase in the net revenue of berseem growers.

Based on the findings of the study several recommendations have made. Berseem has higher productivity and results in higher net revenue. The farmers should grow berseem crops in the sample area keeping in view the current prices and demand for berseem. The farmers should trained by extension personals regarding the scientific ways of production technology i.e. use of optimum seed rate, certified seed, sowing time and crop husbandry etc for improved crop productivity. The government should stabilize the inputs, out put prices which play a vital role in sustaining higher productivity.
REFERENCES


