COSTS AND NET RETURNS OF TOBACCO PRODUCTION IN DISTRICT SWABI (KHYBER PAKHTUNKHWA) PAKISTAN

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Abstract

This study was conducted to estimate cost and net revenue from tobacco in District Swabi during 2004-05. The study was conducted in two (2) villages selected through purposive sampling. The sample includes eighty (80) farmers selected through stratified random sampling process. Who were interviewed through a well-designed questionnaire. The objectives of the study were to estimate the cost and net returns of production of tobacco, impact of different variables/inputs on tobacco yield, significance of major factors of profit function and to identify the major problems faced by tobacco growers. The area of the sampled respondents was 423 acres total in Kharif and Rabi seasons with an average of 5.28 acres. Tobacco was being grown on 199.45 acres, which was 47.15% of the total cropped area. The average total cost of tobacco production was Rs.43864.71 per acre. In it the average rent of land for tobacco crop was Rs.6500 per acre. Nursery raising cost for one acre was Rs 1116.09, cultural practices cost was 2075.5 per acre. Fertilizers and pesticides cost was Rs 6061.3 and 1780.57 per acre. Topping and irrigation cost was Rs 1932.9 and 618.60 per acre. Cost of loading barn, curing, binding and marketing was Rs 23779.75 per acre. The average gross revenue from tobacco was Rs 53292.2 per acre. While net revenue including land rent was Rs 9427.49 per acre. The regression analysis of tobacco yield shows that NPK fertilizer, farmyard manure (FYM), hoeing and weeding were the main contributing factors in higher tobacco yield.

Key words: Tobacco, net return of tobacco crop, tobacco curing and marketing Cost
INTRODUCTION

In Pakistan amongst all food and non food crops the tobacco crop possesses peculiarities of its own nature. Tobacco is basically one of the important cash crops not only of the this country but throughout the world and considerable importance of tobacco as a cash crop can be gauged from the fact that about 30% of the federal Govt. revenue receipts from the CED (Custom and Excise Duties) and taxes are derived from this source. Another notable feature is that per hectare gross valued out-turn of tobacco crop is on higher side compared to other crops (including cash crops) in the country. Thus on the small acreage, it gives more return per acre as compared to other crops. Being a highly labor oriented crop, it provides employment opportunities at the time of production, curing and in the tobacco factories where it is processed for cigarette manufacturing. In Pakistan, though tobacco cultivation occupies relatively a small area of 0.27 percent of the total irrigated farming acres in the country. It is of great economic significance as a source of revenue, employment and foreign exchange earnings to the country. During 2001-2002, tobacco production and trade contributed Rs 21 billion to the Federal Exchequer as central excise duty and sales tax. Also, it is an important source of foreign exchange earning for the country (Rs 286 million during 2001-2002). Being a highly labor-intensive crop, about 80,000 persons are involved in its cultivation, 50,000 are engaged in 26 factories of the tobacco industry and another one million find indirect employment through its trading. (Faraz, 2003).

Presently tobacco is produced all over the world but the principal tobacco growing countries are China, India, Brazil, USA, Turkey, Indonesia, Zimbabwe, and Pakistan. China is the largest tobacco producing country in the World. The position of Pakistan is 9th/10th in the order of importance (Government of Pakistan, 2005). In Pakistan though the area of tobacco cultivation has increased from 46.1 thousands hectares to 50.5 thousands hectares and production increased from 79.9 thousands tonnes to 100.5 thousands tonnes from 1995-96 to 2004-05 respectively (Govt. of Pakistan 2004-05), but its per hectare yield is very high as compared to other countries. Pakistan ranks 10th both in the area under tobacco cultivation and total tobacco production and 4th in the total yield among the top ten tobacco growing countries of the world. The area under tobacco cultivation in Pakistan is 50.5 thousands hectares, yield is 1990 kg/ha and total tobacco production is 100.5 thousand tones. Tobacco production and processing is an important profitable enterprise in the North West Frontier Province. It has great potential to transform the rural economy into a prosperous region of the province.

Khyber Pakhtunkhwa is known for producing relatively good quality of tobacco due to its more suitable agronomic and soil conditions. Given the demand, it can be produced in sufficient quantities. Flue curved Virginia is grown and processed for manufacturing of cigarettes, cigar and bibles where as indigenous is grown and processed for snuff, hookah and chewing purposes. Tobacco is grown once in a year. The flue cured virginia of the Khyber Pakhtunkhwa is preferred over that of the other regions of Pakistan by the domestic manufacturers of cigarettes as well as exporters. In Pakistan the production of tobacco is used for cigarette manufacturing which is mainly concentrated in the North West Frontier Province. This province contributes 99 percent of flue curved Virginia tobacco to cigarette industry. In aggregate terms the tobacco companies collect 90 percent of their requirements from the Khyber Pakhtunkhwa. The remaining 10 percent is picked from the agriculturally rich province of Punjab. The chillum type tobacco is however, largely grown in the province of the Punjab followed by Sindh and Balochistan. (GOP, 2005)
Problems in the manufacturing and export of tobacco are well known. The peculiar feature of tobacco trade is that USA, being an important exporter of manufactured tobacco, is the leading importer of tobacco needed for blending purposes. Other countries are Argentina, Egypt, France, Germany and UK. The quality of tobacco and price are the principal determining factors in its trade at the international level. The production and manufacturing of tobacco is highly fascinating by any yardstick. Not only it involves a scientific treatment, but it requires special attention by the producers during the production, curing and marketing stages. The Pakistan Tobacco Board is directly involved in the purchase/export of tobacco. The tobacco and its products are exported mainly through the tobacco companies. However, there are some other parties who also export tobacco and its products.

Justification of the Study

Tobacco is an important cash crop in district Swabi and provides employment and income generation to human being. About 199.45 acres of area is cultivated under tobacco in district Swabi (Development Statistics Khyber Pakhtunkhwa). The findings of the study were supposed to improve tobacco yield and therefore total production and income of the farmers. The indirect beneficiaries are the Pakistan Tobacco Companies (PTC) and tobacco researchers. Also this study helped in alleviating poverty in general by increasing yield, production and income of the tobacco farmers in the area.

Objectives of the study

Objectives of the study were to:

i. Study the cost and net returns of Tobacco production in District Swabi.
ii. Determine the impact of different variables/inputs on Tobacco yield.
iii. Determine the significance of major factors of profit function.
iv. Identify the major problems faced by Tobacco growers.
v. Formed recommendations based on primary findings.

MATERIALS AND METHODS

The study has been based on primary data collection from tobacco growers, during the year 2004 in district Swabi. Two villages from the selected district were purposively selected that includes Yar Hussain and Char Bagh. The proportional allocation sampling technique was used to get the required sample size at the rate of 2 percent from the above two villages. The proportional sampling allocation method was borrowed from Chaudhry, S.M (1997). A list of all operating farmers was obtained (Govt of Khyber Pakhtunkhwa). The total numbers of such farmers were 4000. Then stratified random sampling was used to select respondents. The collected data was transferred to tally sheets and then punched into computer. Statistical package for social sciences (SPSS) was used for enterprise budgeting and regression analysis.

THEORETICAL AND EMPIRICAL MODELING

Theoretical Modeling

Costs and returns of tobacco production were estimated by using Simple Budgeting Technique. The purpose was to identify the importance of each factor in tobacco yield and production. It was used for estimation of net return and profit through profit function analysis.
Empirical Modeling

Net Returns

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

Hence

$$\Pi = TR - TC$$

$$TR = P * Q_0$$ (value of output produced)

$$TC = \sum V_i * X_i$$ (value of input used)

Further analysis are required to achieve the specific objectives established in chapter 1 i.e. to prepare enterprise budget for tobacco crop to analyze determinants of higher tobacco yield and to estimate net return through profit function. Further details of modeling and analytical procedure is given below.

Tobacco Yield.

The following empirical generalized multiple regression model was estimated using the Ordinary Least Square (OLS) method.

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 D_8 + \beta_9 D_9 + \beta_{10} D_{10} + e_i \ldots$$ (3.3)

Where

- $Y$, $X_1$, $X_2$, $X_3$, $X_4$, $X_5$, $X_6$, $X_7$, $D_8$, $D_9$ and $D_{10}$ are per acre tobacco yield in kgs, seed rate, number of irrigations, per acre fertilizer nutrients applied, proportion of acreage where deep ploughing practiced, FYM per acre applied, Proportion of tobacco acreage sown within optimum time, number of weeding per acre, Dummy variable for tenancy (Owner = 1, else = 0), Dummy variable for institutional credit use (Credit used = 1, Else = 0) and Dummy variable for seed sown (Certified seed = 1, Else = 0) respectively.

Tobacco Profit Function

Theoretical Modelling of Tobacco Profit Function

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

Hence

$$\Pi = TR - TC$$

Where

$$TR = P * Q_0$$

$$TC = \sum V_i * X_i$$

Therefore putting the values of $TR$ and $TC$ in equation, we get

$$\Pi = PQ - CQ$$

$$\Pi = f(P, C, Q)$$
Empirical Modeling of Tobacco Profit Function

The empirical model of tobacco profit function is given below:
\[ \Pi = \beta_0 + \beta_1 P + \beta_2 C + \beta_3 Q \]  
…………………………………(3.5)

Where
\[ \Pi = \text{Profit (Net return)} \]
\[ P = \text{Output price at wholesale level (Rs/Kg)} \]
\[ C = \text{Cost per unit produced (Rs/kg)} \]
\[ Q = \text{Output of tobacco} \]

Equation depicts that profit (\( \Pi \)) depends on price of output (\( P \)), cost per unit produced (\( C \)) and total output (\( Q \)). Thus, equation (3.5) was used to estimate profit (\( \Pi \)) of tobacco.

RESULTS AND DISCUSSION

Size of Holding

Most of cultivars in the area were small landholders. Average size of land holding was 5.28 acres. Over thirty five percent of farmers have land holding less than 5 acres. 28.75% of farmers have land holding between 5 and 10 acres and 32.5% of farmers have land holdings over 10 acres.

Age of sampled Respondents

The age of sampled respondents are more or less equally distributed into various age groups. Ten percent of respondents were between 30 and 39 years. Highest (36.25%) number of respondents were in the age group between 50 and 59 years. No respondent was less than 20 years of age.

Educational Level of Sampled Respondents

Education profile of respondents shows that thirty percent of respondents were illiterate.18.75% of respondents had education of primary level, 10% of middle and 15% of matriculate level. Only 25% of respondents had their education above matriculation.

Tenurial Status of Research Area

The majority (42%) of the sampled respondents of the research area were owners-cum-tenants. The remaining 35% and 5% were owner and tenant, respectively.

Cost of Tobacco Production

Agricultural inputs and their cost play important role in tobacco yield, returns and profitability. The detailed study of tobacco production tells us the contribution of most important inputs in tobacco production and their economic significance in tobacco yield and profitability. It is the total cost which is incurred on tobacco crop raising. Cost of tobacco production consists of Nursery raising cost, land preparation, seed and its application chemical fertilizer, farm yard manure, irrigation water, weeding/hoeing, pesticides, weedicides, harvesting, threshing and land rent. Table I highlights the accounting cost and economic significance of important inputs used in tobacco production. A detailed description of tobacco production budget is as follows:
### Table I  Per acre cost of tobacco production

<table>
<thead>
<tr>
<th>Items</th>
<th>Units</th>
<th>Quantity</th>
<th>Rate/unit</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Preparation</td>
<td>M.Hrs</td>
<td>0.14</td>
<td>350</td>
<td>50.50</td>
</tr>
<tr>
<td>Seed</td>
<td>Kg</td>
<td>9.5</td>
<td>10.07</td>
<td>95.67</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>Kgs</td>
<td>1.19</td>
<td>20</td>
<td>23.84</td>
</tr>
<tr>
<td>Weeding</td>
<td>MDs</td>
<td>4.57</td>
<td>45</td>
<td>205.65</td>
</tr>
<tr>
<td>Pesticides</td>
<td>Sprays</td>
<td>0.67</td>
<td>60</td>
<td>40.43</td>
</tr>
<tr>
<td>Lab. For Irrigation</td>
<td>MDs</td>
<td>8.18</td>
<td>55</td>
<td>450</td>
</tr>
<tr>
<td>Water Charges</td>
<td>Abiana</td>
<td>1</td>
<td>250</td>
<td>250</td>
</tr>
</tbody>
</table>

1. Nursery cost

2. Land Rent

3. Fertilizer (NPK)

4. Cultural Practices

5. Total Pesticide cost

6. Irrigation Cost

7. Topping cost

8. Total production Cost

Source: Survey

**Total production Cost**: Rs 20084.96
**Tobacco Curing and Marketing Cost**

Marketing costs include transportation cost to home or godown, storage and other terminal markets. Most of the respondents sold tobacco leaf. The marketing cost was very high that is Rs23779.75 per acre.

<table>
<thead>
<tr>
<th>Items</th>
<th>Unit</th>
<th>Quantity</th>
<th>Rate/Unit</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves Picking</td>
<td>M.Days</td>
<td>45</td>
<td>50</td>
<td>2250</td>
</tr>
<tr>
<td>Transport to Furnace</td>
<td>Rs</td>
<td>3</td>
<td>220</td>
<td>660</td>
</tr>
<tr>
<td>Stringing</td>
<td>Rs</td>
<td>5.94</td>
<td>80</td>
<td>475</td>
</tr>
<tr>
<td>Loading</td>
<td>Rs</td>
<td>5.07</td>
<td>75</td>
<td>380</td>
</tr>
<tr>
<td>Furnace Depreciation Cost</td>
<td>Rs</td>
<td></td>
<td></td>
<td>1430</td>
</tr>
<tr>
<td>Labour</td>
<td>M.Days</td>
<td>2</td>
<td>60</td>
<td>120</td>
</tr>
<tr>
<td>Fuel Cost</td>
<td>Kg</td>
<td>1643.5</td>
<td>4</td>
<td>6574</td>
</tr>
<tr>
<td>Fireman &amp; Curer Cost</td>
<td>Rs</td>
<td>84.23</td>
<td>75</td>
<td>6317</td>
</tr>
<tr>
<td>Grading Charges</td>
<td>Rs</td>
<td>26.07</td>
<td>70</td>
<td>1825</td>
</tr>
<tr>
<td>Trying Cost</td>
<td>Rs</td>
<td>24.8</td>
<td>50</td>
<td>1240</td>
</tr>
<tr>
<td>Application Cost</td>
<td>Rs</td>
<td>28.6</td>
<td>50</td>
<td>1430</td>
</tr>
<tr>
<td>Transportation</td>
<td>Rs</td>
<td>2.06</td>
<td>250</td>
<td>515</td>
</tr>
<tr>
<td>Unloading</td>
<td>Rs</td>
<td>2</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>Marketing Cost</td>
<td>Rs</td>
<td>7</td>
<td>60</td>
<td>420</td>
</tr>
<tr>
<td>Rent of hired place</td>
<td>Rs</td>
<td>1</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Opportunity rent of own land</td>
<td>Rs</td>
<td></td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>Commission</td>
<td>Rs</td>
<td></td>
<td></td>
<td>3.75</td>
</tr>
<tr>
<td><strong>Marketing cost</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>23779.75</strong></td>
</tr>
</tbody>
</table>

Source: Survey

**Total Cost of Tobacco Production Per Acre**

Total cost of tobacco production includes per acre production cost and marketing cost. The cost of tobacco production in the study area is Rs. 20084.96 per acre while marketing cost is Rs. 23779.75. Therefore, the total cost of tobacco production is Rs. 43864.71 per acre in the area.

**Return Per Acre from Tobacco Crop**

Both tobacco and bhusa are the sources of income for the farmers of the tobacco crop. The return from tobacco depends on farmer’s interest in the activities relating to farming and also investment in inputs, level of tobacco yield and farms management practices. The return also depends on prices of tobacco output received by tobacco farmers.

**Tobacco Leaf Yield**

Higher leaf yield depends on various factors i.e. availability of improved seed, adequate irrigation water, fertilizer, use of pesticides and plantation on time etc. Tobacco yield of 1030 kg was obtained per acre in the study area. Most of the farmers sell the surplus tobacco in the market.
Costs and Returns from Tobacco Production

Table III shows the details of the total cost, total and net revenue of tobacco per acre.

Per acre total revenue of tobacco

Table III Detailed of total cost, Revenue and return

<table>
<thead>
<tr>
<th>Yield/acre(Kg)</th>
<th>Rate/Kg</th>
<th>Total Revenue</th>
<th>Total Costs</th>
<th>Net Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>1030</td>
<td>51.74</td>
<td>53292.2</td>
<td>43864.71</td>
<td>9427.49</td>
</tr>
</tbody>
</table>

An average output of 1030 kgs of tobacco per acre yields total revenues of Rs.53292.2 and net revenues of Rs. 9427.49.

Net Return of Tobacco Crop

Net return is obtained when we subtract total per acre cost from total per acre gross revenue of tobacco crop. Therefore the net income was Rs 9427.49 in the area as calculated as follows.

Net income = Total income – Total cost
Net income = 53292.2 – 43864.71 = 9427.49

Econometric Analysis

To quantify the impact of various variables on the tobacco yield, the following econometric model was used.

\[ y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 D_8 + \beta_9 D_9 + \beta_{10} D_{10} + e_i \]

Where, \( X_1, X_2, X_3, X_4, X_5, X_6, X_7, D_8 \) and \( D_9 \) and \( D_{10} \) are seed rate, number of irrigation, total fertilizer nutrients applied, deep ploughing, farm yard manure, sowing time, chemical weeding, Dummy variable for tenancy (Owner = 1, Else = 0), Dummy variable for institutional credit use (Credit used = 1, Else = 0) and Dummy variable for seed sown (Certified see = 1, Other = 0).

The results of the above given model are as follows:

\[ Y = -1897.1 + 3.98X_1 + 1844.73X_2 + 23.68X_3 + 6.09X_4 \]
\[ + 0.67X5 + 24.68X6 + 4.79X7 - 82.20D8 + 132.99D9 \\
+ 218.34D10 \]

\[
t \text{-Ratio} = (-.24) (20.20) (4.79) (1.98) (1.45) \\
(2.79) (4.30) (3.03) (-1.19) (0.89) \\
(1.80) 
\]

\[ R^2 = 0.881, \quad R^2 \text{ adjusted} = 0.872 \quad F = 37.869 \]

The above estimated model, in general, yields good results. F-test determines the overall goodness of fit/significance of the model. In our case as \( F_{\text{calculated}} > F_{\text{tabulated}} = 2.17 \), therefore, the model is overall significant. The coefficient of determination \( R^2 = 0.881 \) suggests that 88.10 percent variation in dependent variable tobacco yield has been explained by the independent variables. The signs of the explanatory variables are in line with our priori expectation of the economic theory.

The coefficients representing seed rate, number of irrigation and application of total chemical fertilizer nutrients were positive and significant. ( \( t_{\text{calculated}} > t_{\text{tabulated}} = 1.67 \)). Similarly, preparation of land for tobacco cultivation using deep tillage implements also has a positive but insignificant impact on yield. Deep tillage minimizes compaction below the plough layer and conserves moisture under rainfed conditions. The use of farmyard manure has a positive and significant effect on tobacco yield. The coefficient for proportion of tobacco acreage sown within optimum time was positive and significant showing that sowing within optimum time of tobacco increases per acre yield obtained. Weeds in tobacco crop are a growing problem in almost all tobacco growing areas of Khyber Pakhtunkhwa. The results reveal that additional coverage of tobacco acreage using chemical weed control methods increased tobacco yield significantly. The dummy variables for credit have positive but insignificant effect on tobacco yield. The dummy variable for seed sown has positive and significant effect on tobacco yield, which shows that certified seed significantly increase yield. While tenancy has negative but insignificant effect on tobacco yield. The dummy for tenure is negative because tenants are expected to be more competitive and exploit fully the available resources to obtain higher tobacco yields.

Keeping in view the overall result of the model the coefficient of seed rate was highly significant which means that optimum use of seed plays significant role in higher tobacco
yield. The coefficients of irrigation, fertilizer nutrients applied, farmyard manure applied, tobacco sown within optimum time and chemical weeding was also significant which means that these factors had substantial impact on farm yield at the recommended level. The coefficient of recommended varieties was also significant which shows the importance of certified varieties in higher tobacco yield.

**Estimation of Profit (Net Revenue)**

The net revenue (income) of the farmers is the difference between total income and cost of tobacco production. It means that price of tobacco, quantity of tobacco and costs play an important role in determination of net revenue. We postulate the following net revenues function to examine which of the aforementioned determinants significantly affect the net revenue.

\[
II = f(P, Q, C)
\]

Where II is profit (Net revenue), P is output price at whole sale level (Rs/Kg), Q is output of tobacco (Kg) and C is Cost per unit produced (Rs/Kg).

We estimated the above model and get the following results.

\[
II = -5180.6 + 2.2491P + 3.43Q - 0.2389C
\]

\[
t\text{-Ratio} = [-.958] \quad [8.18] \quad [11.33] \quad [-2.24]
\]

\[
R^2 = 0.88, \quad R^2 \text{ adjusted} = 0.87, \quad F = 185.78
\]

F-test determines the overall goodness of fit/significance of the model. In our case as \(F_{\text{calculated}} > F_{\text{tabulated}} = 2.76\), therefore, the model is overall significant. The coefficient of determination, \(R^2\), indicates that (88) percent variation in the dependent variable has been explained by the independent variables. The sign of the explanatory variables are in line with the economic theory. As \(t_{\text{calculated}} > t_{\text{tabulated}} = 1.67\), therefore, the t-ratios of the model confirm that, profit (II) is significantly determined by the price (P) total production (Q) and the per unit cost (C), keeping all the other inputs constant, a one rupee increase in per Kg price (P) of tobacco will increase the profit by Rs.2.2491, producing another Kg of Q will increase net revenue by Rs3.43 while each additional unit of per Kg cost (C), will decrease net revenue by Rs.0.2389.

The estimation of the revenue function revealed that revenue is significantly affected by
respective prices, total quantity produced and per unit cost of tobacco grain. However, increase in price significantly contributes towards higher revenues for the farmers.

CONCLUSIONS AND RECOMMENDATIONS

In the estimation of cost and net returns of tobacco production, land rent, fertilizer cost and cultural practices cost were the main cost contributing factors in tobacco production, that were Rs. 6500, 6061.3 and 2075.5 respectively. The net returns from tobacco crop was Rs. 9427.49. Besides tobacco leaf, by-product of tobacco production was also a major contributor to the net return from tobacco crop. The regression analysis of tobacco yield shows that seed rate, number of irrigation, total fertilizer nutrients applied, farm yard manure, sowing time, chemical weeding and certified seed were the main contributing factors in higher tobacco productivity. The revenue function revealed that price of the produce significantly contributes towards higher revenue for the farmers. Unawareness of the respondents about the optimum use of seed rate, certified tobacco varieties and recommended doses of chemical fertilizer were the main constraints in the way of higher tobacco productivity. It is suggested that the farmers should be trained by the extension personnel towards the use of optimum seed rate and certified seed to increase tobacco productivity. Canal irrigation system should be properly managed and the government should concentrate on rainfed areas by water harvesting and small dams. The farmers are unable to install tubewells on their own resources, therefore, to ensure timely availability of credit on low interest rate can play vital role. Policy should be devised for stable input and output prices that is necessary for sustaining higher tobacco productivity.
References


