



ECONOMICS OF TOBACCO PRODUCTION IN DISTRICT SWABI, NWFP

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ABSTRACT

A research study was conducted to estimate net revenue from tobacco crop in district Swabi, NWFP. Four villages were selected through purposive sampling. The sample includes hundred farmers selected through random sampling process, who were interviewed through a well-designated questioner. The area of the sampled respondents was 1327.5 acres total in kharif and rabi seasons with an average of 13.275 acres. Tobacco was grown on 656 acres with an average of 6.56 acres. The average total cost of tobacco production was Rs. 24080.99 per acre. On average, rent of land for tobacco crop was Rs. 5000 per acre, nursery raising cost for one acre was Rs. 1005, tillage cost was Rs. 973.66 per acre, fertilizer and pesticide cost was Rs. 3771.95 per acre, cultural practices, topping and irrigation cost was Rs. 1302.73 per acre, and loading barn, curing and marketing cost were Rs. 16743.44 per acre. The average gross revenue from tobacco was Rs. 53145.77 per acre. While net revenue was Rs. 29064.78 per acre.

Keywords: tobacco, cost, production, Swabi.

INTRODUCTION

Tobacco plant can be defined as wicked weed, yet loved by many. Human beings have been utilizing this golden leaf crop since the 15th century. It was on October 11, 1492 when Christopher Columbus first sighted the home of Awarkess where he was offered the dried leaves of tobacco. (Muhammad, 1975). The use of tobacco in Mexico and South America reflects from records of 1499. Thereafter, the Portuguese and Spaniards took tobacco plant to other countries. In South Asian sub continent, the Portuguese are said to have introduced this crop in 16th century. However, the regular cultivation of tobacco started in the first decade of 17th century (Bhatti, 1992).

The history of tobacco cultivation in this part of Sub-Continent is traced back to 1912 when some experiments were undertaken on Cigarettes and Cigar varieties at the Agricultural Research Station, Tarnab (Peshawar). Although the crop was successfully grown but lack of facilities and technical know-how on curing, obstructed its production (Muhammad, 1975). The production of FCV tobacco was first tried in lower Indus Basin, then in North-West of Punjab plains and finally in NWFP (Statistical bulletin of NWFP, 1999). There are two types of tobacco grown in Pakistan. These are *Nicotiana tabacum* and *Nicotiana rustica*.

The area under tobacco crop in Pakistan was 56.4 thousands hectares in 1999-2000 which decreased to 45.6 thousands hectares in 2000-01 and then increased to 49.4 thousands hectares in the year 2001-02. During the years of 2002-03 and 2003-04 the tobacco cultivation descended to 46.6 and 45.6 thousands hectares, respectively. The tobacco production was 107.7 thousands tones in 1999-2000, decreased to 85.1 thousands tones in 2000-01 but then increased to 94.5 thousands tones. Then decreasing trend from 88.2 to 86.2 thousands tones in 2002-03 and 2003-04 (statistical survey of Pakistan, 2000-04).

The yield per hectare was 1907kg in 1999-2000, which decreased to 1866kg in the year 2000-01. This increased to 1914kg in 2001-02 and then decreased to 1891kg in 2002-03 and further decreased to 1888kg during 2004. (Tobacco Statistical Bulletin, 2004).

The area under tobacco crop in NWFP was 35.7 thousands hectares in 1999-2000 which decreased to 26.5 thousands hectares in 2000-01 and then increased to 29.8 thousands hectares in 2001-02. District Swabi is famous for the production of the Flue Cured Virginia tobacco due to suitable agronomic and environmental conditions. Tobacco produced in district Swabi is of high quality and is used for the manufacturing of Cigarettes. According to Tobacco Statistical Bulletin-2005, the area under tobacco crop in district Swabi was 15912 hectares, 11540 hectares, 12387 hectares, 12777 hectares and 12601 hectares in 1999-00, 2000-01, 2001-02, 2002-03 and 2003-04, respectively.

Tobacco is one of the major cash crops of Pakistan. The role of tobacco in Pakistan economy can be established from the fact that 40% of all government excise taxes and 10% of total government revenue are earned through tobacco and its products. According to Tobacco Statistical Bulletin, 2003 Pakistan has earned foreign exchange of Rs. 235.17 million in 1998-99 from the export of tobacco, Cigarettes and Cigar. This foreign exchange increased to Rs.586.77 million during 2000-2001, and then decreased to Rs.362.37million during 2001-2002. (Tobacco Statistical Bulletin, 2003). Pakistan has collected revenue of Rs. 15507.3 million in 1997-98 from the Excise Duty and Sales Tax on tobacco and its products. This revenue increased to Rs.22189 million during 2002-2003 (Tobacco Statistical Bulletin, 2003).

Pakistan is producing tobacco on wide range and earns a handsome amount of foreign exchange and Excise



Duty and Sales tax. Pakistan has earned foreign exchange of Rs.362.37million during 2001-2002.

MATERIALS AND METHODS

Sampling and sample size for collecting primary data:

District Swabi is favorable for the production of both Desi and Flue Cured Virginia Tobacco due to suitable environmental, agronomic and soil conditions. Four villages namely Managi, Sherdara, Marghuz, and Tharakai were selected to conduct this study (Table-1).

Table-1. Sampling frame and the study area.

Name of Village	Total No. of T.G	Sample size
Managi	468	14
Sherdara	438	13
Marghuz	1013	30
Tharakai	1501	43
Total:	3420	100

Source Survey Data.

Keeping in view the time and financial limitations, a sample of 100 farmers was selected from these four villages. Village wise sample was calculated using the proportionate allocation technique which is as under;

$$n_i = \frac{n}{N} * N_i \quad (i = 1, 2, 3, \dots, k)$$

Where:

- n_i = The number of sampled farmers in village i
- n = Total sample size
- N_i = Total number of farmers in ith villages
- N = Total number of farmers in all villages

The number of farmers selected from Swabi district was as follows:

$$n_1 \text{ (For Managi Village)} = 468/3420 * 100 = 14$$

$$n_2 \text{ (For Sherdara village)} = 438/3420 * 100 = 13$$

$$n_3 \text{ (For Marghuz village)} = 1013/3420 * 100 = 30$$

$$n_4 \text{ (For Tharakai village)} = 1501/3420 * 100 = 43$$

Data collection:

Primary and secondary data were used in this study. Primary data was collected through field surveys of farmers involved in tobacco production. An interview schedule was used to collect the primary data. The secondary data was downloaded from the Federal Bureau of Statistics, Government of Pakistan, FAO websites and other relevant sources.

Data analysis:

Statistical Package for Social Sciences (SPSS) was used for analysis of the data.

Cost and returns of tobacco production:

Theoretical modeling of cost and returns of tobacco production:

Costs and returns of tobacco production were estimated by using simple budgeting technique. For identify the importance of each factor in tobacco yield and production. Apart from this, it was further used for estimation of net return and profit through profit function analysis.

Empirical modeling of cost and returns of tobacco production:

Net return:

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

Hence:

$$\Pi = TR - TC \quad \text{Eq. 1}$$

Where:

$$TR = P * Q_o$$

$$TC = V_i * X_i$$

The above function was used to estimate the net revenue of the tobacco enterprise in the study area.

Tobacco profit function:

Theoretical modeling of tobacco profit function:

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

Hence:

$$\Pi = TR - TC \quad \text{Eq. 2}$$

Where:

$$TR = P * Q_o$$

$$TC = V_i * X_i$$

Therefore, putting the value of TR and TC, in equation 1, we get.

$$\Pi = f(P, C, Q) = PQ_o - V_i X_i \quad \text{Eq. 3}$$

Where:

Π = Profit (Net Revenue)

P = Output price at wholesale level (Rs/kg)

C = Cost per unit produced (Rs/Kg)

Q = Output of tobacco or total production of tobacco (kg)

TC = Total cost of production (Rs/acre)

V_i = Input prices

$i = 1, 2, 3, \dots, n$

Empirical Modeling of Tobacco Function:

The empirical model of tobacco profit function is given as:

$$\Pi = \beta_0 + \beta_1 P + \beta_2 C + \beta_3 Q \quad \text{Eq. 4}$$

This equation shows that profit (Π) depends on output price (P), cost per unit produced (C) and total



output (Q). This equation was used to estimate profit (II) or net return of tobacco.

RESULTS AND DISCUSSION

General characteristics of sampled respondents:

Socio-economic characteristics of the farmers play very important role in agricultural production, efficiency, farm management and agricultural marketing activities.

Age of sampled respondents:

Table-2 shows that only 5% of farmers were below 20 years of age, 50% of farmers were between 20 and 40 years of age. Rests were above 40 years. This implies that most of the respondents were adults and strong farmers.

Table-2. Age level of the sampled respondents.

Age group	No. of respondent	% age
Up to 20	5	5
21-30	21	21
31-40	29	29
41-50	30	30
51 and above	15	15
Total:	100	100

Source: Survey data.

Educational status of the respondents:

Table-3 shows that one third i.e. 20% of the sampled respondents were illiterate and 80% were literate. Among literate, upto primary level were 23%, upto middle were 17%, upto high level were 13%, upto inter level were 09%, upto bachelor level were 08 and 10% were master degree holders. The high literacy rate of the farmer's community is due to the availability of educational facilities in the research area.

Table-3. Educational level of the sampled respondents.

Educational status	No. of farmers	% age
Illiterate	20	20
Literate	-	80
Primary	23	23
Middle	17	17
High	13	13
Inter	09	09
Bachelor	08	08
Master	10	10
Total:	100	100

Source: Survey data.

Tenurial status of sampled respondents:

Table-4 shows that the highest numbers (60%) of the respondents were tenants followed by owner-cum-tenants (25%) and owner cultivators (15%).

Table-4. Tenurial status of sampled farmers.

Tenurial status	No. of farmers	% age
Owner	15	15
Owner-Cum-tenant	25	25
Tenant	60	60
Total	100	100

Source: Survey data.

Cost of tobacco production:

Rent of land:

In the study area there are two kinds of land rent. One kind of rent was determined by people willingness to pay and the other kind was the opportunity cost of land. The per acre land rent was Rs. 5000 per acre.

Nursery raising cost:

Table-5 shows that the average cost incurred on nursery raising per acre for tobacco crop was Rs. 1005 which is 4.17% of the total cost of tobacco production. Among the nursery cost, highest amount of Rs. 239.2 (23.80%) was spent on forest protection of nursery while lowest amount of Rs. 66.98 (6.66%) was spent on seedbed preparation. The result is in conformity with Shah (1998).

Table-5. Nursery raising cost per acre.

Item	Unit	Qty	Rate	Cost (Rs)	%age
Land Preparation	Kanal	0.58	119.8	69.24	6.9
Seed bed Preparation	M. days	1.34	50.0	66.98	6.66
Fertilizer	Kg	17.38	10.8	187.64	18.67
FYM	Kg	359.44	0.25	89.86	8.94
Frost Protection	Yard	36.5	6.55	239.2	23.80
Weeding	M. days	16.632	50.0	81.6	8.12
Pesticides	Sprays	0.31	356.84	110.62	11.01



Labour for Irrigation	M. days	1.734	50.0	86.72	8.63
Water Charges	Rs	-	-	73.14	7.27
Total:				1005	100

Source: Survey data.

Tillage cost:

Table-6 shows that the average cost of tillage was Rs. 973.66 per acre, which was 4.04% of the total cost of production and marketing. The results conform the earlier studies conducted by Shah (1998). His tillage, seedbed preparation cost and plantation cost was Rs. 1360 per acre, which was 5.98% of the total cost.

Table-6. Tillage cost per acre.

Activity	Unit	Qty	Rate	Cost (Rs)	% age
Normal Plough	M.Hours	1.88	300	563.80	57.91
Deep Plough	M.Hours	3.66	350	183.29	18.20
Rotavator	M.Hours	0.51	350	178.95	18.38
Leveling	A. Hours	0.21	220	47.62	4.89
Total:				973.66	100

Source: Survey data.

Fertilizer and pesticides cost:

Table-7 shows that the average cost of fertilizer and pesticides was Rs. 3771.95 per acre, which was 15.66% of the total cost. In which chemical fertilizer, farm yard manure (FYM), their application and transportation cost was Rs. 3141.79 (13.05%) per acre. Pesticides, insecticides and their application cost was Rs. 630.168 (2.62%) per acre.

Table-7. Fertilizer and pesticides cost per acre.

Items	Unit	Qty/No.	Rate	Total cost	% age
Urea	Kg	46.88	10.8	506.34	13.42
NPK	Kg	99.32	20.8	2065.90	54.77
FYM	Kg	1849.56	0.25	462.39	12.26
Application cost	M. Days	1.11	50.0	55.64	1.48
Transportation to farm	Rs	-	-	51.52	1.37
Sub-total:				3141.79	83.30
Pesticides cost					
Chemical	Rs	-	-	567.39	15.06
Application cost	Rs	-	-	62.23	1.65
Sub-total:				630.16	16.71
Total:				3771.95	100

Source: Survey data.

Fertilizer, FYM and their application cost is in conformity with Shah (1998). His fertilizer, FYM and their application cost was Rs. 3500 per acre which was 15.41% of the total cost, while pesticides and their application cost is close to that of Muhammad (1991).

277.44 (1.15%), Rs. 366.77 (1.52%) and Rs. 658.52 (2.73%), respectively.

Hoeing/weeding, topping and irrigation cost:

Table-8 shows that the average cost of cultural practices, topping and irrigation was Rs 1302.73 per acre, which was 5.41% of the total cost. In which the per acre cost of cultural practices, topping and irrigation was Rs.

**Table-8.** Cost per acre of cultural practices.

Items	Unit	Qty/No.	Rate	Cost (Rs)	% age
Field lay out		2.01	25	50.46	3.87
Hoing	M. days	2.13	50	106.86	8.20
Weeding	M. days	1.41	50	70.73	5.43
Ridges	A. hrs	1.97	25	49.39	3.79
Sub-total				277.44	21.29
Topping cost					
Labour	M. days	1.5	50	75	5.76
Suckercides	Rs		-	291.77	22.40
Sub-total				366.77	28.16
Irrigation cost					
Water charges	Hrs	1.87	328	612.96	47.05
Labour charges	M. days	0.91	50	45.56	3.50
Sub-total				658.52	50.55
Total:				1302.73	100

Source: Survey data.

Cultural practices cost is in conformity with Shah (1998). His Cultural practices cost was Rs. 720 per acre which was 3.17% of the total cost, while irrigation cost is in conformity with Muhammad (1991).

Curing and marketing cost:

Table-9 shows that the average cost of loading barn, curing, binding and marketing was Rs. 16743.44 per

acre, which was 69.53% of the total cost. In which the cost of loading barn was Rs. 166.03 (0.69%) per acre, curing and binding cost was Rs. 16128.8 (66.98%) per acre and marketing cost was 448.61 (1.86%) per acre. The result is in conformity with Alam (2000).

Table-9. Loading barn, curing and marketing cost per acre.

Items	Unit	Qty	Rate	Cost (Rs)	% age
Cost of Loading Barn					
Leaves harvesting	M. days	1.60	50	80.27	0.48
Stringing	Rs	-	-	52.68	0.31
Loading	Rs	-	-	33.08	0.20
Sub-total:				166.03	0.99
Curing and binding cost					
Fuel wood	Kg	3200.27	3.4	10880.95	64.99
Fire man	Rs	-	-	1562.5	9.33
Curer	Rs	-	-	631.25	3.77
Un-loading	Rs	-	-	610.82	3.65
Moisturizing	Rs	-	-	610.82	3.65
Picking	Rs	-	-	610.82	3.65
Binding	Rs	-	-	610.82	3.65
Storage	Rs	-	-	610.82	3.65
Sub-total:				16128.8	96.34
Marketing cost					
Loading	Rs	-	-	41.46	0.25
Un-loading	Rs	-	-	60.92	0.36
Transportation	Rs	-	-	346.23	2.06
Sub-total:				448.61	2.67
Total:				16743.44	100

Source: Survey data.

Total cost of tobacco production:

Total coat of production of tobacco was Rs. 24080.99 per acre, which includes land rent, nursery cost, land preparation cost, inputs cost and marketing cost. The average rent of land for tobacco crop was Rs. 5000 per

acre, cost on nursery raising for one acre of tobacco crop was Rs. 1005 per acre, cost of tillage, normal plough, rotavator and leveling was Rs. 973.66 per acre, cost of fertilizer and pesticides was Rs. 3771.95 per acre, cultural practices, topping and Irrigation cost was Rs. 1302.73 per



acre and cost of loading barn, curing, binding and marketing was Rs. 16743.44 per acre.

Gross revenue of tobacco production per acre:

Table-10 shows the gross revenue of the tobacco crop. The total production of main products was 1222.36kg per acre, which was sold at an average price of Rs. 42.935 per kg; By-products were sold at an average price of Rs. 385.69 per acre and ash product obtained from burning fuel were sold at an average price of Rs. 277.69 per acre. The result is in conformity with Shah (1998). His main products were 1080kg per acre and income from By-products was Rs. 1200 per acre.

Table-10. Gross revenue of tobacco production per acre.

Items	Unit	Qty	Rate	Rs/Acre
Main product	Kg	1222.36	42.935	52482.45
Ash	Rs	-	-	277.69
By-products	Rs			385.63
Gross revenue	Rs			53145.77

Net revenue of tobacco production per acre:

Table-11 shows that the average gross revenue from tobacco was Rs53145.77 per acre. The total cost of the production, curing and marketing of tobacco was Rs. 24080.99 per acre. While net revenue from tobacco was Rs29064.78 per acre.

Table-11. Net revenue of tobacco production per acre.

Items	Unit	Rs/Acre
Gross revenue	Rs	53145.77
Total cost	Rs	24080.99
Net revenue	Rs	29064.78

Source: Survey data.

Econometric analysis:

To quantify the impact of various variables on tobacco profit, the following econometric model was used:

$$\Pi = f(P, C, Q) \dots\dots\dots (1)$$

Where:

Π = Profit (net revenue) of tobacco in kg per acre.

P = Out put price at wholesale level (Rs/kg).

Q = Out put of tobacco or total production of tobacco (kg).

C = Total cost of production (Rs/acre).

The regression results for tobacco profit are summarized below:

Estimated results are:

$$\begin{aligned} \Pi = & -54057.3 + 280.672P - 0.978C + 42.234Q \\ & 935.317 \quad 19.277 \quad 0.014 \quad 0.301 \\ & (-57.796) \quad (66.437) \quad (-67.604) \quad (140.450) \\ R^2 = & 0.996 \quad F = 7193.480 \quad DW = 1.676 \end{aligned}$$

Note: Figures without brackets are standard errors; with the brackets is t-ratio.

If there is one unit increase in price per kg and quantity produced, the profit will increase by 1280.672 and 42.234 rupees, respectively. Similarly with one unit increase in the cost of production, the profit will decrease by 0.978 rupees.

The above estimated model gave good results in general yield. F-test determines the overall significance of the model. In our case $F_{cal} > F_{tab}$, the model is overall significant. The coefficient of determination $R^2 = 0.996$ suggest that 99.6 percent variation in dependent variable has been explained by the independent variables.

CONCLUSION

In the estimation of net revenue from tobacco production, the most costly item is NPK fertilizer, which costs Rs. 13552.3 per acre. The second costly item is fuel wood which costs Rs. 10880.95 per acre. The gross revenue from tobacco was Rs. 52745.36, total cost of production was Rs. 24080.99 and net revenue was Rs. 28664.37 per acre.

RECOMMENDATIONS

The Agricultural Scientists should conduct research studies to improve tobacco seed varieties to increase net return per acre. Extension services should focus on balance use of inputs particularly fertilizers to increase tobacco production per acre. Firewood being a costly input needs to be substituted with cheaper fuel alternative.

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