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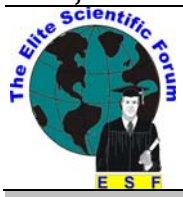

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RESEARCH ARTICLE

Production Cost of Major Crops in District Bahawalpur (Pakistan): An Economic Analysis

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ABSTRACT

This paper focuses on the production cost of major crops in Bahawalpur district. We have estimated the production cost per unit and net income per unit area of major crops. The primary source of data collection was multistage purposive sampling technique in order from tehsil, village and respondents. The sample size consists of four tehsils such as Bahawalpur, Yazman, Ahmadpur East and Hasilpur, 12 villages and 120 respondents. Two major crops that have been taken for analysis purpose are wheat and cotton. Results showed that high variation is caused in output/income due to fluctuation in cost of production of cotton and wheat. R^2- shows 79% variation in income of wheat is due to cost factors and for cotton its 97% in Ahmedpur East. In Yazman, 97% variation in income of cotton and wheat is due to factors of production. In Bahawalpur district, 95.6% variation in income of wheat and 87% variation in income of cotton is due to variation in cost of these crops. In Hasilpur, 85.7 % and 84.5% variation in income of wheat and cotton is due to variation in cost of production factors. All results were found to be significant at P=0.000. Whereas, results of cotton were found to be insignificant and negative relationship was found between cost and output/income.

INTRODUCTION

Agriculture has bidirectional impact in enhancing the economic growth. Pakistan is an agricultural country; however, agriculture production is less in Pakistan as in most of the developing countries. As a result, slow and meandering agriculture growth is unable to keep pace with the fast and persistently growing population pressure in these countries (Ali, 2005). Pakistan is mainly an agricultural state and agriculture sector contributes almost 24 percent of the GDP and provides work for 41 percent of its work force (Anonymous, 2007). It is a major source of providing raw material to local industries, especially to fabric production firms. Textile industry is the leading manufacturing sub-sector of the country. Pakistan is facing main challenges of provision of sufficient food, yarn and the fuel wood for the rapidly increasing population. The economy also has a challenge to provide raw material for the growing industry. The scenario in food production is changing fast in the world, the concept of food security has attained indeed a paramount importance and only those countries will survive which have ample food production (Khan, 1979).

Cotton is the main non-food cash crop among the crops of Pakistan. Pakistan is earning ample of foreign exchange source from cotton crop. Total production of cotton in Bahawalpur division was 1364610 bales during the year (Chaudhry et al., 2009).

Ahmad (2000) conducted an analysis on financial side of different enterprises on small farm. The study identified inverse relation of farm size with family and bullock labor. Proportion of family labor to total labor input was negatively related to farm size. The production cost of output per unit in crop zone is inversely linked to size of farm. However, production cost of output per unit of farm animals' products is positively linked to farm size. High fixed costs are the main reason for bad production of performance of small sized farms in the assorted crops. Ishizuka (2001) concluded during this study that production proficiency can be gained in paddy farms of Japan by increasing the farm size and efficient usage of technological

machinery. The analysis shows that decrease in the amount of machines, development in the cropping structure and extension in farm size by using rented land are needed to diminish costs in paddy production. Deolalikar and Stephen (2003) confirmed the highly interrelated nature of input used for wheat crop, and the policies on it. The study suggested that an increase in the output of wheat and farm produced inputs will be caused by the increase in price of wheat. Increase in tractor use in response to decrease in tractor hire rates would lead to a decrease in the quantity, of hired and family male labor used, and an increase in family female labor used. Changes in rural wages clearly affected farm production as well as input choice. Labor was a key ingredient to agricultural production and its sparing use in the face of increases in wage rates was not fully compensated for by the use of other inputs. Finally, the speed with which different output and factors of production reacted to price and other agro ecological changes differed greatly. Tripathi (2006) observed the financial side of a group of three farms in middle hill and farms Tehri Garhwal district Utter Pardesh, India. Sample of 120 farms is used to collect data for the time period of 1987-88. The common methods of plant protection are not used. Net income and input-output ratio for middle areas and valleys areas are maximum. In valley areas except manure, all the input factors, point up a positive significant impact on crop production while in the middle hills no factor showed a considerable impact. Ahmad and Qureshi (2009) investigated technical efficiency in different categories of farm related to size of farm in the areas of Punjab. A negative association among output per acre and farm size was not found for all crops. The finding concluded that managerial proficiency of farming community is essential to enhance the yield. Fang and Beghin (2010) assessed the cost and advantages of self-adequacy policy, policy deformation by policy Analysis Matrix (PAM) in agricultural sector of China. They utilized the intuition of the simple Heckscher-Ohlin model. Agricultural protection revealed systematic pattern of input subsidy and output taxation through exchange rate overvaluation. Efficient protection model shows that the sector of rapeseed gained benefits of high protection. Ishizuka (2001) examined the Indo-Gangetic plains level production of wheat-rice. He estimated effective incentives and resource use efficiency. By efficient utilization of resources and gaining subsides indicate that cultivators of Indo Gangetic belt would gain significantly. Zhong and Lu (2012) explored the production of grain in China. China has comparative advantage in production grain. The study discovered that comparative advantage of China in production of grain crops considerably fluctuates across the region. The study shows that grain sector reformation and progressed resource allocation can increase the grain yield level. Iqbal et al. (2013) investigated the determinants of high productivity of wheat in Pakistan in 1999-2000. The study analyzed the current unpredictability of wheat management practice of the farmer over the preceding season. The unpredictability is evaluated by the factors including average yield of wheat, weeding, irrigation and use of credit. The factors are assessed by applying paired t-tests. A significant boost is observed in phosphoric fertilizer in wheat crop field. This method of chemical weed control is observed measure in all cropping zones**.** Salam et al. (2014) evaluated positive link between crop production and size of farm while inverse link between size of farm and per unit cost. They investigated that in tenure based farm group's tenant farmers come into view as more skillful while owner farmers having higher production cost were the least proficient with minimum crop production. Farmers having basic education have the maximum per acre productivity rate with the maximum production cost.

On the basis of above background and literature, this study was conducted to investigate the relationship between factors of cost of production and its income. Findings of this study will be useful for the farmers to determine the variation in output of crops due to variation in cost of inputs. Additionally, this study will also provide an insight to farmers about profit and cost of crops production.

Concept and theoretical framework of cost function

The nature of Cost refers to the Cost-Output relation during the short run and long run periods. The total expenditure which is made by the firm for the specific level of output is called production cost.

From the above discussions, it is clear that cost is related with output which is produced by the firm. So cost is a function of output.

We can express mathematically as

$C = f(q)$

Where, C=Costs of production, q= quantity of output.

The nature of costs/costs concepts

Different costs concepts which are most important in the study of the theory of cost are discussed in this section.

Explicit cost refers to the actual expenses of firm to employ, rent, or buy the input that are needed in production process. Such expenses include the labor wages, the price of hiring capital equipment, building rent, cost of raw material and partially completed products.

Implicit Cost means the worth of firm's production and inputs. Firm uses all the owned inputs in production process are included in its implicit cost. Implicit costs comprise the maximum salary that the industrialist may produce from any best option of employment.

Opportunity cost is the most favorable price that can be commanded by a factor of production which thus tends

to become the minimum cost at which that factor can be had an entrepreneur. In the words of Lipsey, "The opportunity cost of using any factor is what is currently foregone by using it."

Fixed costs are those costs which firm has to pay even without producing anything or at zero production level. The land, the factory building, the machinery and office equipment must be bought or rented. Fixed costs do not change with the level of output.

Variable cost and Total Variable cost is the one when the output level changes, variable cost also change. In production process the cost of raw materials is considered as variable cost. A boost in production would increase the total variable costs (TVC). The variable cost is per unit cost.

$TVC = VC \times Q$.

Total cost is sum of the total variable costs and the fixed costs is called total cost. Simply we can say that total cost is obtained by adding total variable and fixed costs. It is denoted by TC.

Marginal cost is the cost of producing an additional unit is called marginal cost. It is denoted by MC.

Average cost is Average fixed costs is represented by AFC are obtained by dividing fixed cost with output.

Data and methodology

In present study, both primary and secondary data have been used. Primary data has been collected through questionnaire from respondents and secondary data has been collected through available literature. Convenient sampling technique was used to select the respondents of the present study. Respondents were the farmers of four districts of Punjab viz. Yazman, Bahawalpur, Ahmadpur East and Hasilpur.

Empirical results and analysis

In this analytical study, quadratic regression equations were used for nonlinearity function.

This equation for Wheat in Ahmad Pur East represents the effects of output on its cost. All the results are significant at all levels with p value=0.00. T values are shown in parentheses. R^2 indicates that 79% variations in income is due to factors of cost of production. The coefficient of independent variables shows if Q increases 1% then cost increases 41.7%.

The results for wheat crop in Yazman are significant at 1% of probability level with P value = 0.002. T values are shown in parentheses. R^2indicates that 97% variations of variables. The coefficient of independent variable shows that cost increases 12.9% with an increase of Q 1%.

The results for wheat crop in Bahawalpur Tehsil are significant at 1% probability level. The value of R^2 indicates that 96% variations are present in variables. The coefficient of independent variable indicates that cost decrease 14.8% when Q increases of 1%.

The wheat crop in Hasilpur Tehsil results are significant at probability level of 1%. The value of R^2shows that

Table 1: Regression results for Bahawalpur District for wheat and cotton crops

Tehsils	Crops	
	Wheat	Cotton
Ahmadpur East	C = -19083 + 41.7Q – 0.0131Q^2 T = (-3.63) (4.92)(-3.86) R^2 = 78.8%	C = 6217 – 108 Q + 0.00730Q^2 T = (2.39) (-0.21) (2.97) R^2 = 97.3 %
Yazman	C = -2383 + 12.9Q – 0.00106Q^2 T = (-1.07) (3.44) (-0.69) R^2 = 96.8%	C = 3205 + 5.14Q + 0.002 Q^2 T = (1.24) (1.12) (0.99) R^2 = 96.9%
Bahawalpur	C = 12861 – 14.8 Q + 0.0112Q^2 T = (2.04) (-1.32) (2.26) R^2 = 95.9	C = -18326 + 48.6Q – 0.00979Q^2 T = (-2.13) (2.17) (-1.07) R^2 = 87.2
Hasilpur	C = -51114 + 78 Q – 0.0249Q^2 T = (-2.51) (2.63) (-2.31) R^2 = 86.6	C = 1329+ 22.6Q – 0.0106Q^2 T = (0.28) (1.90) (-1.44) R^2 = 85.4

87% variations are present in variables. The coefficient of independent variable shows that cost increases 78% with the increases of Q 1%.

The results of the equation for cotton in Ahmad Pur East show that difference between cost and production are non- significant with P=0.834. T values are shown in parentheses. R^2 indicates 97% variations of variables. The coefficient of independent variables shows that 1.08% decreases of cost by the increase of Q 1%.

Equation shows that results of cotton crop in Yazman are significant at all probability levels. The value of R^2indicates that 97% variations of variables. The coefficient of independent variable indicates that cost increase 5.14% when Q increases of 1%.

The results showed that there were significant differences between cost and production of wheat in Bahawalpur Tehsil at 1% probability level. R^2value indicates that 87% variations of variables. The coefficient of independent variable shows that cost increases 48.6% with an increase of Q 1%.

The results in Hasilpur Tehsil relating to total cost and production of cotton crop is significant at 1% of probability level. The value of R^2also indicates that there were 80% variations of variables. The coefficient of independent variable shows that cost increases 22.6% with the increase of Q1%.

DISCUSSION

The present study analyzed economic analysis of production cost of major crops in District Bahawalpur. Four Tehsils such as Bahawalpur, Yazman, Hasilpur,

Ahmadpur East and three villages from Tehsil were selected for data collection.

Average income of cotton per acre was amounted to Rs. 24666.4, 24882.9, 22252.2 and 23633.2 for Bahawalpur, Yazman, Hasilpur and Ahmadpur East respectively and on average amounted to Rs. 23858.7 per acre. Similarly, average cost per acre for cotton was calculated as Rs. 15326, 15210, 13337 and 14421 for Bahawalpur, Yazman, Hasilpur and Ahmadpur East, respectively. However, net income of cotton crop per acre was calculated as Rs.9340.4, 9672.9, 8915.2 and 9212.2 for Bahawalpur, Yazman, Hasilpur, and Ahmadpur East, respectively.

The cost per 40 kg of cotton was calculated to Rs. 13.82, 13.25, 13.34, and 13.45 in Bahawalpur, Yazman, Hasilpur, and Ahmadpur East Tehsil respectively. Average income per 40 kg came to Rs. 22.25, 21.68, 22.25 and 22.05 for respective Tehsils; Bahawalpur, Yazman, Hasilpur, and Ahmadpur East. Thus, the average income per 40 kg was greater than average cost per 40 kg for all Tehsils. So it is profitable for all farmers to grow cotton crop in Bahawalpur District.

Results of cost and income are in accordance with previous studies conducted by different researchers (Iqbal et al., 2013; Saleem and Jami, 2013; Salam et al., 2014).

The average income per of wheat per acre is amounted to Rs. 12916.5, 11560.0, 12145.3 and 12497.2 for Bahawalpur, Yazman, Hasilpur, and Ahmadpur East respectively. On the other side, average cost of wheat per acre was calculated as Rs. 8763, 7458, 9110 and 9219.1 for Bahawalpur, Yazman, Hasilpur, and Ahmadpur East, respectively. Thus, the net income of wheat per acre was achieved as Rs. 4153.5, 4102, 3035.3 and 3278.1 for Bahawalpur, Yazman,Hasilpur, and Ahmadpur East respectively. However, the average cost per 40 kg was calculated to Rs. 6.7, 6.45, 7.19 and 7.34 for Bahawalpur, Yazman, Hasilpur, and Ahmadpur East respectively while the average income per 40 kg came to Rs. 9.88 for Bahawalpur, 10.0 for Yazman, 9.89 for Hasilpur and 9.95 for Ahmadpur East. Thus, the average income per 40 kg is greater than average cost per 40 kg in each Tehsil which shows an evident that it is profitable to all farmers in each Tehsil to grow wheat crop.

Results of cost and income if wheat are in accordance with previous studies conducted by different scholars like Ishizuka (2001).

The picture of overall results shows that in Ahamdpur East, the total cost of wheat is positively influenced by output while the cost of cotton crop is affected negatively. However, in Yazman and Hasilpur tehsils, the cost of both cotton and wheat crops are increased as output increased. In Bahawalpur Tehsil, the cost of wheat crop is negatively influenced and the cost of cotton is positively affected by the quantity of output. The reasons of negative effect on cost might be occurred because the use of low cost input i.e. organic fertilizer instead of chemical fertilizer and better management of labor and judicious use of available resources in the cropped area. These farmers also have their own farm machinery (cultivator, harrow and tractor etc.) and ado pt extensive/horizontal farming system. Furthermore, negative effect means that the cost of production is inversely related to the output per unit cropped area. However, these results are similar with the results of Ahmad (1990) who reported that per unit production cost is negatively related to the farm size. Further, the cost of the inputs declined with an increase in the farm size resulting thereby, a decline in the output per unit area (Bhatti and Soomro, 1996).

It is clear from the analysis that cotton crop stands first for its higher net income than wheat which stands at second position in Bahawalpur District. However, both the crops compete with each other for land, water and other resources. It is evident from the results that among these two crops cotton is more beneficial for farmers because it has more net income as compared to wheat crop in Bahawalpur District.

Conclusion

The overall picture of the results shows that in Ahmadpur East Tehsil, the total cost of wheat production is positively influenced by output whilst the cost of cotton crop is affected negatively. However, in Yazman and Hasilpur Tehsils, the cost production of both cotton and wheat crops are increased as output increased. In Bahawalpur Tehsil, the cost of wheat crop is negatively influenced and the cost of cotton is positively affected by the quantity of output. The reasons of negative effect on cost might be occurred because the use of low cost input i.e. organic fertilizer instead of chemical fertilizer and better management of labor and judicious use of available resources in the cropped area. It is also observed that these farmers have their own farm machinery (cultivator, harrow and tractor etc.) and adopt the extensive/horizontal farming system at their farms.

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