Measuring Profitability of Chilli Pepper Production in Sindh, Pakistan

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Abstract

Chilli is one of the most important commercial crops of Pakistan. The intentions of present study was to investigate the cost of production and net returns of chilli production in the study area and determine the contributing factor of chilli profit function. Primary data for this study was collected purposively from various villages of Taluka Kunri district Umarkot through random sampling technique. Total five villages and twenty farmers from each village were selected randomly. The farm accounting method was applied for estimating cost, net returns and profitability in the production of chilli. The yield of chillies obtained was 1785.53 (Kgs) per acre and price per (Kg) was Rs. 102.81. Total cost of production of chilli with opportunity cost was Rs. 102543.44 and Rs. 85334.45 without opportunity cost per acre. Moreover, per acre revenue was Rs. 183506.74, similarly net return of chilli with opportunity cost was Rs. 80963.30 and without opportunity cost was Rs. 98172.29 per acre respectively. Government should take steps for the improvement of the structures, the diversification of the products and the added value allow access to new markets, better prices and better living standard for all the related in the value chain.

Keywords: Chilli, Net Return, Profitability, Opportunity cost, Value chain

1. Introduction

Agriculture sector holds great significance for Pakistan's economy. In Pakistan, agriculture sector accounts for more than 18.5 percent of Gross Domestic Product (GDP) and employs about 38.5 percent of country's labor force. The agriculture sector is lifeline for 62 percent of the population of Pakistan living in rural areas who directly and indirectly depends on agriculture for their earnings (GoP, 2019).

In Pakistan, horticulture sector contributes 12 percent in agriculture (GDP) and predominantly represents high-value cash crops. Vegetables have a potential for food insecurity and occupied for 22% and 6% share of food production and gross domestic product respectively (Sheikh et al., 2012). Vegetables occupy an important place in the human diet since ever smaller nutrients were present (Muhammad. S.A, A. Saghir, I. Ashraf, 2015).

Chilli (*Capsicum annum* L.; *Capsicum frutescene* L.) commonly known as red pepper belongs to *solanaceae* family (Olayiwola, 2014). The cultivation of chilli crop was at least 7500 BC, it is an important part of the

human diet in Americans. Archaeological evidence exists in sites in southwestern Ecuador that chilli peppers were domesticated over 6,000 years ago and were one of the first self-pollinating crops in central and South America (Mehta, 2017). Pakistan is the fourth largest producer of red chillies followed by India, China and Taiwan (FAO, 2018). During 2018-19, in Pakistan area under chilli is 65,300 hectors and chilli production is 148.7 thousand tonnes and it was 148.1 thousand tonnes in 2017-18. Therefore, it is increase of 0.4 percent compared to production of last year (GoP, 2019).

Chilli is major crop in the province of Sindh, which accounts for about 86 percent of Pakistan's total red pepper production. In Sindh Kunri, a small town of Umarkot district is the home of red chillies. It contributes about 85 percent to the Pakistan Red chilli production and is known as one of the largest chilli production centre in Asia (SBI, 2010).

Chillies are excellent source of Vitamin A, B, C and E and minerals such as molybdenum, manganese, thiamin, foliate, copper and potassium (Marin, Ferreres, Tomás-Barberán, & Gil, 2004). It has been found that the 100 gram of peppers furnish 1.3 gram of protein, 4.3 gram of carbohydrate and 0.3 gram of fat (Anonymous, 1997).

Chilli is one of the most important herbs of considerable economic value in Pakistan. Both fresh and dried chilli peppers are used as a significant ingredient in the daily diet (Saleh, Omer, & Teweldemedhin, 2018). Chillies are also used in the preparation of oleoresin that has high export potential and demand in the global market. Fresh chilli is can also be consumed directly after harvesting. These chillies are used as a vegetable (Hussain & Abid, 2011). The use of fresh chilli by consumers is very common in Pakistan, though it has a lower storage life, chillies have numerous nutritional, economic, commercial and medicinal uses. Fresh are also highly useful as healing agent and immune system stimulant, particularly in case of cellular damage. Chillies are also used in medicines used to control pain or as antibiotic. Red pepper is an important crop in Pakistan, it is not only an important component of food, but it is also used for basic production (Pundir, Rani, Tyagi, & Pundir, 2016). The peppers are dried to keep them longer, this can also be done by pickling. Dried chilli peppers are often ground to powder and used in curries and dry dishes as a necessary component in daily food (ASF, 2014).

The intentions of present study was to investigate the cost of production and net returns of chilli production in the study area and determine the contributing factor of chilli profit function. Furthermore, there is a very little research being carried out before on this topic in this area, my aim is to analyze properly the reasons that why there is a huge cost-benefit gap in chilli production in study area.

2. Materials and Methods

2.1. Study Area

Kunri could be a tehsil and a town placed within the Umarkot district, Sindh province, within the southern a part of Pakistan. It's placed concerning 270 kilometers (170 miles) east of Karachi, the most important town in Pakistan. It's a population of 218,493 (Umerkot *et al*., 2014). It's the capital of the red chilli pepper of Asia (Kalroo *et al*., 2014). Its economy relies on agriculture. The region produces different types of crops, together with red chilli pepper and is planted in about eighty eight thousand acres round the Kunri Sub district.

2.2. Sampling Procedure

For present study primary data was collected through random sampling technique from villages of Taluka Kunri district Umarkot. District Umarkot was selected purposively, while from district five villages and twenty farmers from each village were selected randomly.

2.3. Data Collection and Analysis

The data was collected with the help of comprehensive and pre-tested questionnaire. Initially the data were arranged and organized in coding system. By using the coding sheet, all the data were analyzed, interpreted and tabulated through Micro Excel and SPSS software.

2.4. Data analysis

Net farm income was used to determine the return to investment in chilli pepper production which the differences between the two parameters are a measure of the net farm income. The farm income is the total output multiplied by the price per unit cost. Therefore, farm income is the total revenue generated from the production while net farm income is the difference between the total revenue and total cost. The total cost of production includes both total variable cost and total fixed cost. Total variable cost includes; cost of seed, cost of fertilizer, cost of labour, and cost of agrochemicals while total fixed cost include cost of land. The following procedures were applied:

2.5. Profit function

Profit or net revenue (π) = total revenue (TR) − total cost (TC) (Debertin 1986).

$$\pi = TR - TC \qquad (1)$$

$$TR = P * Q$$

Whereas; $\qquad TR = P * Q$ (P is price of output and Q is quantity of output)

$\qquad TC = V * X$ (V is input price and X is input quantity purchased)

Therefore:

$$\pi = PQ - VX \qquad (2)$$

3. Results and Discussion

This section contains analysis and discussion of results in light of the objectives of the study. Necessary explanations have also been added along with the findings of the research at the appropriate places. This section includes two sub sections. The first section deals with the costs and gross net revenue from chilli crop and the second section clarifies the description and estimation of the net revenue function.

3.1. Socio-economic characteristics

Table 1. Farmers' socio-economic characteristics

Variable	Frequency (N=100)	Percentage
Age (Years)		
Up to 20	4.00	4.00
21-35	45.00	45.00
36-50	38.00	38.00
51 & above	13.00	13.00
Educational status		
No formal education	21.00	21.00
Primary	25.00	25.00
Middle	16 .00	16 .00
Matriculation	19.00	19.00
Intermediate	14.00	14.00
Graduate	5.00	5.00
Household size		
1-5	46.00	46.00
6-10	28.00	28.00
11-15	18.00	18.00
16-20	08.00	08.00
Farming experience		
1 to 10	27.00	27.00
11-20	43.00	43.00
21-30	17.00	17.00
31 & above	11.00	11.00

Table -1 indicates that majority (45%) of chilli farmers in study area were in 21-35 years age group. Similarly, the majority (25%) of respondents were educated up to primary level and 21% of the respondents were illiterate. Whereas, the majority (46%) or household size were 1-5 people. However, the majority (43.00%) of chilli farmers in the study area have 11-20 years chilli farming experience.

The major component in cost of chilli production were the variable costs (V) that includes land preparation, seed, chemical fertilizer, irrigation water, pesticides, weedicides, picking, packing, drying, sorting and cleaning which are shows in Table-2.

3.2. Cost of production of chilli

Table 2. Cost of production of chilli in study area (rupees/ acre)

Item	Unit	Quantity	Rate/ Unit (Rs.)	Total cost (Rs.)
1.1 Tractor	Hours	6.68	1185.06	7911.20
1. Land preparation	Rs.			7911.20
2.1 Seed	Grams	1112.81	10.83	12052.83
2.2 Nursery Labour	PDs	2.69	383.60	1030.11
2.3 Nursery transplanting Labour	PDs	3.47	386.29	1340.32
2. Seed & sowing	Rs.			14423.26
3.1 Urea	Bags	4.31	2573.71	11081.36
3.2 DAP	Bags	1.60	3824.72	6127.96
3.3 Transportation (labour)	Rs.	5.67	96.02	544.45
3.4 Application (labour)	PDs	5.91	77.66	458.82
3. Farm inputs	Rs.			18212.60
4.1 Tube well	Rs/irrigation	2.05	1575.51	3228.84
4.2 Canal	Seasonal	5.87	326.91	1918.89
4.3 Labour	PDs	7.92	383.50	3036.97
4. Irrigation	Rs.			8184.70
5.1 Pesticide & weedicides	Spray	5.77	959.78	5540.78
5.3 Labour	*PDs	5.77	366.74	2117.20
5. Pesticide & weedicides	Rs.			7657.98
6.1 Picking	Kg	1785.53	8.31	14837.75
6.2 Packing	Kg	1785.53	0.36	642.79
6.3 Drying, sorting and cleaning	Kg	1785.53	5.60	9998.97
6. Management	Rs.			25479.51
7. Abiana	Rs.			500.00
8. Opportunity cost of land	Rs.			17208.99
9. Total cost with Opportunity cost	Rs.			99578.24
10. Total cost without Opportunity cost	Rs.			82369.25

*Source: Survey data, Note: *PDs means number of days per person*

3.2.1. Land Preparation

The first and important step in cultivating of chilli crop is preparing of land, which enhances the ability to keep water out of the soil for a long time, and also maximizes the ability of the chili plant to extract the necessary nutrients from the soil (FAO, 2005). The average cost of land preparation was Rs. 7911.20 per acre.

3.2.2. Seed and sowing

Sowing costs are the cost of seed, nursery labour and nursery transplanting labour used in the nursery of seed. The average seed cost was Rs. 12052.83 per acre whereas average cost of nursery labour per acre remained Rs. 1030.11 and average cost of nursery transplanting labour was Rs. 1340.32. Therefore, seed and sowing cost was Rs. 14423.26 per acre.

3.2.3. Farm inputs

Chemical fertilizer is important input. Fertilizer make the soil more fertile and have a direct impact on yield. Fertilizers like Urea and DAP were commonly used by farmers in chilli production. The cost incurred on farm inputs including fertilizer cost, transportation and application of fertilizer cost was Rs. 18212.60.

3.2.4. Irrigation

Water is measured lifeblood for farming and agriculture. Irrigation water is the limiting factor in agricultural production. In the study area tubewell and canal were the main sources of irrigation. Abiana was charged for canal-irrigated system, which was Rs.500.00 and other charges were Rs. 1918.89 per season while in case of tube wells water charges were on per hour basis charged by the owner of the tube well. Average cost of tube well irrigation was Rs. 3228.84 per acre. Labour charges in application of irrigation water came to be Rs. 3036.97 per acre. Therefore, the average cost of irrigation stood at Rs. 8184.70 per.

3.2.5. Pesticide and weedicides

Pesticides are substances used to control pests, including weeds. The average cost of weeding and application of pesticide was Rs. 7657.98 per acre.

3.2.6. Management

Management cost is the cost incurred on picking, packing, drying, sorting and cleaning cost. The average cost of picking was Rs. 14837.75 whereas, the average cost of packing was Rs. 642.79 and the average cost of drying, sorting and cleaning was Rs. 9998.97. Therefore, management cost was Rs. 25479.51 per acre.

3.3. Marketing cost

Table 3. Marketing cost of chilli in study area (Rupees/ acre)

Items	Unit	Quantity/ acre	Rate/ Unit (Rs.)	Cost (Rs.)
1. Transportation to market	Kg		0.98	1749.82
2. Loading	Kg	1785.53	0.27	482.09
3. Unloading	Kg		0.27	482.09
4. Commission	Kg		013	223.19
5. Marketing cost	Rs.			**2937.20**

Table-3 shows marketing cost that includes transportation cost, loading, unloading and commission charges. The average cost of transportation to market was Rs. 1749.82. However the loading and unloading cost was Rs. 482.09 and Rs. 482.09. Whereas, the commission charges was Rs. 223.19. Therefore, the marketing cost was Rs. 2937.20 on per acre basis.

3.4. Total cost of production

Total cost of production of chilli per acre included production cost and marketing cost per acre basis. The cost of production (Table-2) was Rs. 99578.24 with opportunity cost and Rs. 82369.25 without opportunity cost per acre and marketing cost (Table-3) was Rs. 2937.20 per acre. Therefore, the total cost of production of chilli came to be Rs. 102543.44 with opportunity cost and Rs. 85334.45 without opportunity cost per acre.

3.5. Gross returns from chilli production

Table 4. Gross returns of chilli in study area (rupees/ acre)

Item	Unit	Yield	Price/ Kg (Rs)	Gross income (Rs)
Chilli crop	Kg	1785.53	102.81	183506.74

Table-4 shows gross income of chilli crop. It shows that the yield of chilli was 1785.53 (Kg) per acre and price per (Kg) was Rs. 102.81, respectively. Therefore, gross income of chilli was Rs. 183506.74 per acre.

3.6. Net returns of chilli production

Table 5. Net returns of chilli in study area (rupees/ acre)

Item	Unit	TR	TC	Net returns (TR-TC)
with opportunity cost	Rs.	183506.74	102543.44	80963.30
without opportunity cost	Rs.	183506.74	85334.45	98172.29

Table-5 shows net returns of chilli crop in study area. Net returns estimated from the data collected for the current study are Rs. 80963.30 with opportunity cost per acre whereas, Rs. 98172.29 without opportunity cost per acre.

4. Conclusion

In conclusion, findings of the study indicated that the chilli cultivation is profitable cash crop and yielded sizeable per unit net income in the study area. It is concluded that the chilli production is increase of 0.4 percent in 2018-

19 compared to production of 2017-2018. Similarly, it was concluded that of majority of the respondents have sufficient chilli growing experience. Therefore, it is suggested that government should improvement of the structures, the diversification of the products and the added value allow access to new markets, better prices and better living standard for all the related in the value chain. Producers and farmers can not only be encouraged to grow more chili but also increase the exportable volume of the product. They can be technically and financially supported by the federal or provincial government. Foreign trade missions can be considered for international market share and their need to increase chili exports from Pakistan. Government of Sindh, agricultural department intervention is needed to allow effective extension services to chilli growers. Exporters should be encouraged to set up a supply center in Kunri with modern technology laboratories to purchase the crop from the producers and process it according to the needs of international buyers / importers.

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