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Investigation of the Factors Affecting the Potato Production with Special Reference to Farmers Entrepreneurial Level in Punjab, Pakistan

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Abstract

Potato is considered as swap to the cereals in under developed regions of the world. It has 75 percent contribution in food chain which contains higher calorie ratios than both grains and rice. It is used as staple food in many countries of the world and feed the millions of the peoples in the world which are anguish to somber issue of augmenting food security. Present study was conducted to inspect the factors affecting Potato production with special reference to entrepreneurial level of farmer in Punjab, Pakistan. Okara, Sahiwal and Kasur are considered leading potato producer Districts in Punjab, Pakistan. Largest share of the labor force in these districts is engaged in potato production. Sample sizes consisting of 109 potato producers were taken from these three districts through purposive sampling technique and statistical analysis of study variable was done by the use of Multiple Linear Regression Model. Results of the study suggested that cost efficiency, use of high yielding variety, provision of extension services, awareness regarding diseases of potato crop, level of technology and market information were contributing significantly in increasing potato production in Punjab, Pakistan. Study recommended that provision of extension services, awareness regarding potato diseases and market information about last year production statistics, trade volume of potato shared last year and coming year trade decisions should be made available by government for the prop up farmer in term of gainful potato production and surmount the peril of instability in potato price.

Keywords: swap, anguish, food security, entrepreneurial level, cost efficiency, awareness, instability.
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Introduction

Agriculture sector is being largest sector is granted as backbone of the Pakistan's economy. It accounts for the 20.9 percent share in national GDP and engaged about 43.7 percent labor force which is a large number of labor that attached with agriculture. Stagnant agriculture growth coupled with the issue of instable market prices have become a giant issue in Pakistan economy. Growth of this sector has decreased overtime instead of increasing or showing a positive trend of growth. Population growth which was experienced 1.95 has become a stern subject to solve the future issues of food security. Potato crop has been affected from stagnant agriculture growth and instable market prices. It was examined often farmer do not meet his cost of production in potato due to large instability in potato price (Govt. of Pak., 2015). Production of vegetable crops had always been given less importance and addressed inadequately. Due to no priority given by policy makers to vegetable crops, it had created instability determinant in markets which are entirely drastic and very difficult to forecast. To realize the significance of vegetable crops and resource allocation to enhance area under vegetable cultivation, new polices should be need be made research institutes and government (Seakin*et al.*, 2006). Potato cultivation by having largest area under production of the crop plays a significant role in Pakistan's economy. Potato account for 5.71 percent of the total cropped area of Punjab province have engaged a lot of labor force which is consumed in processes starting from sowing till marketing of the produce. It acts as a supplement crop in the scenario of huge consumption due to increase in population, which demands for increased supply of grains, chicken and meat. On the other hand it is known as a complementary product, because it is used with all vegetables at home, it have significantly lower prices and supplying the sufficient amount of nutrient and helping to reduce the issue of food security. The global data had showed that potato is greatest contributor of food energy in the developing regions of the world and by providing 75 percent in food energy per unit area of such countries while wheat and rice both are capturing 58 percent of the total share in food energy. In term of nutrition potato has 78 percent higher protein than rice and wheat. Therefore, the consumption of the best

alternate to the wheat and rice both economically and nationally (Bashir *et al*., 2006). Okara, kasur and Sahiwal are considered as the hub of potato production and potato is largest cultivated crop these districts in Punjab, Pakistan. Entrepreneurial level of farmers in potato production and their forecasting decision of production and marketing are much crucial for profitable potato production. The present financial situation demonstrates popularity for advancing entrepreneurial exercises in potato production (Khan, 2008). The advancement in farmer's entrepreneurial ability for production of crops especially potato is imperative in managing as a game changer in a worldwide economy that is achieved by using latest production techniques (Pihie, 2012). The distinguishing proof of the potato producers abilities and the information of their entrepreneurial profile of potential farmers which want to be engaged in entrepreneurial potato cultivation have been picking up a developing significance in the improvement of entrepreneurially arranged instructive projects and start-up procedures (Raposo *et al*., 2011).

Materials and Methods

The present study was conducted to investigate the factors affecting the potato production in three major potato producing districts of Punjab, Okara, Sahiwal and Kasur. Farming community especially farmers who were potato growing from five years focused as the representative of the potato producing farming community in these districts. Study incorporated unusual feature about the entrepreneurial level of the farmers with respect to their marketing skills.

Purposive sampling technique was used to collect the required data from respondents. Multiple linear regression model was utilized for statistical analysis of study variables.

$$\mathbf{Y_i=f(X, \beta)}$$

In this equation the dependent variable, y_i is a linear combination of the parameters, but for the independent variable it is not necessary to must be in linear form. A more general form of the multiple regression with variables of the study is:

$$\mathbf{Y_i=\beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \mu_i}$$

Where,

$\mathbf{Y_i}$ = Average per Acre Yield (No. of Bags of per acre produce)

$\mathbf{\beta_0}$ = Intercept term in the model

$\mathbf{X_1}$ = knowledge about Potato Production (0-100 percent)

$\mathbf{X_2}$ = Cost Efficient in Potato Production (0-100 percent)

$\mathbf{X_3}$ = Adoptive of high yielding variety of potato (0-100 percent)

$\mathbf{X_4}$ = Public extension service Provision (0-100 percent)

$\mathbf{X_5}$= Use of advanced means of cultivation (0-100 percent)

$\mathbf{X_6}$ = Awareness about potato crop diseases (0-100 percent)

$\mathbf{X_7}$ = Market information in potato production (0-100 percent)

$\mathbf{\mu_i}$ = Error term in the model

0= Lowest, 100= Highest

(Weight values, 0,1, 2, 3,4, …..100 percent).

Results and Discussion

Respondent's answers with most fitted perception were noted, analyzed into frequencies and percentages and represented in the tables. Analysis of the study variables was done and results are represented.

Education is key factor to achieve high success rates and remove bottlenecks regarding production and marketing of produce. Results revealed that there was a diversity educational status of farmer's household heads. By looking at the results it can be concluded that most of the respondents belongs to the matriculation level of education. As shown (Table-1) there was 19.27 percent of the respondent who have 14 years of education and that was the second highest among other all. There were 15.60 percent of the respondents who belong to the group in which individual's 12 years of schooling. It was observed that the number of non-educated was 8.26 percent which was found the lowest number among all other educational levels. It's obvious from results that most of the farmers engaged in agriculture were not having high educational levels (Binam *et al.*, 2004).

It is more vibrant for a farmer to have more than one income sources. Having healthy and more than one source of income for a farmer assist him in meeting the utilities in slack period of farm income (Gildemacher, 2006). Results depicted that most of the farmers were relying on agriculture and livestock for meeting the livelihood as basic sources of income (Table-2).

Labor as human capital is considered as the most fundamental determinant of production activities. The role of labor in potato production is much crucial and labor involved at each stage of crop through seed plantation till harvesting and marketing of the crop. Results of the study (Table-3) explored that there were 33.94, 54.13 and 11.93 percents of the labor belong to the family, hired and mix of these both labor sources respectively. To reduce the factor of fixed cost is much important for making potato production as profitable one that's why farmers employed their family members as labor force at various stages of the potato production. It was observed that farmers were employing both family and hired labor in adequate mix according to their demand and

economic perspective of cost reduction and profit maximization (Jaetzold, 2006).

Nowadays it has become crucial to use advance farm mechanization to reduce to the cost of production and increase production (Khai, 2007). Results (Table-4) explored that there were 10.09, 80.73 and 9.13 percents of the farmers were using old, advanced mechanization and ix of both respectively. So, it is concluded that most of the farmers were in making use of advance mechanization in agriculture for making it more profitable and market oriented (Bhasin, 2002).

Seed is the fundamental determinant in ensuring high yield in potato production. The study revealed that (Table-5) there were 53.21, 28.44 and 18.35 percents of the farmers were using improved, local and mix of both types of seed types. It was concluded that most of the farmers in the study as potato producers were using improved seed types in potato precaution and the use of local seed types have swept out by the introduction and awareness of the farmers regarding the use of improved seed types (Alene and Hassan, 2003).

Potato crop have severe losses due to fungicide attack which may leads to reduced production and crop failure. Respondents were distributed as 86.26 of the farmers who were using fungicides and 13.76 percents of the farmers who were not using respectively (Table-6). It is obvious from review that severe losses have become confronted due to fungal diseases (Alila and Atieno,2006).

Table-1: Education level of farmers

Years of Schooling	Frequency	Percent
0	9	8.26
5	17	15.60
8	14	12.84
10	25	22.94
F.A.	17	15.60
B.A	21	19.27
M.A.	2	1.83
Above	4	3.67
Total	109	100

Table-2: Farmer's income sources

Sources	Frequency	Percent
Agriculture	67	61.47
Livestock	23	21.10
Wages	13	11.93
Others	6	5.50
Total	109	100

Table-3: Source of labor used in potato production

Sources	Frequency	Percent
Family	37	33.94
Hired	59	54.13
Both	13	11.93
Total	109	100

Table-4: Technology use at the farm for potato production

Technology	Frequency	Percent
Old	11	10.09
Advanced mechanization	88	80.73
Both	10	9.17
Total	109	100

Table-5: Type of seed used in potato production

Seed	Frequency	Percent
Improved	58	53.21
Local	31	28.44
Both	20	18.35
Total	109	100

Table-6: Use of fungicide to control diseases

Fungicide	Frequency	Percent
Yes	94	86.24
No	15	13.76
Total	13	100

Potato has relatively high cost of production. It is obvious from the results (Table-7) that cost of production in potatoes 14.03, 7.74, 1.55, 2.90, 1.74, 11.13, 1.45, 37.72, 4.84 and 16.90 percents as hiring land, harrowing, planting, chemicals, fertilizers, spraying (labor), seed, harvesting and marketing (bag charges also included) respectively. It is evident from many studies that incurred higher cost of potato production confronted a colossal problem for farmers by acting as barriers to engage in potato production (Battese *et al*., 2005).

Credit if the intrinsic factor of production which leads to timely application of all other factors of production for achieving the desired set objectives. The presence of the various credit institutions in credit provision to farmers in potato production showed that there was facility available for credit purpose. The respondents of the study were distributed (Table-8) according to credit institution or facility which provide them with credit were as 29.36, 11.01, 24.77 and 19.27 percents of the respondents by having informal group, private bank, friend/relative, input dealer and governments banks (I.e. ZTBL). Study explored that most of the farmers were taking loans by informal lenders. It can be concluded that informal lenders are the major credit suppliers in country's agriculture sector (Ali and Flinn, 2001).
Credit has different forms which have different productive and non-productive endings. It was observed that credit institutions facilitating farmers with credit in form of money and input for potato production. The respondents of the study were distributed according to credit forms were (Table-9) as 25.69, 61.46 and 39.54 percents of the respondents by having money as credit, inputs and other products or services. To assure with the productive use of agriculture credit is vital for improving production and revival of country's agriculture from vicious circle of instability and stagnant growth (Meeusen and Broeck, 2008).

To ensure the productive use of agriculture credit should be focused by the credit institutions. It is obvious from the results (Table-10) that according to credit forms were as 8.26, 42.20, 15.60, 22.02 and 11.93 percents of the respondents by using credit as investing in business, investing in agriculture, children's school fees, home consumption and other uses. Study concluded that non-productive use of agriculture credit was the major determinant in making not a great deal of credit in agriculture (Obwona, 2006).

Disbursing produce at right market leads to having an economic price a commodity. It can be depicted from the results (Table-11) there were about 3.67, 6.42, 69.72, 11.01, 6.42 and 2.75percent of the respondent with their perception varies from at village, at small market, at big market, to input provider, broker and others respectively. Results showed that all of the respondents were scattered in all of the available options. Results exhibited that farmers were making disposal of their produce at big market and find it more competitive in commodity price taking (Lungaho, 2006).

Transportation has a great role in increasing mobility to market. Results (Table-12) revealed that there were about 15.60, 58.72, 17.43 and 8.26 percent of the respondent with varies rented, owned, public and others respectively. Study concluded that by having an economic mean of transportation from farm gate to market contribute in reduction to marketing cost and boost chances for getting higher prices for produce (Wilson and Hadley, 2008).

Market information provides the great deal of information regarding the profitability in disbursing produce at right time for getting higher market price. It is obvious from the results (Table-13) there were about 40.37, 6.42, 12.84, 19.27, 6.42, 1.84 and 12.84 percent of the respondent with perception varies from Traders, Neighbors, Friends and relatives, TV/cable /Radio, Internet, Magazine and magazine respectively. It is obvious from results that most of the farmer seeking market information from traders and market intermediaries in developing countries markets (Amara, 2001).

Table-7: Costs for different operations in potato production Operation Costs/Acre

Operations/Acre	Cost/Acre	Percent of total cost
Hiring land	14,500	14.03
Land cultivation	8,000	7.74
Planting	3,000	2.90
Chemicals (fungicides, insecticides, herbicides)	1,800	1.74
Fertilizers	11,500	11.13
Spraying (labor)	1,500	1.45
Seed (buying costs + haulage cost)	38,980	37.72
Harvesting	5,000	4.84
Marketing (Bag charges also included)	17,460	16.90
Total	114,940	100

Table-8: Sources of credit

Sources	Frequency	Percent
Informal group	17	15.60
Private Bank	32	29.36
Friend/Relative	12	11.01
Input dealer	27	24.77
Governments Banks (I.e. ZTBL)	21	19.27
Total	109	100

Table-9: Forms of credit

Credit forms	Frequency	Percent
Money	28	25.69
Input	67	61.46
Others	14	12.84
Total	109	100

Table-10: Use of Agriculture credit made by farmer

Credit forms	Frequency	Percent
Investing in business	9	8.26
Investing in agriculture	46	42.20
children's school fees	17	15.60
Home consumption	24	22.02
Others	13	11.93
Total	109	100

Table-11: Place of selling potatoes

Options	Frequency	Percent
At village	4	3.67
At small market	7	6.42
At Big Market	76	69.72
To input provider	12	11.01
Broker	7	6.42
Others	3	2.75
Total	109	100

Table-12: Means of transport to get to market

Options	Frequency	Percent
Rented	17	15.60
Owned	64	58.72
Public	19	17.43
Others	9	8.26
Total	109	100

Table-13: Sources of market information

Options	Frequency	Percent
Traders	44	40.37
Neighbor farmers	7	6.42
Friends and relatives	14	12.84
TV/cable /Radio	21	19.27
Internet	7	6.42
Magazine	2	1.83
Others	14	12.84
Total	109	100

Results in Table-14 revealed that estimated slope of cost efficiency was observed significant at 1 percent probability which revealed it was highly significant. It explored that with each percent increase in farmer's cost efficiency level there was resultantly 0.618 units increase in potato production (Xu and Jeffrey, 2000). Slope of high yielding variety use was observed significant at 5 percent probability value. It depicted that with each percent increase in farmer's high yielding variety use there was 0.838 units increase the value of dependant variable (potato production) (Okoruwa, 2006). Results indicate that high yielding variety use leads to high potato yield. It was concluded that the use of high yielding variety was found crucial for getting high potato yield. Slope of extension service provision was pragmatic significant at 1 percent probability value. It revealed that with each percent increase in extension service provision there was 0.097 units increase the potato production (Nchare, 2007). Results indicate that extension service provision leads to high potato yield. It was concluded that the extension service provision was found crucial for getting high potato

yield. Estimated slope of awareness about potato diseases was observed significant at 1 percent probability value. It depicted that with each percent increase in awareness about potato diseases there was resultantly 0.235 units increase the value of dependant variable. Results indicate that awareness about potato diseases leads to high potato yield (Kopp and Diewert, 1982). It was concluded that the awareness about potato diseases was found crucial for getting high potato yield. Slope of coefficient of market information was observed significant at 1 percent probability value, which states that it was highly significant. It showed that with each percent increase in market information there was resultantly 0.347 units increase in potato production (Farrel, 2008). Results showed that market information leads to high potato yield. It was concluded that the market information was found crucial for getting high potato yield. Slope of coefficient of advanced technology use was examined significant at 1 percent probability value. It showed that with each percent increase in advanced technology use there was 0.095 units increase the value potato production. Results indicate that advanced technology use leads to high potato yield. It was concluded that the advanced technology use was found central for getting high potato yield (Coelli, 2006).

Table-14: Empirical Analysis

Model	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
Constant	0.846	0.830	1.020	0.010
Knowledge	0.003	0.007	0.480	0.832NS
Cost Efficient	0.618	0.159	3.883	0.001*
High yielding variety	0.838	0.093	0.409	0.043**
Extension service Provision	0.097	0.073	1.328	0.007*
Awareness about potato diseases	0.235	0.076	3.099	0.003*
Market information	0.347	0.146	2.381	0.019*
Advanced Technology	0.095	0.016	0.266	0.029**

(*,**= significant at 1 and 5 percent probability level respectively. $\mathbf{R^2}$=86.69 %

Summary

Present study was conducted to investigate the factors affecting potato production in Punjab, Pakistan. Results of the study exposed that there were major constraints in potato production are farmers entrepreneurial level, credit in availability and non-productive use of agriculture credit, non availability of market production and trade statistics, instability in potato market price, perishable nature of crop, high cost of production. Study revealed that cost efficiency, use of high yielding verities, provision of extension services, market information, awareness about potato crop diseases and use of advanced mechanization were significantly contributing to potato production and profitability of potato growers in the study area.

Recommendations

One the basis of results of the study following are the amicable recommendations;

- Farmers should be provide with the high yielding verities of potatoes at low cost because high potato seed cost was found a major constraint in using low quality 2-3 three old seed which leads to low production.
- Market price for potato crop should be stabilized through proper policy instrument.
- Government should provide farmers with proper road infrastructure from their field to markets.
- To encourage potato export by giving relief in taxes for exporting agriculture commodities.
- There should be availability of proper market information regarding the last year production, domestic consumption and export statistics.
- Online availability of published yearly production statistics.
- Government should installed cold storage and provides storage services on subsidized rates at immediate vicinity of farmers.
- Government should turn the role of agriculture credit institutions into facilitators of farmers by making banks as the partners of the farmers.

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