

Research Article

Impact of Agricultural Credit on Wheat Productivity in District Jhang, Pakistan

Nisar Ahmad^{1*}, Inayatullah Jan², Saif Ullah¹ and Sidra Pervez¹

¹Department of Economics, University of Sargodha, Pakistan; ²Institute of Development Studies, The University of Agriculture, Peshawar, Pakistan.

Abstract | Agriculture is a major sector of Pakistan's economy as it has a significant contribution to GDP, employment generation, and export earnings in the economy of Pakistan. Due to modernization in agriculture sector over the last few decades, credit needs of the farmers have increased rapidly. Credit is considered an important factor for raising the productivity and income of the farmers. The current study attempts to analyse the impact of credit on wheat productivity in district Jhang. Furthermore, study explores the purpose of farmers for acquiring loan and major sources of credit in district Jhang. This study is based on primary data collected in 2013 from eight villages in district Jhang – Punjab, Pakistan. The district was divided into four zones and two villages were selected from each zone. An equal number of beneficiaries and non-beneficiaries, i.e. ten each, were selected from each village. Thus the total sample size was 160 farmers. Cobb Douglas Production Function (CDPF) was used to analyse the data. The results of the study indicate that credit has positive effects on wheat productivity. Analysis shows that only 30% of credit users are utilizing loan for the purchase of seed and fertilizers while 70% are utilizing loan for other purposes as for marriages & ceremonial and for purchase of agriculture land & tractor etc. Similarly, 80 percent of credit users are borrowing from Zarai Tarqati Bank Limited (ZTBL). It is suggested that financial institution should expand the credit facilities to the farmers which shall be utilized exclusively for agricultural purposes. It is also suggested that credit constraint should be plausibly minimized so that small farmers could also get loans easily.

Editor | Tahir Sarwar, The University of Agriculture, Peshawar, Pakistan.

Received | December 13, 2014; **Accepted** | March 14, 2015; **Published** | March 22, 2015

***Correspondence** | Nisar Ahmad, University of Sargodha, Pakistan; **E-mail** | nisarahmad_25@hotmail.com

Citation | Ahmed, A., I. Jan, S. Ullah and S. Pervez. 2015. Impact of agricultural credit on wheat productivity in District Jhang, Pakistan. *Sarhad Journal of Agriculture*, 31(1): 65-69.

Keywords | Agricultural credit, Wheat productivity, Cobb Douglas Production Function (CDPF)

Introduction

Agriculture is the largest sector of Pakistan economy with a large impact on socio-economic conditions of rural population. Being the dominant sector, it contributes 21.4% to GDP, employs 45 percent of the country's labour force, and contributes to the growth of other sectors of the economy ([Government of Pakistan, 2013](#)). A sustained agricultural develop-

ment is required for economic development, raising the living standards of the people, and reducing poverty in the rural areas of Pakistan ([Government of Pakistan, 2011](#)).

Credit is required for executing different farm operations in the agriculture sector. Timely credit is needed for the adoption of modern technologies, purchase of fertilizers and improved seeds. It increases the farm

production and ultimately the growth rate of the economy is enhanced. Therefore, agricultural credit is a necessary part for modernization in agriculture sector. Generally, developing countries have established formal institutions with the aim of channeling credit to small scale farmers (Machethe, 2004).

The credit needs of the farmers have increased rapidly due to modernization in agriculture sector over the past few decades. In Pakistan, the agricultural credit system comprises of informal and formal sources of credit supply. The informal sources includes: friends, relatives, commission agents, traders and private money lenders. Currently the main formal credit sources consist of financial institutions such as Zarai Taraqati Bank Limited (ZTBL), commercial banks, and co-operative societies (Jan et al., 2012). ZTBL provided credit to the agriculture sector in Pakistan. Credit is a pivotal factor for improving the welfare of rural poor through consumption smoothening that reduces their vulnerability in the form of short-term income. It also enhances productive capacity of the poor farmers through financing investment in their human and physical capital (Okurut et al., 2004).

Bashir et al. (2010) examined the impact of credit on wheat productivity in district Lahore using Cobb Douglas Production Function and found that credit has a positive impact on productivity of wheat. The results indicated that credit raised the living standards of the rural poor. It was concluded that improvement in the seed, land preparation, technologies and the use of fertilizer can improve the productivity of wheat if credit is available to farmers at the time of wheat cultivation. Sebopetji and Belete (2009) found that gender and farming experience have significant positive influence on farmers' decision to use credit. It was suggested that credit support programme should be started and targeted to needy and experienced farmers so that to raise the production. Godquin and Sharma (2008) studied the impact of credit constraints on the household's production and consumption decisions and found that credit constraints have deep impact on farmers production and consumption decision depending on its credit needs and the availability of loan from the financial institutions. It was also concluded that credit constraints affect the scale of production, production technology and input use.

Jan and Manig (2008) found that provision of credit by ZTBL has positive effect on crop production and income of farmers and it is likely to be an effective

tool for raising productivity of agriculture sector and increasing the contribution of agriculture sector to GDP provided that the distribution of credit is made fair and credit constraints are minimized. Iqbal et al., (2003) studied how the institutional credit affected the agriculture productivity in Pakistan. In the analysis, formal credit was used as an explanatory variable in production function. The results showed that the impact of institutional credit was positive. Other variables like cropping intensity, labor, and irrigation water availability were also found positive. Although many studies have been conducted in different parts of the world but a comprehensive work on the impact of credit on wheat productivity and on the purpose of acquiring loan and major sources of loan in district Jhang was lacking. Therefore, current study is motivated to determine the purpose of acquiring credit and its major sources; and to analyze the impact of institutional credit on productivity of wheat in district Jhang, Pakistan.

Materials and Methods

Research location and data

The study is based on primary data collected in 2013 from four Tehsils called 'zones' in District Jhang in the Punjab Province of Pakistan. The four zones included Tehsil Jhang (Mouza Habib, Chak No. 268 (Khokra Chak)), Tehsil Shorkot (Mouza Bhangu, Mouza Dab Kallan), Tehsil Ahmad Pur Sial (Mouza Daiti Sial, Mouza Garh Mahraja), and Tehsil Athara Hazari (Mouza Mundy Syed, Mouza Chela). Two villages, as mentioned in the parenthesis, were randomly selected from each zone. From each village, ten loanees and ten non-loanees were randomly selected. Thus, the total sample size was 160 households which included half loanees and half non-loanees respondents.

Analytical technique

In this study Cobb Douglas Production Function (CDPF) was used for analysis. This functional form is used due to its certain advantages. It facilitates computations and has the properties of uniformity; represent ability, and flexibility (Bhanumurthy, 2002). The sample data form is linear in logarithmic and is analysed with standard linear regression. The following functional form was fitted to the data set to analyse the impact of credit on wheat productivity.

Cobb-Douglas production is of the form:

$$Y = AX_1^{\beta_1} X_2^{\beta_2} X_3^{\beta_3} X_4^{\beta_4} X_5^{\beta_5} \dots \dots \dots (1)$$

Taking the natural log of equation (1) and considering the case of five explanatory variables, the equation (1) converts to the following form:

$$\ln Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 X_5 + \mu \dots (2)$$

Where,

β_0 = Natural log of A = Intercept

$\ln Y$ = Natural log of yield of wheat (kg/ha)

$\ln X_1$ = Natural log of fertilizer cost (Rupees/ha)

$\ln X_2$ = Natural log of irrigation cost (Rupees/ha)

$\ln X_3$ = Natural log of plant protection cost (Rupees/ha)

$\ln X_4$ = Natural log of land preparation cost (Rupees/ha)

X_5 = Dummy variable representing credit users; (1 for credit user and 0 alternatively)

$\beta_1, \beta_2, \beta_3, \beta_4$ = Output elasticities, and

μ = Error term

The following hypothesis was formulated to analyse the impact of credit on raising the productivity of wheat crop in district Jhang, Pakistan.

H_0 : Credit has no impact on the wheat productivity in the area.

H_1 : Credit has a significant positive impact on wheat productivity in the area.

Results and Discussion

Distribution of credit users on the basis of farming experience

Results as shown in Table 1 indicate that 40 percent of the credit users had farming experience in the range of 10-20 years whereas 32.5 percent had an experience in the range of 21-30 years. Results further indicate that only 2.5 percent credit users had farming experience between 50 to 60 years.

Table 1: Frequency distribution of credit users on the basis of farming experience

Farming Experience	Frequency	Percentage
10-20	32	40
21-30	26	32.5
31-40	12	15
41-50	8	10
51-60	2	2.5
Total	80	100

Source: Field Data, 2013

Similarly, Table 2 indicates that 35 percent of the non-credit users have farming experience in the

range of 10-20 years while the same figure for those non-credit users who have this experience in the range of 21-30 years is 32.5 per cent. Results further indicate that only 6 non-credit users out of total of 80 have farming experience between 41 to 50 years.

Table 2: Frequency distribution of non-credit users on the basis of farming experience

Farming Experience	Frequency	Percentage
10-20	28	35
21-30	26	32.5
31-40	20	25
41-50	6	7.5
Total	80	100

Source: Field Data, 2013

Distribution of credit users on the basis of source of credit

Table 3 depicts that 80 percent of credit beneficiaries borrowed from the largest agricultural credit disbursement institution in the country, i.e. Zarai Tariaqiati Bank Limited (ZTBL). Only 2.5 percent of respondents were taking loan from commission agents. Another 12.5 percent of respondents were borrowing from friends and 5 percent of respondent of were taking loan from other sources. This shows that people in the area benefited from both formal as well as informal sources of credit; however, formal credit source (ZTBL) dominated in the area.

Table 3: Frequency distribution of credit users on the basis of source of credit

Source	Frequency	Percentage
ZTBL	64	80
Commission agents	2	2.5
Friends	10	12.5
Others	4	5
Total	80	100

Source: Field Data, 2013

Utilization of credit for different purposes

Table 4 shows the percent distribution of credit users regarding the purpose of loan. Among credit borrowers 2.5 percent of farmers were getting loan to purchase agriculture land. Only 2.5 percent of farmers borrowed loan to purchase tractor and same percentage of respondents borrowed loan for the tube well. Similarly, 25 percent were taking loan for agricultural production. 37.5 percent of credit users were taking loan for marriages and ceremonial expenses. Another

30 percent of borrowers were utilizing loan for the use of inputs such as seed and fertilizers.

Table 4: *Frequency distribution of credit users on the basis of purpose of loan*

Purpose of Loan	Frequency	Percentage
Purchase of agriculture land	2	2.5
Purchase of tractor	2	2.5
Purchase of tube well	2	2.5
Other agricultural production inputs	20	25
Marriages and ceremonial expenses	30	37.5
For agriculture seed fertilizer	24	30
Total	80	100

Source: Field Data, 2013

Results of the Cobb Douglas Production Function

Table 5 shows results of regression analysis. Cobb Douglas production function (CDPF) was used to estimate the coefficients. The intercept of the model is 10.18 which means that yield of wheat is 10.18 when there is no input used. The coefficient of fertilizer is -0.09 which implies that 1 percent use of fertilizer would lead to 0.09 percent decrease in wheat yield because the sign of coefficient was found negative. The coefficient of irrigation is 0.01 indicating that yield will increase by 0.01 percent by 1 percent increase in irrigation. The results are comparable with Bashir et al., (2010) and Mehmood et al., (2012). They also used CDPF for estimation and found positive impact of credit on wheat productivity.

Table 5: *Elasticities of wheat production (kilogram per hectore)*

Variables	Coefficients	t- values	Probability
(Constant)	10.18	8.55	0.00
X_1	-0.09	-3.88	0.00
X_2	0.01	0.09	0.93
X_3	0.16	1.68	0.09
X_4	0.01	0.16	0.87
X_5	0.05	2.04	0.04
R-Squared	0.45	F-Statistics	4.21

Note: All the variables except X_5 are in log form. Dependent variable is wheat production in kilogram per hectore.

The main concern of the study is the impact of credit on the output of wheat and estimated coefficient of credit is 0.05 indicating that output growth is increased by 5 percent due to use of credit because this

coefficient of credit is the semi elasticity. An important implication from this result is that proper utilization of credit and hence, increased wheat production will lead to increase income resulting in reducing poverty in the rural areas. Similarly, 1 percent increase in plant protection would lead to 0.16 percent increase in the yield of wheat. The coefficient of land preparation is 0.01 which implies that output will increase by 0.01 percent if land preparation is improved by 1 percent. All the variables were significantly affecting the wheat production except irrigation and land preparation. Average wheat yield of the sample sites was 3560 kg/ha.

Conclusion and Recommendations

It can be concluded that credit has a positive impact on the productivity of wheat crop that as a result raises the living standards of the rural poor. However, the coefficient of credit is low because primary analysis shows that only 30% of credit users were utilizing loan for the use of seeds and fertilizers whereas 70% were utilizing loan for other purposes. The results of the study indicate output growth is increased by 5% due to use of credit. It is important policy implication of the study based upon the results that wheat productivity can be further enhanced if farmer use credit purely for the wheat production rather than for marriages and other activities. It was also found that 80% of credit users were borrowing from ZTBL. Therefore, ZTBL was a major source of providing loan. An implication of the study is that financial institutions should make sure that credit is utilized for agricultural purposes only. The results of this study affirm the importance of credit for wheat productivity in case of district Jhang, Punjab.

References

- Bashir, M., K. Ahmad, and S. Hassan. 2010. Impact of credit disbursed by commercial banks on the productivity of wheat in Lahore district. Pak. J. Agric. Sci. 47(4): 405-409.
- Bhanumurthy, K.V. 2002. Arguing a case for the Cobb-Douglas production function. Review of Comm. Stud, Delhi, India. pp. 75- 91.
- Godquin M., and M. Sharma. 2008. If only I could borrow more? Production and consumption credit constraints in the Philippines TEAM (University of Paris I - La Sorbonne) and CNRS, 106-112, Bd. de 'Hospital, 75013 Paris, marie

- godquin (univ-paris1. IFPRI, 2033, K Street NW, Washington DC 20006-1002, USA.
- Government of Pakistan. 2013. Economic Survey of Pakistan. Ministry of Finance, Islamabad.
 - Government of Pakistan. 2011. Agricultural Statistics of Pakistan. Ministry of Food, Agricultural and Livestock, Islamabad.
 - Iqbal, M., Ahmad, M., and K. Abbas. 2003. The Impact of Institutional Credit on Agricultural Production in Pakistan. *The Pak. Dev. Rev.* 42(4):469-485.
 - Jan, I., S. Munir, A. Usman and M. Idress. 2012. Agricultural credit markets in North-West Pakistan: Implications for the development policy. *Sarhad J. Agric.* 28(3):521-529.
 - Jan, I. and W. Manig. 2008. Influence of participation in agricultural support services on income from agriculture: results from the multiple regression model (a case from rural Northwest Pakistan). *Sarhad J. Agric.* 24(1): 129-136.
 - Machete, L. 2004. Agriculture and poverty in South Africa: Agriculture can reduce poverty? Paper presented at the Overcoming Underdevelopment Conference, Pretoria South Africa.
 - Mehmood, Y., Z., Farooqi, K., Bakhsh, M. B. Anjum and M. Ahmad. 2012. Impact of Bt. Cotton Varieties on Productivity: Evidence from District Vehari, Pakistan. *J. Agric. Soc. Sci.*, 8 (3):109-111.
 - Okurut, F. N., Banga, M. and Mukungu, A. 2004. Micro Finance and Poverty Reduction, UGANDA: Achievements and Challenges. Research Series No.41. Economic Policy Research Centre EPRC, Makerere University.
 - Sebopetji, T.O. and A. Belete. 2009. An application of probit analysis to factors affecting small-scale farmers' decision to take credit: a case study of the Greater Letaba Local Municipality in South Africa. *African J. Agric. Res.* 4 (8): 718-723.