IMPACT OF AGRICULTURAL CREDIT ON PRODUCTIVITY OF WHEAT CROP: EVIDENCE FROM LAHORE, PUNJAB, PAKISTAN

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Financial requirements of the farming sector have increased tremendously over the last few decades due to the extended use of fertilizers, biocides, improved seeds, mechanization etc. The study in hand was carried out to check the impact of credit on the productivity of wheat crop in District Lahore, Punjab, Pakistan. United Bank Limited (UBL) was selected as a representative of the institutional credit sources. Primary data were collected through a well structured questionnaire by dividing the district into three strata. Two villages were selected randomly from each stratum and then out of the list of loanees provided by the UBL, ten were randomly interviewed from each village. An equal number of non-loanees were also selected for the purpose of comparison. Multiple regression analysis was carried out for making of analysis. Findings showed that agricultural credit plays an important role in facilitating the transformation of agriculture and raising the participation of farmers in production process.
Keywords: agricultural credit, institutional sources of credit, wheat productivity

INTRODUCTION

The economy of Pakistan dependents on agricultural sector as it contributes about 20% to the GDP, employs more than 45% of the country's total labor force and supports directly or indirectly around 67% of the population for their sustenance. Any internal or external shock that happens to agriculture is likely to affect the country's growth performance and a large segment of the country's population. Wheat, the main staple food of the people of Pakistan, contributes about 13% to the value added in agriculture and 2.8 % to the GDP. The targets for area and production for the year 2008-09 were set at 8610 thousand hectares and 25.0 million tons, respectively. It was cultivated on an area of 9060 thousand hectares, showing a 5.9% increase over last year's area of 8550 thousand hectares. The estimated production of the wheat crop was 23.4 million tons which was 11.7% more than that of the last year (GOP, 2009).

Higher use and better mix of inputs require funds at the disposal of farmers. These funds could either come from savings or through borrowings, since the saving of the farmers is either quite meager or negative so they have to borrow for their productive activities. Majority of the farmers, particularly small ones, are not in a position to secure key inputs (fertilizer, improved seed, advanced technology, plant protection, etc.) from

their own sources due to lack of funds. Thus to meet the required investment to bring about the increase in the production, agricultural credit is an essential element (Iqbal *et al.,* 2003).

Agricultural credit is considered as one of the strategic resources for pushing the crop production to the high horizons consequently raises the living standards of our rural poor farming community. Hence, it plays a pivotal role in development of the economy. It has mainly two sources; informal and formal. Informal sources normally consist of commission agents, input providers, village shop keepers, friends and relatives. Out of these sources, credit from commission agents, shopkeepers and input suppliers has more baneful effects on the rural poor. Evidence suggests that such loans further aggravate rural poverty as the effective rate of interest on informal credits is exorbitantly high (Nasir, 2007). It is a general practice that the small growers obtain loan in the form of cash or inputs like seed, fertilizers and pesticides. These are tied loans in the sense that farmers obtaining them have to deliver their produce to these commission agents who offer the price of their produce much lower than the market price. According to a study conducted by Punjab Economic Research Institute (PERI), the cost of tied loan in case of cotton is 45 percent and in case of wheat, the cost of borrowing loan from commission agent comes to 47 percent, the cost of urea credit

purchase is 76 percent and that of DAP credit purchase is 68 percent. In case of weedicides and pesticides cost of credit purchase is about 83 percent. Despite this exorbitant interest these sources are still popular amongst the small farmers. It is because of the reluctance of potential formal suppliers of credit to advance loans to them due to the high transaction costs and perceived high risk and is considered to be biased in favor of big farmers. Their political influence facilitates their access to formal credit and thus lending by the formal institutions becomes skewed towards the rich as thought by the small farmers. The informal sources of credit on the other hand are considered to be providing loans for consumption purposes. Being short-term, it does not contribute to rural growth as it cannot be channeled to long-term productive investment. Non-availability of credit or difficulty in getting from formal lending institutions compels small farmers and tenants to choose informal lenders alternatively. According to Pakistan Rural Household Survey (PRHS) 2001-02, nearly 80 per cent of cultivator households participated in the credit market, with two-thirds of total rural credit coming from the informal sector, implying thereby that non-institutional agricultural credit is much more widespread in rural areas (Nasir, 2007).

A number of successful financial sector reforms have been undertaken in recent years due to which the formal credit sources developed, expanded and replaced many non-institutional sources. These include Zarai Taraqiati Bank Limited (ZTBL) previously known as Agricultural Development Bank of Pakistan (ADBP), Commercial Banks, Domestic Private Banks (DPBs) and Punjab Provincial Cooperative Bank Limited (PPCBL). These sources have been playing an active role in the provision of agriculture credit for the last two decades. These sources provide loans for the production and development purposes for increasing the production and productivity of this important sector. The share of these institutions is increasing day by day as described in the Table 2 (GOP, 2009).

The share of commercial banks has increased over time and they are the largest contributor in this sector followed by ZTBL. Keeping in view the importance of credit and the share of commercial banks the study in hand was undertaken with the objective to focus on the impact of credit disbursed by commercial banks on raising the productivity of wheat crop with particular reference to District Lahore of Pakistan formulating the hypothesis as;

H_0: Credit has no impact on the wheat productivity
H_1: Credit has a significant positive impact on wheat productivity

MATERIALS AND METHODS

United Banks Limited (UBL) was selected as the representative of commercial banks due to its last year's performance in the region. For the purpose of collecting primary data stratified random sampling technique was applied because of the underlying advantages of the technique as it improves the

Table 1. Area, production and yield of wheat

Year	Area		Production		Yield	
	(000 hectares)	**% Change**	**(000 tons)**	**(Kg/Ha.)**	**(Kg/Ha.)**	**% Change**
2004-05	8358	1.7	21612	10.8	2586	8.9
2005-06	8448	1.1	21277	-1.6	2519	-1.9
2006-07	8548	1.0	23295	9.5	2716	7.8
2007-08	8550	-0.3	20959	-10.0	2451	-9.8
2008-09 (P)	9062	5.9	23421	11.7	2585	5.5

P = Provisional; Source: GOP, 2009.

Table2. Credit disbursed by institutional sources (Rs. million)

Fiscal Year	ZTBL		Commercial Banks		DPBs		PPCBL		Total	
	Amount	**%**	**Amount**	**%**	**Amount**	**%**	**Amount**	**%**	**Amount**	**%**
2004-05	37,408.84	34.4	51,309.78	47.1	12,406.82	11.4	7,607.47	7.0	108,732.91	100
2005-06	47,594.14	34.6	67,967.40	49.3	16,023.38	11.6	5,889.40	4.28	137,474.32	100
2006-07	56,473.05	33.4	80,393.18	47.5	23,976.16	14.1	7,988.06	4.72	168,930.45	100
2007-08	66,938.99	31.6	94,749.29	44.7	43,940.92	20.7	5,931.45	2.80	211,560.66	100
2008-09 (July-March)	45,399.87	29.8	74364.60	49.0	28,557.24	18.8	3,538.89	2.33	151,860.60	100

Source: GOP, 2009; Percentages are calculated by authors

accuracy of survey results and lowers the cost of survey without losing accuracy (Fuller, 1993). The district was divided into three strata as Zone-I, II and III, from each stratum two villages were randomly selected and out of each village, ten loanees were selected randomly from the list of loanees provided by UBL. An equal number of non-loanee was also selected for the sake of comparison. Thus the total number of respondents came out to be 120 i.e. 10 (loanees) x 2 (Villages) x 3 (Strata) = 60 + 60 non loanees. Table 3 shows the zones and the selected villages.

Table 3. Zones and villages

Sr. No.	Zones	Villages
1	Zone-I	Manga Mandi
		Sham ka Battian
2	Zone-II	Lallyani
		Kanah Nau
3	Zone-III	Addah Chabeel
		Batapur

After going through all the scatter diagrams it was decided to use the Cobb Douglas Production Function (CDPF) for the purpose of data analysis. The selection of CDPF was made on the basis of: it can handle multiple inputs in its generalised form; in the presence of imperfections in the market it does not introduce distortions of its own; and various econometric estimation problems like serial correlation, hetroscidasticity and multicolinearity can be handled adequately and easily. Further, it facilitates computations and has the properties of uniformity, representability, and flexibility. This technique do has some weaknesses including inflexibility and except for one obvious assumption all other assumptions can be relaxed (Bhanumurthy, 2002). Following equation represents CDPF for the current study;

$$Y = AX_1^{\beta 1} X_2^{\beta 2} X_3^{\beta 3} X_4^{\beta 4} X5^{\beta 5} X_6^{\beta 6} \qquad (1)$$

Where   Y = wheat yield (mounds/acre)

X_1 = seed cost (Rs./acre)
X_2 = fertilizer cost (Rs./acre)
X_3 = irrigation cost (Rs./acre)
X_4 = plant protection cost (Rs./acre)
X_5 = land preparation cost (Rs./acre)
X_6 = loan taken
        (1 for loan taken and 0 alternatively)
$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ = output elasticities

Log-linearizing and adding a stochastic term to (1),
$lnY = \beta_0 + \beta_1 lnX_1 + \beta_2 lnX_2 + \beta_3 lnX_3 + \beta_4 lnX_4 + \beta_5 lnX_5 + \beta_6 X_6 + \mu$
Where μ = Disturbance term
The insertion of credit as an independent variable in above equation can be criticised because of the fact that it does not affect the output directly and has an indirect effect on output through lessening the financial constraints of the farmers. Credit was included in the above equations due to the fact that it can move farmers along the production surface more efficiently: firstly, credit influence the efficient resource distribution by overcoming constraints to purchase inputs and use them optimally which shifts the farmer along a given production surface to a more intensive input use; secondly, credit may help to purchase a new technological package (including high yielding hybrid seeds, drip or sprinkler irrigation system etc.) that will shift the production surface; and thirdly it may help to use more intensively the use of fixed inputs (Carter, 1989).

RESULTS AND DISCUSSION

The results of the regression analysis are presented in Table 4 as Cobb Douglas production function was used so the estimated coefficients are the elasticities of production. The intercept of the model is 2.75, which represents that the natural log of the expected yield of wheat when there is no input. The coefficient of seed (*ln X_1*) is 0.138 which implies that 1 percent increase in the seed rate will bring 0.138 percent increase in the wheat yield. The coefficient of fertilizer (*ln X_2*) is 0.114 indicating that the yield will increase by 0.114 percent by increasing the fertilizer use by 1 percent. The coefficient of irrigation (*ln X_3*) is 0.118 indicating that the yield will increase by 0.118 percent by increasing the irrigation use by 1 percent. The coefficient of plant protection (*ln X_4*) is 0.0154. This coefficient indicates that wheat yield will be increased by 0.0154 percent by increasing the plant protection use by 1 percent. The coefficient of land preparation (*ln X_5*) is 0.110 which implies that the yield will increase by 0.11 percent if the land preparation is improved by 1 percent. The coefficient of credit *(X_6)* is 0.0245. This coefficient indicates that wheat yield will increase by 0.0245 percent by 1 percent increase in credit. These results are inline with the earlier studies by Feder *et al.* (1991), Khandker and Faruqee (1999), Nazli (2000), Iqbal *et*

Table 4. Results of regression analysis

	Coefficients	t	Sig.
(Constant)	2.757	13.491	0.000
ln X_1	0.138	2.549	0.012
Ln X_2	0.114	2.573	0.011
ln X_4	0.015	2.327	0.022
ln X_3	0.118	2.480	0.015
ln X_5	0.110	3.179	0.002
X_6	0.024	2.585	0.011
$R^2 = 0.653$		F = 30.169	

al. (2003), Channgakham (2006), Olagunj (2007), Bashir *et al.* (2008, 2009).

The over all significance of the model can also be viewed from the value of the coefficient of multiple determination i.e. R-square. The value of R-square is 0.653 which indicates that about 65 percent of the total change in wheat yield is explained by these six independent variables. The F-calculated value is 30.169 which is highly significant. This suggests that the independent variables included in the model are significantly affecting the wheat yield.

CONCLUSION

It can be concluded that credit has a positive impact on the productivity of wheat crop hence rejecting the null hypothesis i.e. credit has no impact on the wheat productivity and alternatively we accepted the alternative hypothesis that credit has a significant positive impact on the rice productivity that in tern raises the living standards of the rural poor. A number of studies (including the study in hand proved that credit has a positive impact on the agricultural productivity (as mentioned above). The impact seems to be low as seen from the coefficient of the credit variable, from above. Similar is the case in most of the studies that raises the question, despite this reported positive impact, why there is no significant dent in the rural poverty? The poverty head count is about 27 percent (GOP, 2009). It implies that along with the impact studies of credit on productivity other factors should also be taken into account e.g. it is important and necessary to assess the *use pattern* of the loans acquired by the farmers that will give the complete fungibility analysis. Further, from the problems stated by the farmers (Table 5) suggests that the loaning procedures must be made more simplified and convenient, Islamic financial system may also be helpful to get rid of the interest, proper technical guidance must be provided by the bank and extension staff and keeping proper check and balance in form of supervised credit schemes or perhaps providing the inputs in time rather than cash. Furthermore it is also suggested that farmer's cooperative societies be re-vitalized in the rural economy of Pakistan to look after the interests of the growers and to help them to get and spend the loan.

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Table 5. Problems stated by the loanee farmers

Sr.No.	Nature of Constraints	Number of Farmers who reported	Percentage
1	Difficulty of preparation of pass book by revenue department	45	75
2	Lack of proper guidance	49	82
3	Bribery	11	18
4	Less loan than required	39	65
5	Insufficient term wise-loans	31	51
6	Indifferent attitude of bank officials	11	18
7	Delay in disbursement	33	55
8	Lack of publicity	40	67
9	High interest rate	43	72

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