

## Raising Maize Productivity through Agricultural Credit A: Case Study of Commercial Banks in Pakistan

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### **Abstract**

Agriculture is an extremely important sector of Pakistan's economy. This sector contributes more than 20.9 percent to the Gross Domestic Product (GDP) and provides employment to 43.5 percent of the total labour force of the country. Almost 68 % of the population of Pakistan lives in rural areas and earns its livelihood, directly or indirectly, from agricultural activities such as crop cultivation, livestock rearing, labour in agriculture, agriculture input supply, transportation of agricultural output to the market etc. Thus, in Pakistan commercial Banks such as Allied Bank limited (ABL), United Bank limited (UBL), National Bank limited (NBP), Muslim Commercial Bank (MCB) and Habib Bank Limited (HBL) have been playing vital role in the provision of agriculture credit for the last two decades. The government of Pakistan has been extending loan to small farmers for adoption of new farm technology to enhance agricultural productivity. Therefore, the main objective of this study was to investigate the impact of agricultural credit on maize production by using the secondary data for the period of 1991-2014. Cobb- Douglas production function was applied to estimate using OLS method and all the variables transformed to per cultivated hectare. Thus, results indicates that agricultural credit, maize cropped area and agricultural labour force are positively significant related to maize production.

**Keywords:** Institutional credit, Maize production, Time series analysis, Pakistan

### **INTRODUCTION**

Agriculture is mainstay of Pakistan's economy. It accounts for 20.9 percent to the GDP and more than 43.5 percent of the labor force is engaged in this sector (GOP, 2014-15). Almost 68 percent of the population of Pakistan lives in rural areas and earns its livelihood, directly or indirectly, from agricultural activities such as crop cultivation, livestock rearing, labour in agriculture, agriculture input supply, transportation of agricultural output to the market etc. Maize, an important food grain and produces an array of products as raw material for multi products. It contributes 2.1 percent to the value added in agriculture and 0.4 percent to GDP. It was cultivated on an area of 1117 thousands hectares, showing a 5.4 percent increase over last year's area of 1060 thousands hectares. The estimated production of the maize was 4527 million tones which was 7.3 percent more than of the last year (GOP, 2014). Higher use of inputs required funds which either comes from savings or through borrowings. Majority of the small farmers and tenants, are not in position to purchase inputs such as fertilizer, improved seed, pesticide and modern implements. Thus, to meet the required investment to bring about the increase in the production, agricultural credit is an important element (Iqbal et al., 2003). Credit plays vital role in increasing agricultural productivity. Timely availability of credit enables small farmers can purchase the farm required inputs and machinery for carrying out farm operations (Saboor et al, 2009). However, small farmers, tenants and non-farm population in agriculture sector all suffer from the problem of lacking in capital. Small farmers and tenants usually face complicated procedure and collateral problems in availing credit. These impediments had hardly hit the small farmers, tenants and share croppers who did not own land. Therefore, easy and cheap credit is the quietest way for increasing agricultural productivity (Abedullah, 2009). In Pakistan; there are two types of agricultural credit such as institutional and non- institutional credit. The institutional credit provide by Zari Traqiati Bank Limited ZTBL, commercial banks such as .Allied Bank limited (ABL), United Bank limited (UBL), National Bank limited (NBP), Muslim Commercial Bank (MCB) and Habib Bank Limited (HBL), cooperative and domestic private banks. Whereas, non- institutional credit suppliers are such as friends, professional money lenders, shopkeeper, and input dealers. Therefore, at present 31 Commercial, Microfinance Banks and Islamic Banks with around 3,950 agriculture designated branches are facilitating farmers by extending agriculture credit throughout the country. The agriculture lending banks comprising of 19 Commercial banks, 2 specialized banks (ZTBL, PPCBL), 7 Microfinance Banks and 3 Islamic Banks which are engaged in providing development loans to farming community for agriculture activities including growing of crops, livestock, poultry, fisheries, orchards, forestry, nurseries, apiculture and sericulture. 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) have been playing

vital 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. Therefore, the share of commercial banks has increased over time and they are the largest contribution this sector followed by ZTBL.

Table 1: Area, Production and Yield of Maize

Year	Area	% Change	Production	% Change	Yield	% Changes
	(000 hectares)	-	(000 tonnes)	-	(Kgs /Hec.)	-
2009-10	935	4.2	3,261	13.7	3,487	9.1
2010-11	974	11.6	3,707	17	3,806	4.9
2011-12	1,087	-2.5	4,338	-2.7	3,991	-0.3
2012-13	1,060	5.4	4,220	7.3	3,981	1.8
2013-14	1,117	-	4,527	-	4,053	-

Source: GOP (2013-14, P 29)

Table 2: Credit Disbursed by Institutions

Year	ZTBL	Commercial Banks	Domestic Private Banks	PPCBL	Total
2001-02	29,108	17,486	593	5,128	52,315
2002-03	29,270	22,739	1,421	5,485	58,915
2003-04	29,933	33,247	2,702	7,564	73,446
2004-05	37,409	51,310	12,407	7,607	108,733
2005-06	47,594	67,967	16,023	5,889	137,473
2006-07	56,473	80,393	23,976	7,988	168,830
2007-08	66,939	94,749	43,941	5,931	211,560
2008-09	75,139	110,666	41,626	5,579	233,010
2009-10	79,012	119,609	43,777	5,722	248,120
2010-11	65,361	140,312	50,187	7,162	263,022
2011-12	66,068	146,271	60,876	8,520	281,735
2012-13	67,068	172,833	69,271	8,304	317,476
2013-14	77,920	195,488	84,813	8,809	367,030

ZTBL: Zarai Taraqiati Bank Limited

PPCBL: Punjab Provincial Corporative Bank Limited

Commercial Banks: Include ABL, HBL, MCB, NBP & UBL

Note: Values are given in rupees million

Source: GOP (2013-14)

The main objective of this study is to investigate the impact of agricultural credit disbursed by commercial banks on raising the productivity of maize crop in Pakistan formulating the hypothesis as;

H<sub>0</sub>: Credit has no impact on the maize productivity

H1: Credit has significant positive impact on maize productivity

The rest of the paper is organized as follows. Section 2 presents a brief review of the relevant literature on the impact of credit on agricultural productivity. Section 3 presents data and methodology. Section 4 reports the empirical results and analysis. And finally, section 5 contains conclusion and recommendations

## LITERATURE REVIEW

Different studies have been conducted to know the impact of agricultural credit in Pakistan. According Anjum (1973) stated that the ZTBL of Pakistan did not meet the credit requirement of agriculture sector in Peshawar Tehsil. He found that 72% borrowers obtained credit as a package of mix inputs while the rest obtained only one item and 66 % obtained very small doses of loans of Rs. 500/- per head. The loans advanced for seasonal inputs were properly supervised. However the recovery position was satisfactory and only 4.4% went in default. He suggested an effective supervisory credit system in order to meet the requirements of agricultural sector.

Malik (1989) observed that the importance of institutional sources of credit had increased as compared to the non-institutional sources for farm sector. In spite the increased importance of institutional sources of credit, the small had smaller "access" to the institutional credit. He concluded that this problem was worsening with the passage of time. The commercial banks had improved a little more in the case of owner category. It was obvious that the small farms credit schemes had not worked in the past. The analysis showed that the small farmers were unable to get credit because of high interest rates

Himayatullah (1995) stated that in the periods from 1980 - 81 to 1994 - 95 institutional credit of the agricultural sector had registered an average annual growth rate of above 5 percent. This positive change in agriculture credit was accompanied by the establishment of new financial institutional and the adoption of credit policies to increase supply of credit for the sector in general and for small farmers in particular. He further stated that despite of all the efforts of the Government of Pakistan, the institutional credit was not reaching non-influential small farmers while resourceful farmers were getting more than their requirements.

Anthony (2010) tried to explore the impact of agriculture credit on economic growth of Nigeria. The researcher specified a functional and operational form, and established a causal relationship among gross domestic product (GDP) and agricultural variables. The results of their study show that agricultural variables have significant and positive impact on economic growth of Nigeria.

S.M. Zafar (2011) stated that small farmers are facing several problems in Pakistan and not easy for them to live and stay long with agriculture sector. However, they need agricultural credit for the purchase of agricultural inputs but only the large holders receive the major share of formal credit due to influence. Even though the small farmers have no access to get credit which having a negative effect on rural development and welfare. Due to high increasing agricultural inputs prices the farmers cannot purchase inputs such as high yield variety, sufficient fertilizer, pesticide and modern implements. Therefore, small farmers borrow credit from other different sources which cannot meet their requirements.

Hanif et al (2004) analyzed that the main purpose of providing agricultural credit to farmers is to increase in production and development in agriculture sector. Production loans were of small amount and mostly for short time. However, production loans were specified for such as seeds, pesticides and fertilizer, etc. Moreover, the development loans were of large amount and for long time. It was supplied for purchase of agriculture capital and equipment such as tractors, threshers, trolleys and installation of tube wells.

Ahmad (2007) reported that small farmers always facing the financial problems and they are not able to use improved seeds, sufficient fertilizers and modern farm implements. However, In Pakistan the lack of agricultural credit is one of the main reasons for low per acre productivity. On the other hand to increase agricultural productivity depends on the availability of credit and delivers agricultural credit facilities to the small farmers in their respective areas in time.

Iqbal et al (2003) found that the agricultural credit in Pakistan have positive impact on agricultural productivity and government practices the credit policy to protect the interest of farmers. They provide loans on flexible terms and conditions to small and medium farmers to facilitate them in case of crop failure or natural disaster. The main purpose of this study is to investigate the impact of agricultural credit on maize production: case study of commercial banks in Pakistan.

## MATERIALS AND METHODS

This study was designed for a period of 24 years accounting from 1991 to 2014. The secondary data was collected from the Economic Survey of Pakistan (Statistical Supplement 2014-2015). The method of Ordinary Least Square (OLS) was applied to investigate the impact of institutional credit on maize production in Pakistan. The model was estimated by choosing explanatory variables i.e. (maize cropped area, agricultural credit and labour force) and maize production as dependent variable.

### Data Source and Methodology

The data used for this study are basically secondary data covering 1991 to 2014 that is 24 years. The data were sourced from the Economic survey of Pakistan and commercial banks records. However, the dependent variables maize productions in tones per cultivated hectare whereas, agricultural credit, agricultural labor force and cropped area are independent variables. Agricultural credit is an important in agriculture production because availability of credit removes financial constraints relating to cash inputs and technical efficiency of farmers will increase. According Qureshi and Shah dropped the important variables such as water and land in their analysis in order to remove multicollinearity. Iqbal et al. included both variables in their analysis and to control multicollinearity problem transformed all variables to pre cultivated hectare. The study transformed all dependent and independent variables to per cultivated hectare and the estimated equation of Cobb-Douglas production is used as follows.

$$\ln MP = \beta_0 + \beta_1 \ln \text{marea} + \beta_2 \ln \text{agri credit} + \beta_3 \ln \text{labf} + \mu$$

Where

*Ln MP* = Natural logarithm of maize production in (000) tones per cultivated hectare

*Ln marea* = Natural logarithm of maize cropped area in (000) per cultivated hectare

*Ln agri credit* = Natural logarithm of agricultural credit per cultivated hectare

*Ln labf* = Natural logarithm of agricultural labour force per cultivated hectare

*U* = random error

## RESULTS AND DISCUSSION

Table 1 presents some descriptive statistics of the selected variables over the period 1991-2014. The summary common statistics contain the means, maximum and minimum, standard deviation (Std. Dev) of each series after transformation in logarithms form.

**Table. 3 Descriptive statistics for variables**

Variables	MProd	Marea	AgriCr	AgriLab
Mean	7.669282	6.870287	10.03465	2.926812
Maximum (Year)	8.505930	7.063048	12.18325	3.224460
Minimum (Year)	7.076650	6.739337	8.165650	2.639771
Std.Dev.	0.480510	0.081017	1.505398	0.191732
Observations	24	24	24	24

Source: Author's calculation using Eviews 9

**Results of regression analysis:** The high value of R-square (0.97) suggests that the fit is good and the proportion of the total change in the dependent variable that was explained by these three independent variables. In this study, we examined the impact of agricultural credit on maize production: a case study of commercial banks in Pakistan. Thus table 4 represents the results of regression analysis to determine the relationship between maize production (Y) and maize cropped area (X1), agricultural credit (X2), and (X3) agricultural labour force. The equation for this model was:

$$\ln MP = \beta_0 + \beta_1 \ln \text{marea} + \beta_2 \ln \text{agri credit} + \beta_3 \ln \text{labf} + \mu$$

$$\text{LnMP} = -5.760 + 1.446 + 0.178 + 0.580 + \mu \dots\dots\dots (2)$$

$$(-2.526) (3.914) (5.171) (2.137)$$

The results of the regression analysis are presented in table 1. Cobb Douglas production function was used to estimate the coefficients of the elasticities of maize production. The intercept of model is -5.760, which represents the natural log of the expected production of maize when there is no input. However, t-statistic of the coefficient of Cobb-Douglas production function indicates that two out of 3 coefficients are statistically significant at 1 percent probability level; the coefficient of agricultural labour force per cultivated hectare is significant at 5 percent probability level. The coefficient of agricultural credit and area of maize crop are statistically significant at 0.01 percent probability level. The coefficient value of agricultural credit indicates that a 1 percent increase in credit maize production will increase by 0.178 percent. The availability of agricultural credit will lead to increase production of maize crop. Moreover, the value of estimated coefficient of maize cropped area (000 hectare) is 1.446 percent and is significant at 0.01 percent probability level. Thus, the labour is the only parameter which is significant at 5 percent probability level. These results are in line with the earlier studies by feder et al (1991), Khander and Faruqee (1999), Nazli, (2000), Iqbal et al, (2003) who find positive impact of credit on agricultural productivity. Our findings show that the observed evidence strongly suggests that agricultural credit has significant and positive impact on maize production in Pakistan.

**Table 4: OLS Estimates for Parameters of the Cobb-Douglas Production Function**

Variables	Coefficient	T	Significance
C	-5.760464**	-2.526411	0.0201
Lnmaarea	1.446774***	3.914572	0.0009
Ln agricultural credit	0.178066***	5.171341	0.0000
Lnagrilab	0.580475**	2.137963	0.0451

Notes: R<sup>2</sup>=0.978; F=310.67

Note: \*\*\*, \*\* Indicates statistical significance at 1% and 5% levels, respectively.

Source: Author's calculation using Eviews 9

## CONCLUSION AND RECOMMENDATIONS

The study concludes that credit have a positive impact on maize production hence rejecting the null hypothesis i.e. credit have no impact on the maize productivity and alternatively we accepted the alternative hypothesis that credit have a significant and positive impact on maize production in Pakistan. However, Commercial Banks have been playing vital role in the provision of agriculture credit for the last two decades. In Pakistan maize production contributes 2.1 percent to the value added in agriculture and 0.4 percent to GDP. Maize was cultivated on an area of 1117 thousand hectares in 2013-14 showing an increase of 5.4 percent over last year's area of 1060 thousand hectares. Moreover, the production of maize crop stood at 4527 thousand tonnes during 2013-14 indicating increase of 7.3 % against last year production of 4220 thousand hectares. The cause of increase in production is ascribed to increase in crop area sown and use of hybrid seed varieties have taken at most share in plantation. A number of studies proved that credit have a positive impact on the agricultural productivity as mentioned above. Therefore, our findings recommended that Zarai Taraqiati Bank Limited (ZTBL), Commercial Banks, Domestic Private Banks (DPBs) and Punjab Provincial Cooperative Bank Limited (PPCBL) should supply agricultural credit on flexible terms and conditions which is the quickest way for boosting agricultural productivity. Financial institutions should provide up to-date information through electronic media and print media about agricultural credit in farming communities so they have an easy way to access to the best financial services.

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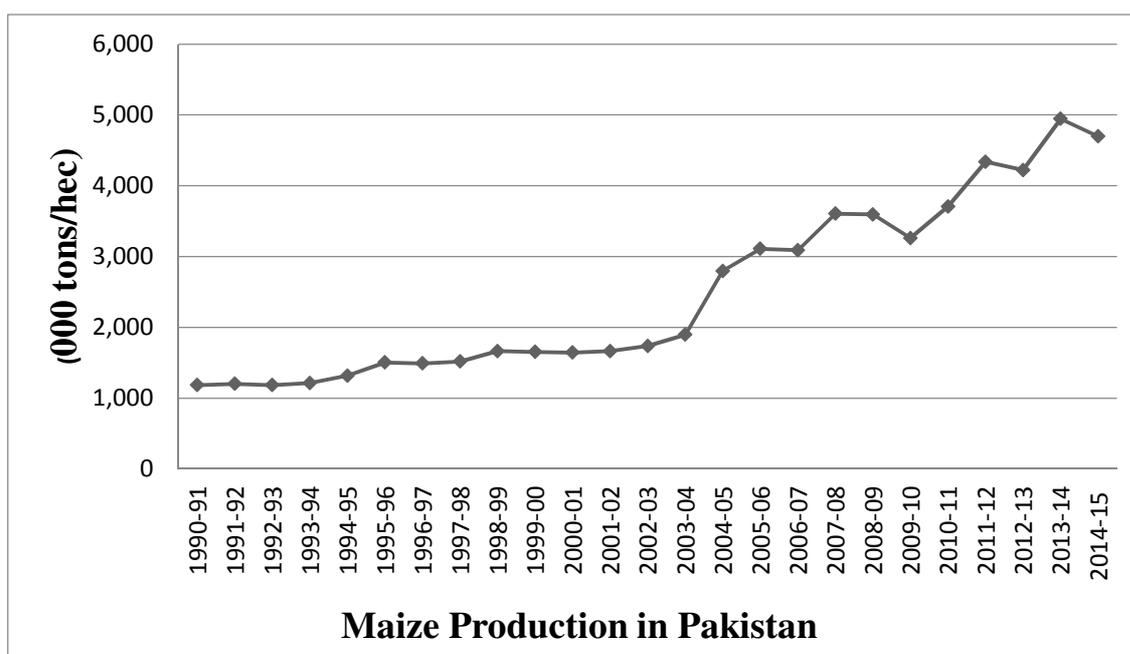
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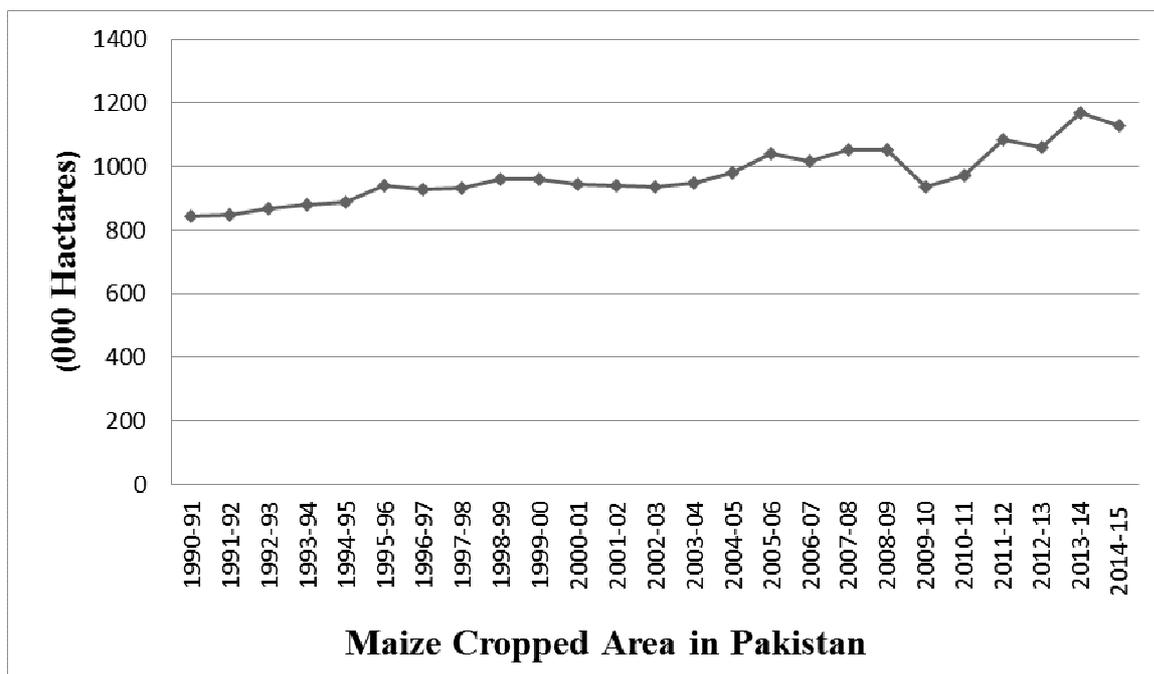
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Appendix:  
 Figure 1:



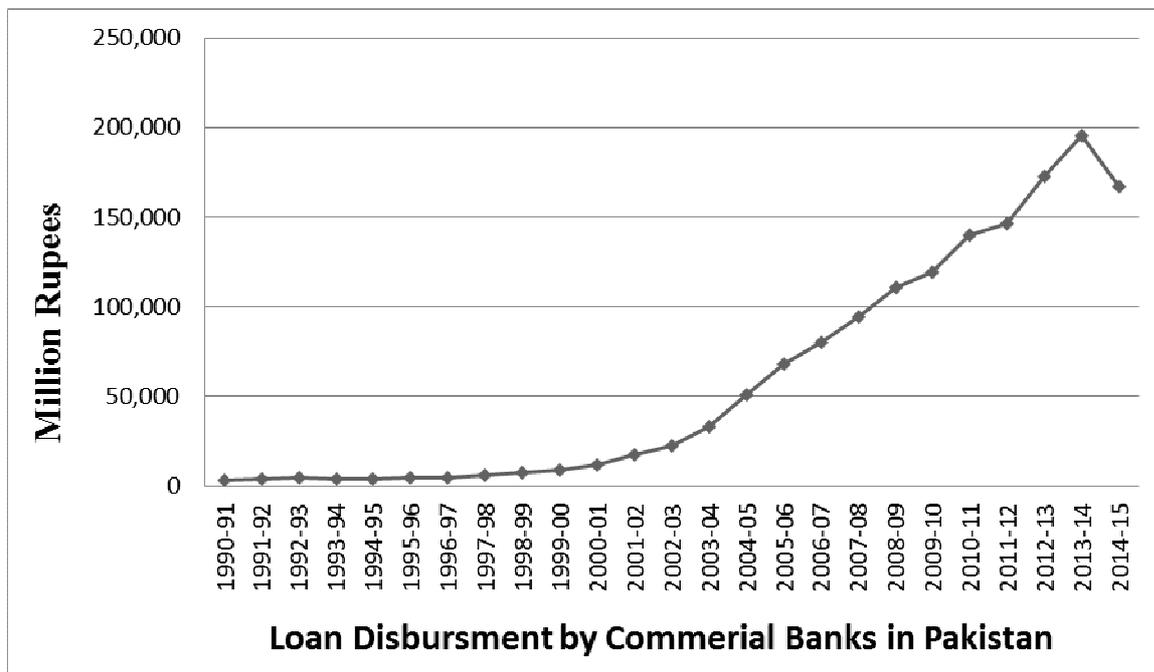
Source: Economic Survey of Pakistan (2014-15)

Figure 2:



Source: Economic Survey of Pakistan (2014-15)

Figure 3:



Source: Economic Survey of Pakistan (2014-15)