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Impact of Agricultural Credit and its Nature on Agricultural Productivity: A Study of Agriculture Sector of Pakistan

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Abstract: This paper is aimed to study the effect of institutional agricultural credit on agricultural productivity. We focused on data of agricultural credits issued by Zarai Taraqiati Bank Limited (ZTBL) and their effect of agricultural efficiency by utilizing logit relapse examination. Results obtained are based on information gathered through field overview of Islamabad. It is reasoned that rural credit, fleeting and long haul advances have positive effect on farming yield per section of land. The positive relationship between credit and agricultural efficiency highlighted that credit empowers the farmers to buy basic inputs required for farming e.g., quality seed, fertilizer, composts, herbicides, insecticides, fungicides and subsequent yield increase as a results of timely and sufficient application of inputs. The study proposes that suitable measures to expedite process of agricultural credit to the farmers can lead higher agricultural profitability. Gender based variations in agricultural credit and relevant influence on crop production can be future research direction.

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1. Introduction

United Nations (UN) have recently formulated Sustainable Development Goals (SDGs) by replacing Millennium Development Goals (MDGs) to provide sustainable directions for policies and agendas of its members from 2015 to 2030 (United Nations, 2015). Ending poverty (SDG1), zero hunger (SDG2) and ensuring sustainable consumption and productions patterns (SDG12) are included in the 17 SDGs are also fit in the dire need of sustainable crop production intensification (SCPI). SCPI focus on the protection of global natural resources without compromising global food needs and sustaining these resources for future generation.

Agribusiness is the backbone of national economy of many developing and underdeveloped countries, including Pakistan. Agriculture is the single largest division in Pakistan in terms of its share in gross domestic products (GDP), work force and meeting food requirements of its population (Maqsood and Khalil, 2013; Government of Pakistan, 2014; Hussain, 2014). Fast and efficient labors, and increased productivity of agricultural lands, especially famers with small landholding, are mandatory to achieve SCPI.

Various factors influence agricultural production and its efficiency. First is the weather (or climate) and agriculture is the most vulnerable to weather or climate conditions. Extreme climatic conditions e.g., drought, heatwave, uneven distribution, intensity and duration of rainfall etc, significantly influence farming activities. These conditions make agriculture highly vulnerable to weather and climatic conditions (O'Brien et al., 2004; Porter et al., 2005; Howeden et al., 2007; Gornal et al., 2010).

Although various strategies e.g., agronomic management, plant protection measures etc, can enhance crop yield and production, however this yield benefits cannot go beyond certain yield potential of soil, crop, cultivars etc. Yield gap usually present, which is different between maximum possible yield and yield under specific agroclimatic conditions (Evans and Fischer, 1999; Tollenaar and Lee, 2002; Sinclair et al., 2004; Licker et al., 2010;). Third crucial factor is attack of insect, pest and diseases often regulated by prevailing climatic conditions (Coakley et al., 1999; Rosenzweig et al., 2001). Intensity of certain pest alters with the

changing conditions and sometime minor pests turn into major pests. Ultimately influence crop production and economic condition of farmers. Strict management practices usually required to control insect pest and diseases significantly influencing cost benefit ratio (Savary et al., 2006; Popp et al., 2013; Oliveira et al., 2014; Oerke, 2006). Mechanization in agriculture is fourth important factor and essential input in farming. It contribute in to increase productivity of labor, expansion of cultivable area, higher land productivity, reducing cost and increasing profit, and reduction of farm budget and ultimately land productivity and income potential (Sims and Kienzle, 2016). Areas with limited availability of farm machinery including tractor, combined harvester, and tillage implements, have lower yield efficiencies mainly due to limitations on timely and rapid field operations. The utilization of mechanical products in farming segment is around 40 percent (Iqbal et al., 2015). Government subsidies and taxes are also important factor influencing crop production including choice of crop, management practices and application of inputs (Hill et al., 2006; Hartel et al., 2010).

Agricultural efficiency is measured as the proportion of farming yields to agricultural inputs (Fageria and Baligar, 2005; Górny and Garczyński, 2008; Fageria et al., 2013; van der Sleen et al., 2015) and can termed as total factor productivity (TFP) (Rada and Buccola, 2012; Van Beveren, 2012). Strategies influencing agricultural efficiencies appear to regulate conversion of inputs to productive yields. (Hashmi et al., 2015; Khaliq et al., 2016). Changes in TFP are generally ascribed to innovative upgrades. The agricultural efficiency of an area is an important indicator for various socioeconomic parameters including food security, economic activities, paying capacity, development of agricultural business etc. Improvement in agricultural profitability of an area infers higher and productive circulation of rare assets. Consequently farmers embrace new methods and advanced technologies for agricultural activities.

A spell of drought, heatwave or flood can cause serious damage to crop stand and shatter farmer's financial conditions (Mertz et al., 2009). Farmer will need financial assistance to grow crop in the next season (Fisher et al., 2015). If farmers of an area are more profitable, they will be flexible in choice of farm inputs and their expenses and ultimately will be more aggressive in business activities to adapt new technology. Adaption of new and innovative technologies e.g., synthetic manures, new varieties, tractors and high efficiency irrigation system in farm activities usually lead to higher farm profits (Baligar et al., 2001; Oerke and Deane, 2004; Rada and Buccola, 2012). Contrarily, insufficient agricultural profit will lead farmers to focus on alternative sectors e.g., private job, migration to cities.

Credit is one of the basic economic requirement of our lives and play important role in commercialization and modernization of business or agribusiness (Schumpeter, 1934; Nelson and Winter, 2009). Farming communities in developing nations like Pakistan don't have capacity to supplement enough quantity of cash to finance their agricultural requirements. Therefore they rely on loans or credits to meet their farming needs and inputs (Boston, 1997; Hussain and Tami, 2014), scheduling cultivation and sufficient arrangement for more effective execution of farming activities (FAO, 1998). There are essentially two types of credit for farming community i.e., non-institutional and institution based credits. Non-institutional credit or informal credit includes farmer investment funds, market incorporates companions, relatives, town retailers, brokers, commission operators and others (Swinnen and Gow, 1999; Petrick, 2005). These sources provide load for brief timeframe and charge a higher loan cost or can be controlled by common assertion.

Institutional credit or formal credits are those credits which are given through banks e.g., cooperatives, Zarai Taraqiati Bank Limited (ZTBL), business banks or Islamic banks (Khan et al., 2011; Khan et al., 2013; Noonari et al., 2016). Formal credit nearly satisfies 50 percent of the credit needs of the ranchers, while the remaining crevice is secured by casual sources (Singh, 2016). .

Farming is critical for financial development and improvement of Pakistan (Hussain, 2014). The credit necessity of agriculturists in Pakistan is expanded after Green Revolution, fundamentally because of innovative progression and the high utilization of fertilizers and pesticides. Because of State Bank of Pakistan (SBP) activity of presentation of yearly exceptional demonstrative focus for banks (Abdullah et al., 2015). Restrictions to credit access are considered as key barriers to adoption of innovations and intensive agriculture and ultimately reduce farm efficiency (Cassman, 1999).

The determinants of both informal and formal credit demand are different. Educational background and credit history, in particular, regional differences in the demand for credit are major credit rationales

(Barslund and Tarp, 2008; Zhao and J. Barry, 2014). Moreover, Kumar et al. (2013) empirically demonstrated that credit constraints have negative relationship with the health, food consumption, educational attainments and farm input applications, and. Reyes and Lensink (2011) using a panel multinomial logit model classified these determinants into four major categories of credit provision and rationing. They suggested that most market-oriented farmers are mostly unconstrained. Empirical evidence supports the significance of relationship variables for increased access to financial capital.

Agricultural credits are important determinant of farm efficiency. Simple accessibility and access to credit enhances capacity of the farmers and business people to improve their economic inputs. Positive relationship found between credit and agricultural profitability, as farmers use credit money to buy high yielding seeds, fertilizers, farm chemicals and equipments and improve farming efficiency and profit (Rahman et.al, 2014). Among the most critical issues in agricultural credit sector is uncertain productivity agricultural credit. Most of the farmers faced difficulties in getting institutional credit, as significant influence of political and social factors exist (Abdullah et al., 2015). Institutional credit is not offered by relative productivity of the agriculturist yet as per the financial and political force of the credit beneficiary. Formal organizations dependably request guarantee when they issue credit. In any case, most of the farmers are with small landholding and economically poor. This makes shabby credit availability troublesome for peripheral, sub-negligible and small farmers (Khandker and Faruqee, 2003; Cottarelli et al., 2005; Bashir and Azeem, 2008; Firth et al., 2009; Chandio et al., 2016).

There is a risk involved in loaning to small farmers due to vulnerabilities and likelihood of default (Riaz et al., 2012; Noonari et al., 2016). This response can be attributed to high financing cost, delayed advance payment, complex technique, and unlawful requests of authorities, no-participation of the income division and the high credit insurance (Abdullah et al., 2015; Shah et al., 2016). Increased accessibility of capital facilitates buying of good quality seeds, fertilizers and current advances which expand the homestead generation and at last the development rate. Thusly, agricultural credit is a key component for modern farming (Gujrati and Porter, 2003).

The essential targets of ZTBL offers credit to farming community and enhance the availability of agrarian cash on basic terms and conditions that met the credit necessities of poor farmers (Iqbal, et al., 2003). In any case, the execution of ZTBL is still inadmissible. Generally businessmen and farmers are reluctant to use credit to a formal establishment on account of high financing expense of associations, Bank's detachment from home, unnecessary deferment in apportioning of development, unlawful enthusiasm of powers and befuddled procedure. In Pakistan main factors influencing the formal credit structure are limited cooperation between salary division and bank security used for the development from the institutional sources. The farmers were standing up to various issues and obstacles in the technique for getting credit course of action. A standout amongst the most imperative issues is the little farmer's detachment of insurance. The occupants and sharecroppers face the security issues and couldn't advantage the credit (Akram et al., 2008; Akram, et al., 2012; Waqar; et al. 2008).

Economic power is access to assets, health, income, mobility to markets, food and decision making power of farmers. Whereas social power is access to financial resources, technical knowledge, information and skills, and participation in social organization programs. Microcredit program has positive and well as negative impacts, but it depends on the person who get it and approaches to utilize it. In some cases it has no significant impact. However, in few cases, microcredit did not change women inclination towards achievement of benefits, like better health, food, access to assets etc. Impact of credit on improvement of women's decision making power in financial matters is limited in the economic sphere. Negligible ratio of women actually participates in making decision about spending farm income. Their contribution is only possible in the absence of strong interference of male member (Khondkar, 2001).

The contribution of credit in agriculture segment has been remained huge. In present day agriculture, cultivating has turned out to be currently mind boggling and needs cautious willing to make progress. Today commercialized cultivation needs credit accessibility for smooth execution of farm activities. Rural credit achieves couple of country family units. Just 36 percent of every single rural family takes advances, of these an insignificant 15 percent getting is from institutional sources. As anyone might expect, there is a positive relationship in the middle of riches and credit source assessments. Richer family units in the provincial extents have better access to

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institutional sources which are less costly as contrasted and poor families. The essential goal of ZTBL offers credit to cultivating grows up to 60 percent inside 2013-2014.on the other hand offer of various establishments out and out recognize apportioning decreased when appeared differently in relation to ZTBL. The execution of business banks are that as it might, in giving credit has surpassed the offer of ZTBL up to 60 percent of the joined credit dispersed inside 2013-2014 (Ministry of Finance Division, 2013).

The extent of this exertion will be restricted to evaluating how agricultural yield is influenced by the formal credits issued by cooperatives, rural and business banks. The impacts of formal credit on the non-agricultural segment will not be focused (Burgess and Pande, 2003)**.** Neither does this business locale the ramifications of late intercessions in acknowledge arrangement, for example, obligation waiver; this is as of now concentrated somewhere else (Cole, 2009). Another vital range that is past transmitting of this research is the monetary ramifications of the arrangement of dispensing formal provincial credit. One could argue that to judge the actual effect of credit, one would need to represent the financial weight (or some idea of net advantage cost proportion) (Binswanger and Khandker, 1995). In this work, the topic of interest is to gage regardless of whether direct formal agricultural credit influences agricultural yield, the degree to which it does as such and the relative significance of the diverse pathways through which these impacts have occur.

This study was aimed to investigate the impact of credit on practical efficiency of agricultural production.

Conceptual Framework

Independent Variable –

H1: Agricultural credit has been significant on agricultural productivity.

Ho: Agricultural credit has negative impact on agricultural productivity.

H2: Short and long term loans has been significant on agricultural productivity.

Ho: Short and long term loans have negative impact on agricultural productivity.

On the base of previous literature hypothesis and model (Fig. 1) was constructed.

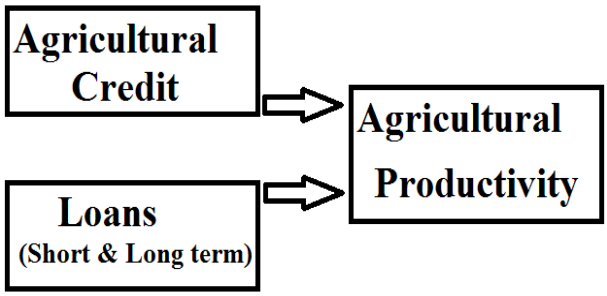

Fig. 1. Theoretical framework of agricultural productivity in relation to agricultural credit and loan.

Table 1. List of Variables for Log it Model Analysis

Variable	Description of variable
Independent variable	
CRDIT	Amount of Agricultural Credit borrowed by the farmer from the bank in a year
SHRTL& LOTL	Short term loan=1, If the farmer has borrowed for short term
	Short term loan=0, If the farmer has not borrowed for short term
	Long term loan=1, If the farmer has borrowed for a long term
	Long term loan= 0, If the farmer has not borrowed for a long term
Dependent variables	
PROD	Agricultural productivity after borrowing from the bank
	= 1, If there is increase in productivity as result of bank loan
	= 0, If productivity remains same after bank loan

SHRTL, short term loan; LOTL, long term loan; PROD, production

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Table 2. Estimates of the Logit Model Analysis

Variable	Coefficient	Std. Error	z-Statistic	Prob. (0.10)
C	-2.33	0.62	-3.39	0.06
CRDIT	2.15	2.09	2.56	0.10
SHRTL	0.60	0.40	1.84	0.15

Mean dependent variable	0.50	S.D. dependent variance	0.6
S.E. of regression	0.56	Akaike info criterion	2.35
Sum squared resident	50.55	Schwarz criterion	2.45
LR statistic (5 df)	20.23	McFadden R-squared	0.20
Probability(LR stat)	0.00		

Represents 10 percent level of significance.

S.D. Standard deviation; SHRTL, short term loan; LOTL, long term loan; PROD, production

2. Research Methodology

Main purpose of current research was to investigate the impact of agricultural credit, issued by Zarai Taraqiati Bank Ltd. (ZTBL), on agricultural productivity and its effect on agricultural efficiency farmers. This study was based on secondary data. We utilized annual credit information from 2008 to 2014.

2.1Sample and Sampling Technique

For this research study credit information was collected from Zarai Taraqiati Bank Ltd. from 2008-2014. A sample of 6 years annual reports were selected from ZTBL.

2.2 Description of variables

2.2.1 Productivity

Productivity is a measure of the ability of human, processing plant, machinery, framework, and so forth., with the changing inputs into economic yield, Productivity is calculated based on economic yield per unit time by the accumulated costs acquired or assets (capital, vitality, material, work force) used in that period. Profitability is a basic determinant of cost proficiency while, Agricultural efficiency is measured as the proportion of agricultural yields to rural inputs. While singular items are generally measured on weight basis. Agricultural yield is highly variable at spatiotemporal scales, therefore its measurement is troublesome**.**

2.2.2 Agricultural credit

Credit is the most imperative thing which is required to run every one of the exercises of life. Credit assumes a basic part during the time spent commercialization and modernization of farming division, and particularly of provincial economy. In basic word agricultural credit implies credit dispensed to farmers to meet their budgetary needs.

2.2.3 Short& Long term loan

Short-lived loan means an advance to be paid within1 year, or lesser time and long haul loan is that one, which can pay after1 year, or all the more, even it can be 20 years, considerably more. Agricultural credits can be categorized into short-term, middle term or long credits, contingent upon their development. Transient credits are regularly utilized for working costs. Credit development more often than not coordinates the length of the agriculture seasonal creation cycle (e.g., 3 to year and a half) while long haul advances are utilized to get, develop and create area and structures, and normally are amortized over periods longer than 10 years**.**

2.2.4 Model: Log it regression model is used in this project study. The list of the Independent and dependent variables for Logit model analysis are described in Table 1.

Variations in agricultural productivity (PROD) is termed as dependent variable and Agrarian yield or productivity is calculated as the proportion of agriculture inputs to farming yield, while singular items are normally measured by weight. Thusly, yield is typically measured as the business sector estimation of definite yield. The relapses are for the most part connected by utilizing a Log it Model, it display a sham or a straight out variable is utilized which speaks to whether there is ascend in agricultural productivity by spending the measure of credit on farming inputs.

This dichotomous variable is relapsed on an arrangement of chose informative variables. The experimental investigation of the effect of different logical variables including farming credit on rural efficiency is broke down by utilizing Logit Model. Similarly as avocation of Logit model is concerned as a part of experimental work because of its effortlessness and moderately compliment tails when

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contrasted with obit model. In a Logit Regression Model, the endogenous variable is a fake variable with 1 if there is ascend in profitability or 0 generally. According to theory and literature our hypothesis: Credit amount (CRDIT), long term loan (LOTL) and short term loan (SHRTL) should have significantly positive impact on agricultural productivity.

2.3 Statistical analysis

The information was subjected for statistical analysis by using softwares, SPSS V.21st and Eviews 9.

3. Results and Discussion

3.1 Data Analysis

The concentrate observationally assessed the effect of credit on employing so as to farm efficiency logit relapse model by considering the agricultural production (PROD) profitability as a needy variable with 1 showing increased efficiency because of credit accessibility or 0 indicating unchanged profitability. The assessments of Logit relapse model are as per the following. Coefficients of measure of credit (CRDIT) and fleeting advance (SHRTL) has critical positive effect on efficiency (Table 2). The level of the considerable number of variables is 10 percent. At the point when farmers obtain credit from bank they can buy quality seeds, fertilizer, pesticides and farm machinery. Subsequently agricultural profitability increase due to sufficient availability of inputs, timely application of fertilizers, plant protection measures and rapid execution of field operations. Due to availability of credit cash farmers mostly have additional capacity to buy farm inputs in advance for timely execution of farm activities without delay, which may occur due to shortage of cash.

Results demonstrated that the coefficients of credit and long haul advances have huge positive relationship with the rural efficiency (Table 3). There was a significant influence of credit all variable at 5 percent probability level. The more noteworthy the family unit measure, the more noteworthy the work power interest of family's individuals in farming exercises and therefore rural produce increase. As income of the family unit rises, the effectiveness of the farmer showed increments by having the capacity to buy inputs of better quality seeds, machinery, pesticides and fertilizers, thus profitability in upgraded. Long term loan (LOTL) have positive effect on efficiency in light of the fact that farmers get to be ready to buy apparatus, install tube well and have their personal tractors and by embracing farm mechanization and better procedures of creation farming profitability could be upgraded.

Similarly Bashir et al. (2010) studied impact of agricultural credit, provided by United Bank Limited (UBL) to farmers in Lahore District, on productivity of wheat crop. They also showed significantly positive role of agricultural credit on wheat crop production through facilitating farm activities.

Table 3: The Logit Model Estimates

Variable	Coefficient	Std. Error	z-Statistic	Prob. (0.05)
C	-2.02	0.72	-2.65	0.15
CRDIT	2.04	2.08	0.57	0.80
SHRTL	1.82	0.40	3.36	0.04

Mean dependent variable	0.50	S.D. dependent variance	0.60
S.E. of regression	0.50	Akaike info criterion	2.30
Sum squared resident	50.56	Schwarz criterion	2.40
LR statistic (5 df)	25.23	McFadden R-squared	0.19
Probability(LR stat)	0.00		

Represents 5 percent level of significance.

Previously Riaz et al. (2012) conducted a study to investigate nature and impact agricultural credit provided by ZTBL in Faisalabad region. They concluded that in the target area higher percentage of farmers (82%) obtained short term loan (i.e., up to one year) and used in the purchased of farm inputs and hiring of labor for crop plantation and harvesting. Moreover farmers also used agricultural credit for poultry and livestock to increase their farm income.

Our results also support findings of studies conducted in Bangladesh (Sharmeen and Chowdhury 2013), India (Misra et al., 2016), Nigeria (Amani, 2012; Osa-Afiana and Kelikume, 2016), and South Africa (Chisasa and Makina, 2015). They also concluded that farm productivity and profitability increased as result of provision of agricultural credit to the farmers.

5. Conclusion

Significantly positive impact of amount of short term and long term loans was observed on agricultural productivity in the studied region. The obtaining from bank is all that much supportive for both the small land holding farmers and also landlords by their financial empowerment. The farmers receiving agricultural loans (both short and long term loans) from Zarai Taraqiati Bank Limited had sufficient financial assets to use on smooth and timely field operations, purchase of farm equipments, high yielding seeds, fertilizers, pesticides, installation and repair of tube wells. Timely and rapid execution of farming activities lead to higher crop yield and net profitability of farmers. Similarly rural efficiency showed increments because of the expansion in cultivable lands of family units, the more prominent the family measure, the more prominent the work power investment of family's individuals in agricultural exercises and thus expanding impact on profitability. The informed famers are acquainted with rural issues and use the financial assets in better path when contrasted with the farmers without credits. The increase in agricultural efficiency resulted in higher income of the farm family units which consequently resulted in increased agricultural activities.

Policy Recommendations are as follows.

Timely release of credit to the farmers, generally delay in issuance of credit will be less effective as farm activities are time bounded and their delay cause yield reduction, which might not be recovered by subsequent execution of field operations. In order to get better yield and enhancing the welfare of farmers, polices of ZTBL ought to be adaptable and rate of interest should be less for farmers with small land holdings as compared to landlords. ZTBL ought to give the credit to farmer as per their need and the significance of harvests. Obtaining and recovery process for credit ought to be easy to offer advantages to greatest number of farmers. Smaller scale credit ought to come in bundle including farm inputs (seed, manure, pesticides etc). This would facilitate the borrowers and henceforth reimbursement condition will be progressed. Managing an account approaches for rural credit is still needs significant improvement.

Competing Interests: The authors declare that there is no potential conflict of interest.

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