

## **Impact of Agriculture Credit on Food Production and Food Security in Pakistan**

Nadia Asghar (Correspondence author)  
National Defense University, Islamabad, Pakistan  
Email: nadiaasghar21@yahoo.com

Aneel Salman  
Department of Management Sciences, COMSATS Islamabad, Pakistan  
Email: the.researchers@yahoo.com

### **Abstract**

The purpose of this study is to bring out the role of financial intermediation in food production and food security. Pakistan is among one of those countries which are food insecure. Agriculture credit can increase the food production which ensures the food security. The widely accepted definition of food security given by Food and Agriculture Organization (FAO) also emphasizes on the accessibility and availability of food for everyone and everywhere. Abundant production ensures the availability of food which further leads to low prices (economic access i.e. accessibility) because of excessive supply. This study is conducted to reveal the impact of credit on food production. Zarai Taraqiati Bank Limited (ZTBL) is the major public bank providing agricultural credit to fulfill the financial requirements of agricultural activities. Bank disbursed the major chunk of credit in district Bahawalnagar of Pakistan, therefore this district is selected as a sample. Survey technique is used and data is collected through structured questionnaire from borrowers and non-borrowers. Collected data is analyzed by using Independent t-test. Findings reveal that production of the borrowers increased after utilizing the credit because of the use of quality farming inputs. The paper concludes that if financial constraints are removed then production increases which further can reduce food insecurity by ensuring availability of food for everyone. Paper is also helpful for policy makers to formulate and improve food security policy by strengthening the credit markets.

**Keywords:** agricultural credit, food production, Zarai Taraqiati Bank Limited, food security.

### **1. Introduction**

Food is the fundamental right and basic human necessity as without food survival of human being is impossible. Hunger and poverty, both are the core issues around the globe since ages. To curb the panic issue of food insecurity, Food and Agriculture Organization (FAO) was established in the year 1945. FAO conducted its first survey in 1946. The objective of the survey was to have an estimate that whether enough food and energy/calories are available for everyone on earth? The result showed that almost one third of world population is suffering from food and energy shortage. After this survey, many European and North American countries adopted different policies to increase food

production in order to achieve the objective that everybody on earth should have enough food. These policies include provision of high yield seeds and credit to farmers, compensation for farmers in case of natural disasters and advanced technology etc.

Afterwards, the United Nations organized a world food conference in Rome in November 1974 with the core objective to ensure the measure that “within a decade nobody would suffer from food insecurity”. The conference approved number of recommendations dealing with and referred as ‘Food Security’. The conference also approved an international undertaking in which it was first time recognized that “Food Security is a common concern of all nations” (FAO, 1984).

Food security was also defined in the conference as “the availability of adequate food supply at all the times”. Main efforts to solve this crisis were the increase in production of food and ensuring the increased availability of food commodities. Later on, World Food Summit was organized in the year 1996, in which food security is defined as follows; “Food security exists when all people, at all times, have physical (Social) and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 1996).

Pakistan joined FAO on 7<sup>th</sup> Sep, 1947 soon after independence. FAO assisted to the government of Pakistan to strengthen the agriculture infrastructure by emphasizing on irrigation. FAO focused on poverty reduction, food security, sustainable livelihood and rural development in the decades to follow. FAO also supported to governments in capacity building of staff of agriculture sector, provides policy guidelines for agriculture and also help in strengthening the agricultural sector to eradicate hunger and poverty from Pakistan which was the second major goal of Millennium Development Goals (MDGs). But unfortunately, Pakistan could not achieve the target of this goal of halving hunger and poverty by 2015. Now Pakistan is a signatory of Sustainable Development Goals (SDGs) which bound countries to achieve “zero hunger” goal by 2030.

Pakistan is still far away to achieve the targeted goal of eradication of hunger and poverty. According to the official national report on Multidimensional Poverty Index (MPI) launched by Ministry of Planning Developing & Reforms in 2015; 39% people are living in multidimensional poverty in Pakistan, out of which 36% are living below the poverty line. Poverty and hunger are interlinked as poor people could not afford food because of surge prices. According to one of the report of United Nation Development Program (UNDP), 43% of the total population is food insecure out of which 18% people are facing alarming food dearth. Report further states that 6 out of 10 people in Pakistan are food insecure and this ratio is increasing day by day (UNDP, 2015). Another report of “World food Program” (WFP) published in 2015 states that 13% of children from age 6-59 months suffer from acute malnutrition and third of all Childs’ death is associated with malnutrition and micronutrient deficiencies. While 45% women and 67% children under the age of five are anemic (WFP, 2015).

Article 38(d) of the constitution of Pakistan ensures the provision of all basic necessities to all citizens including food. But according to Global Hunger Index (GHI), on a point from 0-100 (0 means hunger free) Pakistan is at point 32.6% which is rate at “serious” category and 22% of total population is suffering from hunger. Moreover, index placed Pakistan 107 in a ranking of 119 developing countries that are food insecure which is alarming.

Pakistan adopted the same definition of food security as given by FAO in 1996.

### *1.1 Explanation of Definition of Food Security*

The definition given by FAO covered four dimensions.

#### 1.1.1 Availability of Food

It refers to the physical and sufficient availability of food. This dimension of food security refers to the supply side of food i.e. production of sufficient food, availability of stocks and trade.

#### 1.1.2 Physical, Social and Economic Access

Physical aspect means logistic i.e. food should be available where households actually need that. Social aspect refers that there should be social access to food i.e. no socio-cultural barriers that prevent someone to have food. This aspect also refers to the gender dimension of food which means all gender should have equal access to food or food should be equally available for all the genders. Economic Access means that food should be available at affordable price for households. In general, it is concluded that “Physical, Social and Economic Access” refers to availability at households’ level without any socio-cultural barriers at affordable price.

#### 1.1.3 Utilization (Safe and Nutritionist; Meets Dietary Needs)

Utilization refers to the quality of food. It means that food should be available but having all nutrition and values which a normal human body requires. It also refers to the preparation of food, preservation and diversity of diet.

#### 1.1.4 Stability (All the Times)

Stability means that food should be available all the time. It means that should be available on permanent basis with stability. It should not have to occur for a moment, for a day, for a month, for a season or for a year. Stability leads to a permanent availability all the times.

### *1.2 Conceptual Framework of the Study*

The definition of food security shows that food security refers to the availability of food for all the peoples at all the times on permanent basis. From these entire factors, first and foremost factor is availability of food. If sufficient food would be available then the prices of food would be low and excessive supply would lead to excessive outreach everywhere.

So, availability of food is a necessary condition for food security and for availability of food, increase in food production is recommended (Maxwell & Slater, 2003). If ample food would be produced, it would be available in sufficient quantity, everywhere for everyone at low price as there is an inverse relationship between supply and prices. Moreover, use of quality inputs can make the food safe and healthy. So, it is concluded that low production is one of the major causes of food insecurity.



**Figure No. 1: Role of Production in Food Security**

Above figure shows that increase in production can fulfill all four components of definition of food security.

Pakistan also opt the same definition as given by FAO. The definition emphasizes on sufficient food production which is associated with robust agricultural sector. Credit is considered a key in the growth of agriculture sector. Therefore, it is significant to know that whether credit is enhancing food production or not? The objective of the study is to reveal the impact of credit on food production hence, food security.

### *1.3 Role of Credit in Food Production and Food Security*

Wheat, rice and sugarcane are the important food crops in Pakistan and wheat is the major food used by the large chunk of population out of these three. Due to lack of finance, farmers could not yield the possible production of wheat; hence face losses in form of income. Low production also increases the food insecurity in Pakistan (Khan et al., 2015).

Credit can play a significant role in increase in wheat production. Due to availability of credit, farmers will purchase quality inputs and cultivate the wheat at proper time. Thus, production will increase, which will further result in decrease in food insecurity. So, through availability of agricultural credit food security can be ensured.

### *1.4 Theory of Financial Intermediation*

There are many studies and theories which support the role of finance in any business. The theory of financial intermediation is one of those. It describes the relationship between finance and economic growth. The theory was first established by Gurley and Shaw in 1960. Later on, the importance of finance is widely acknowledged by (Bernanke, 1983) (Diamond, 1984). According to this theory finance plays a vital role in the growth of any economic activity. As financial constraint is a major hurdle for any income generating activity. Therefore, if financial constraints are removed then growth will start. The theory was established on the basis of asymmetry information theory and agency

theory. According to which, in past, borrowers and lenders did not have information about each other and there was no common agency that plays role in their mediation. The theory acknowledges the role of banks as “agency” which is providing the information to both lenders and borrowers about each other. So, credit disbursed by banks is playing significant role in economic growth. In previous literature, several researchers like King & Levine (1993), Obstfeld (1994), Bencivenga et al. (1995), Greenwood & Smith (1997), Levine (1997), Demirguc-Kunt & Levine (2008) used this theory to establish the relationship of finance and economic growth i.e. production. This study is also based on the same theory.

## **2. Literature Review**

Finance is the backbone of any business and economic activity. There is a positive connection between agricultural credit and agricultural production and banks are playing an important role in agricultural development. In developing countries, issue of food scarcity, poverty and hunger is expanding with the passage of time. Governments of developing countries are putting efforts to raise agricultural productivity by giving allowance to farmer (Mellor, 2001). Agricultural credit empowered agriculturists to actualize better farming practices, through applying more quality inputs. Agrarian credit has been given by government is considerably expanding every year and contributing in production enhancement positively (Sjah et al., 2003).

Furthermore, due to less supply and high inflation, access to safe and healthy food is becoming a major challenge for common peoples. Governments should plant biotechnology, bring innovations in agricultural practices by providing financial help and advanced technologies to poor farmers. All these will enhance the efficiency of agriculture sector and ensure the production of food in an effective way. Moreover, more production of food may increase the satisfaction of the society by making easy access to food, affordability of foodstuffs and variety of food (Laha, 2004).

In Pakistan most of the farmers possess number of little and minimal farms with low assets and money constraints. Profit in agriculture sector is decreasing and raising several social issues like poverty, poor health because of inadequate diet, low education rate and unemployment in rural regions. It is found that reason of declining profitability in agriculture sector is poor quality and low yield. Farmers did not use optimal inputs and hence could not get maximum possible yield. The reason of using poor quality inputs is traced back as lack of credit (Siddiqui et al., 2006).

Furthermore, most of the agriculturists are poor, living in rural area and credit is their desperate need to carry out agricultural activities. They are not in a position to buy quality inputs like seeds, fertilizers, cultivate apparatus and so forth, hence, yields remain low (Sheik & Abbas, 2007). Low yield is causing food insecurity which further causing anxiety in masses. Provision of credit is vital to achieve the end goal to eradicate hunger by enhancement of food production (Khan et al., 2007).

Agriculture is also providing raw material to industries. At the same time, this sector is also responsible to provide food to whole nation. Some food is taken from animals but animals further depend upon agriculture for their food. Rural credit helps farmers to enhance the quality of crop by removing finance related confinements (Bashir et al., 2007). Credit has an effect on the efficiency of crops and gives farmers’ an opportunity to earn more money and upgrade their living standard by increasing their production. Banks

are adequately serving the agrarian segment of Pakistan through their credit dispensing plans henceforth, enhancing the expectation for everyday comforts of individuals, living in rustic zones and diminishing the poverty eventually (Baig et al., 2008). It also has massive effect on rural money creation, living standards and change in personal satisfaction. Credit encourages the poor farmers to buy required inputs at proper time and further help in hiring labor, machinery and other requirements (Jehan & Muhammad, 2008). Credit is also necessary if government of developing countries wish to reduce the issue of food insecurity. Food security is linked with agriculture sector. Therefore, expansion in agriculture sector is inevitable to overcome the issue of food shortage (Vatta et al., 2008).

In spite of the rapid development in alternate segments, agriculture is as yet the single biggest sector contributing almost one fourth to Pakistan's (GDP) and engaging around 45% of its workforce (Mehmood et al., 2009). Unfortunately, in developing countries, this sector is on decline as the inflation and population both increased with the passage of time and farmers are unable to spare money for the quality inputs (Alston et al., 2009). Zarai Taraqiati Bank Limited (ZTBL) is providing agricultural credit to the needy farmers and results are found significant (Nawaz, 2011). Loan is provided for seed, fertilizer, and pesticides for plants protection and higher of labor and machinery (Ayaz et al., 2011). Quality inputs are the key to enhance production. Increased production not only increases the food availability but also reduces the poverty by raising the income of the farmers (Chowdhury & Chowdhury, 2011).

Eradication of hunger and poverty is a major challenge for government of Pakistan (Rahman et al., 2011). Government is formulating several strategies to cope up this issue. Problem of food security can be resolved by strengthening the agriculture sector (Iqbal et al., 2012). Prosperous agriculture sector can enhance the food production thus food availability (Riaz et al., 2012). Higher supply of food leads to low price which is only possible by efficient performance of agriculture sector (Khan et al., 2013). Pakistan can achieve the SDG of zero hunger by strengthening the credit markets (Islam et al., 2014). It plays a vital role in prosperity of agriculture sector which further bring prosperity in rural areas by increasing the income of the farmers (Ahmad et al., 2015). Increased income of farmers enhances the living standard of rural communities (Noonari, et al., 2015).

Credit encourage the farmers to grow more as they reap the benefits of high production in form of high margin of profit which becomes possible because of use of quality inputs (Naqvi et al., 2016). Results of credit can be expanded if condition of collateral may be removed as some farmers hesitate to obtain credit from institutions or banks because of collateral condition (Chandio et al., 2017). It will not only increase the food production but will also enhance the food security (Iftikhar & Mahmood, 2017).

Literature concludes that credit is one of the major hurdles faced by the poor farmers. Food production is low which is further causing food security in the country. The definition of food security emphasizes on the availability and affordability of the food which is possible if credit constraints are removed. Hence, it is concluded that ample quantity of food will be available, if production will increase. It will further lead to low prices and increase the purchasing power of the people. Thus issues of hunger and poverty both can be resolved.

### 3. Material and Methods

Credit is a basic need and requirement to run any income generating activity including agriculture. It plays a mediatory role and enhances the production of agriculture by making use of quality inputs. Enhanced production of food further enhanced the food security. Different researchers' used different variables and econometric models to find out the impact of agricultural credit on production. In this study production of the borrowers is compared with the production of non-borrowers in order to find out the impact of credit on production.

Punjab province is the large province producing more agricultural produce as compare to other provinces. While ZTBL is the major agricultural bank which provides credit to needy farmers to fulfill the financial requirements of agricultural activities. ZTBL disbursed the large amount of credit for wheat crop in the district Bahawalnagar-Punjab. Therefore the borrowers who obtained credit from ZTBL for wheat crop were selected as sample borrowers. All these had repaid all installments of loan one month prior to the survey. Similarly, the farmers who applied for loan but did not receive credit yet, were selected as non-borrowers. The total number of borrowers who obtained credit for wheat crop was found 930. The sample size was determined by using following statistical formula.

$$n = \frac{N}{1 + Ne^2}$$

(N= Total Population, n= sample, e= error margin which is taken 0.05 in this study)

$$930/1+930(0.05)^2$$

280 Approximate

District Bahawalnagar has five tehsils. Proportionate sample was taken in order to secure the participation of borrowers from each tehsil. Non-borrowers are selected with the same proportion from each tehsil.

**Table 1: Sample Selection**

Sr. No.	Name of Tehsil	Number of Borrowers	Percentage in Sample	Selected Number from Each Tehsil
1	Bahawalnagar	211	22.69	63
2	Fort Abbas	262	28.17	79
3	Minchinabad	175	18.82	53
4	Chistian	166	17.85	50
5	Haroonabad	116	12.47	35
	<b>Total</b>	<b>930</b>	<b>100</b>	<b>280</b>

#### 3.1 Data Collection Technique

Survey technique was used to collect the data. While face to face interviews were conducted through structured questionnaires.

#### 3.2 Data Analysis Method

Independent t-Test is used to determine the mean difference of two independent but identical groups. Test is first introduced by a chemist namely "William Sealy Gosset" in

1908. Gosset was hired by a company “Guinness Brewely” in Dublin Ireland due to Guinness innovative recruiting policy to hire best graduates from oxford and Cambridge to apply biochemistry and statistics to the industrial process of Guinness. “Gosset” devised the t-test to monitor the quality of students in economical way. He published his work in the journal “Biometrika” in 1908 but used his pen name “student’s t-test” as he was forbidden by his employer to publish the findings. Independent t-test is also called two sample t-test, student’s t-test and unpaired t-test and used by many researchers to find out the mean difference of two independent but identical groups. Assumptions of the test are as follows.

- **H<sub>0</sub>**: There is no difference between the production of the borrowers and non-borrowers.
- **H<sub>1</sub>**: There is significant difference between the production of borrowers and non-borrowers

α: 0.05

t-test formula for statistical test:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\left[ \frac{(N_1 - 1)s_1^2 + (N_2 - 1)s_2^2}{N_1 + N_2 - 2} \right] \left[ \frac{1}{N_1} + \frac{1}{N_2} \right]}}$$

Where;

(X<sub>1</sub> is the mean of control group (non-borrowers) while X<sub>2</sub> is the mean of experimental group (borrowers))

(N<sub>1</sub> is the total number of sample of control group and N<sub>2</sub> is total number of sample of experimental group)

(S<sub>1</sub> is the variance of control group and S<sub>2</sub> is the variance of experimental group)

Dummy Variables: 0 is used for non-borrowers and 1 is used for borrowers

Conclusion: Rejected H<sub>0</sub> if t-calculated falls in critical region

### 3.3 Operational Definitions of the Variables

#### 3.3.1 Production of the Borrowers (y)

ZTBL disbursed the credit for per acre land. Therefore per acre total production of wheat crop after utilizing the credit was asked and used in the analysis (In KGs’).

#### 3.3.2. Production of the Non-Borrowers (y)

There is one common eligibility criteria of ZTBL for all borrowers who wish to obtain loan for wheat crop from ZTBL. Therefore, farmers who were entering as a borrower in current year have the same characteristics as had the borrowers of previous year (selected above). Applicants of current year who did not receive the credit amount or utilize the credit yet are treated as non-borrower in this study. Per acre total production of wheat crop of non-borrowers was asked and used in the analysis (In KGs’).

#### 4. Result & Discussion

**Table 2: Independent Sample t-Test**

		Levene's Test for Equality of Variance		t-test for Equality of Means				95% Confidence Interval of the Difference	
		F	Sign.	T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
<b>Production</b>	<b>Equal variances assumed</b>	18.246	.000	-26.922	558	.000	-543.036	-582.656	-503.416
	<b>Equal variances not assumed</b>			-26.922	507	.000	-543.036	-582.664	-503.407

N= 280, Mean Value of Production of Borrowers (In KGs') = 2160  
 Mean Value of Production of Non-Borrowers (In KGs') = 1616.96

Above table shows that the value of F-statistics is found 18.246 with p value .000 which is significant at 5 % level of significance. Moreover, the value of t-statistics is found 26.922 having p value .000 which is also significant at 5% level of significance. So,  $H_0$  is rejected (which assumes that both means are equal) against  $H_1$  (which assumes that there is significant difference between both means) and found that both means (mean value of production of borrowers and mean value of production of non-borrowers) are not equal. Mean difference of borrowers and non-borrowers is found 543.036. Lower and Upper values of confidence interval does not contain zero therefore, null hypothesis i.e.  $H_0$  is rejected against  $H_1$  and concludes that the difference is significant. It depicts that production of the borrowers is greater than the production of non-borrowers. Mean of production of the borrowers is found 2160 KGs' while mean production of the non-borrowers is found 1616.96 KGs' which is significantly less than the mean of borrowers' production. Results revealed that the credit has positive and significant impact on food production and verifies the "Theory of Financial Intermediation" by depicting the role of credit in agricultural growth.

Pakistan is following the same definition as given by FAO in 1996. Definition emphasize on the physical and economic access of food which means food should be available at affordable price. Law of supply explains that there is an inverse relationship between price and supply i.e. price will come down if supply will increase. Therefore, it can be inferred that if abundant food will be available then everyone can have access to food at affordable price. Results are consistent with the findings of (Saleem & Jan, 2011) (Ammani A. , 2012), (Riaz et al., 2012) (Rahman et al., 2014), (Ahmad et al., 2015a), (Saqib et al., 2016), (Iftikhar & Mahmood, 2017), (Osabohien et al., 2018).

By summarizing the above, it is concluded that production of borrowers has increased after utilizing the credit. It implies that credit has significant and positive effect on production. Increased production of wheat means, increase in the production of food as wheat is used as primary food by most of the population of the country. Increased supply of food leads to lower prices and ensures the availability of food everywhere.

## 5. Conclusion & Recommendation

Food is the basic right of every human being but Pakistan is facing the issue of food insecurity since independence. Food is not only expensive but scarce. There are many causes of food insecurity but less production is one of the major causes. Due to less supply of food, prices of food are too high that poor people are unable to purchase adequate food. Pakistan also signed SDG of eradication of poverty and hunger which aims to eradicate food insecurity and malnutrition from country by the year 2030. Pakistan adopts the same definition of food security as given by FAO in 1996. According to that definition food security means availability and access to food for everyone, everywhere and all the times. The definition emphasizes on the availability of food which is associated with production of sufficient food. If the supply of food will be higher, price will be less; make possible for everyone to buy adequate food at reasonable price. It depicts that increase in production can reduce food insecurity positively.

Production is linked with agriculture sector. This sector is facing diverse issues hence, yielding less. Inadequate or unavailability of finance is one of the major issues, contributing in less production. This study is conducted to reveal the impact of credit on food production. ZTBL is the major public agricultural bank which is facilitating to the farmers by providing credit facility. Therefore, borrowers of ZTBL are selected as a sample. Production of the borrowers is compared with the production of non-borrowers. Results revealed that the production of the borrowers was increased because of use of high yield quality inputs. Borrowers purchased those inputs from the credit received from ZTBL. Results verify and prove the “Theory of Financial Intermediation” which explains that finance plays an intermediary role in any business or economic activity. It increases the production and profit of any business and economic activity. Therefore, it can be concluded that credit is playing a significant and positive role in enhancement of food production thus, food security.

ZTBL is providing agricultural credit against collateral and also charging interest rate. Interest rate decreases the profit of the borrowers (Saqib et al., 2016). Questions were asked about the procedure of obtaining loan, collateral conditions and interest rate. It was found that borrowers were highly dissatisfied from interest rate and collateral. It is recommended that interest rate may be waived off for agricultural credit and condition of collateral may be relaxed so that, poor farmers may get some relief. It will encourage the farmers to grow more food.

In Pakistan, most of the farmers are illiterate. They are not well aware to new and advanced technologies. It is recommended that government may provide advanced harvesting machinery to needy farmers on easy installments. Government should also conduct training and workshops to guide and train the farmers about the use of new technology. Moreover, farmers may be provided free of cost weather updates in their regional languages through text messages. ZTBL is providing credit against per acre land. Inflation is increasing with the passage of time and per acre credit amount became insufficient to purchase quality inputs. It is recommended that per acre credit amount may be increased and outreach of the bank branches may be expanded in rural areas so that maximum number of farmers may have access to credit facility. Government may also launch some food programs to feed children, women and poor communities. All these steps will not only eradicate poverty from country by increasing the income of the

farmers but will also make the Pakistan self-reliant and food secure. This study is conducted in one district of Punjab province in Pakistan, future studies can be conducted by selecting other districts/areas.

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