

Hafiz Fawad Ali\*  
Zahid Iqbal\*\*  
Labiba Sheikh\*\*\*  
Rizwan Qaiser Danish\*\*\*\*

**Analyzing the Moderating Role of Rural Population on the Relationship of Agricultural credit and Fruit Production: Evidence from Fruit Production Sector of Pakistan**

**ABSTRACT**

The staple aims of this study are to measure the impact of agriculture credit/finance (X) on total fruits production (Y) keeping in view the moderating role of the rural population (M) in the context of Pakistan. Time series data regarding observed variables of study from 2000 to 2017 was collected from the Economic-Survey of Pakistan 2017-18. Various descriptive statistics tools were applied to check the normalcy of data. Correlation analysis and Regression Analysis approaches imply observing the relationship and impact of an independent variable/Repressors (Agricultural Credit/Finance) on a dependent variable (Fruits-production) with a moderate role of moderating variable (Rural-population). The outfalls of the research signpost that agricultural credit/Finance (X) has a positive and significant impact on fruit production (Y) in the presence of a rural-population (M). The findings of the study are equally important for the farmer and financial institutions, who are associated with fruits production and agriculture credit/finance respectively.

**Key Words:** *Agriculture Credit, Fruits Production and Rural Population:*

**1. INTRODUCTION:**

The agricultural sector of Pakistan is the important component of the Pakistan economy as a share of the agriculture sector in GDP is 18.9% and 42.3% of employment of the total population is associated with the agriculture sector. The growth rate of the agriculture sector for the financial year is 2.07% and the target set for the financial year 2017-18 was 3.5% whereas the actual growth rate that is achieved in this sector in the financial year 2017-18 is 3.81%. During the financial year, 2017-18 share of fruit production in total value added to the agriculture sector is 3.33% that is 2.04% of Gross Domestic Product (GDP). The input against this remarkable growth is the compassionate Government dogmata, an endowment of proficient seeds, insecticides, and handiness of fertilizer, and all these elements are concomitant with the endowment of appropriate credit/finance facility. Due to the expansion of agricultural credit/finance Pakistan enjoying the highest growth rate in the agriculture sector for the last 13- years. As per the 6<sup>th</sup> population and Housing-Census of Pakistan 2017, the population of Pakistan mounting at the rate of 2.4% and due to this demand of agriculture products/output are swelling day by day and this increasing demand target can be achieved through the delivery of well-timed and cheap credit facility to the farmers. (Economic-Survey-of-Pakistan, 2017-18).

Considering the importance of agriculture credit/finance, the State-Bank-of-Pakistan (S.B.P) of Pakistan has set Rs. 1001/- billion rupee through 52-financial institutions including-19 commercial banks, 2-specialized financial institutions, 5-Islamic banks, 11-Microfinance banks, and 15-Microfinance Institutions / Rural Support Programmed (MFIs/RSPs). This target for agricultural credit/finance is 43% greater than last year's target and 42% greater than last year's disbursement amount. According to Iqbal et al. (2003), Pakistan is the 4<sup>th</sup> largest producer of fruits but due to lack of the latest technology, latest techniques of fruits processing, and shortage of funds Pakistan fails to export the major portion of fruits production. Agriculture credit is required by the small and large farmers for various agriculture activities before production and after production.

Khan et al. (2011) that agriculture credit not only ensure the availability of food for the people but also play its role in term of economic development, savings, generate employment and also ensure industrial development in the country by the provision of availability of raw material. Both types of loans including short terms and long term must be provided to the small farmers through the provision of proper operational assistance in terms of training and

---

\* Hafiz Fawad Ali Lecturer, University of Okara, Pakistan

\*\* Zahid Iqbal, Ph.D. (Scholar), Hailey College of Commerce, University of the Punjab, Lahore

\*\*\* Labiba Sheikh, Assistant Professor, Institute of Business Administration, University of the Punjab, Lahore

\*\*\*\* Rizwan Qaiser Danish, Associate Professor, Institute of Business Administration, University of the Punjab, Lahore

development. They further added that proper supervision of loan schemes must be made through qualified employees and the portfolio for agriculture credit must be increased from time to time by keeping in view the rural population and other macroeconomic factors inflation, interest rate, and unemployment. Bashir and Azeem (2008) That productivity and efficiency of small farmers in terms of agriculture production/output based on the timely provision of agriculture credit at a reasonable interest rate. They mentioned that small farmers have to face multiple problems for getting loans from informal and formal resources and these problems must be addressed to improve the productivity farmers. They suggested that loan repayment schedule of small farmers may be revised in case of any calamity or pandemic situation. They also mentioned that operational assistance may be provided to the farmers and activities of farmers may be supervised by the bank employees or through a group loaning model to ensure effective utilization of loan amounts. Besides all these loans must be sanctioned at the time of needs and interest-free lending may be introduced by keeping in view the Islamic Banking Principles.

Chandio et al. (2020) that agriculture credit has significant importance in developing countries especially in the context of agriculture production. Farmers of developing countries can enhance their production capacity by availing the financing facility and ensuring the availability of agriculture input and agricultural technology in their farms. They further added that socioeconomic characteristics of small farmers like formal education, the experience of farming, the size of farms, infrastructure, and contract extension play a significant role in getting access to the formal credit. Sher et al. (2021) Conducted a study to observe the impact of interest-free agricultural credit schemes on agricultural production. They found that this period of credit has a significant difference in the context of agricultural output. They mentioned agricultural credit showed a negative impact on agricultural production if farmers take the loan for six months and showed a positive impact on agricultural production if farmers take the loan for the next consecutive crop or a period of one year. Therefore, agricultural credit must be provided for the period of more than one year.

According to the State-Bank-of-Pakistan (SBP), agriculture finance is the provision of credit facilities provided for forestry, horticultural, fish farming, dairy farming, poultry farming, and exports of agriculture output including various important crops and fruits. There are two sources of the agriculture credit/finance facility including formal and informal. Informal sources including friends, relatives, and coworkers whereas formal sources including the formal banking sector of Pakistan. The efficiency of the farmer regarding agriculture output and exports of important crops depends upon rapid and timely credit facility. Another important reason for the inefficiency of a farmer regarding agriculture output and exports is the misuse of agriculture credit facility. The majority of farmers used the agriculture credit/finance facility for their immediate/basic needs including marriages of their daughters and sons, construction of a house, educational expenses of children, and medication of their family members (Hanif et al, 2004). The facility of agriculture credit/finance is more important for Pakistan because the 2/3 population of the country belong to rural areas. Therefore, the State-Bank of Pakistan (SBP) formulating various policies to ensure self-reliance in agriculture products; ensure food security, and enhancing exports of agriculture output.

### ***1.1. Objectives of the Study:***

The staple objectives for this study are given below.

- To observe the impact of agriculture credit on fruit production in the context of Pakistan.
- To observe the moderating impact of changes in rural population between the relationship of agricultural credit and fruit production in the context of Pakistan.

### ***1.2. Research Questions:***

Through the detailed study of literature following research questions have been derived.

- Does agriculture credit have any impact on fruit production in Pakistan?
- Does variance in rural populations moderate the relationship between agriculture credit and fruit production in Pakistan?

### ***1.3. Significance of the Study:***

This study specially designed to measure the impact of agriculture credit on fruit production with special reference to the moderate impact of the rural population between the relationship of agriculture credit and fruit production?

## **2. LITERATURE REVIEW:**

In most developing countries like Pakistan agriculture sector play important role in Gross Domestic Product (GDP). Pakistan (Maqsood and Khalil, 2013; Hussain, 2014). In underdeveloped and developing countries agricultural machinery and equipment usually finance through the provision of agriculture credit (Iqbal et al., 2015). Through the latest machinery and equipment agriculture production can be enhanced but the affordability of mentioned machinery and equipment is associated with the handiness of credit/finance facility to the farmers (Schurmpeter, 1993; Nelson and Winter, 2009). Due to the inaccessibility of well-timed and cheap credit/finance facilities, the majority of farmers in

Pakistan fail to avail of the maximum output in form of agriculture output (Boston, 1997; Hussain and Tami, 2014). Formal credit referred to the credit facility provided by the financial institutions whereas informal credit referred the loan provided by friends and family members (Khan et al., 2011; Noonari et al., 2016). Formal credit institution only fulfills the demand of 50% rural population and remaining credit needs of the rural population are fulfilled by the informal resources including close friends and relative (Singh, 2016).

In Pakistan majority of the rural population unable to avail of the credit facility due to the unavailability of collateral or securities (Akram et al., 2008; Akram et al., 2012; Waqar et al., 2008). The efficiency of the rural population concerning agriculture production is based on the availability of formal and informal credit facilities (Rehman et al., 2014). Due to nepotism and political interference majority of rural farmers fail to obtain the credit facility from agricultural financial institutions (Abdullah et al., 2015). Agriculture output or production suffer due to the political influence of politicians on financial institutions (Chandio et al., 2016). The latest agriculture machinery & equipment, quality seeds, fertilizers are the important factor used to enhance agricultural production and all these things can be ensured through the rapid and timely availability of agriculture credit (Gujrati and Porter, 2003). The availability of agriculture ensures the agriculture input that playing a vital role to enhance agriculture production in developing countries by enhancing the rural population (Bashir et al., 2010).

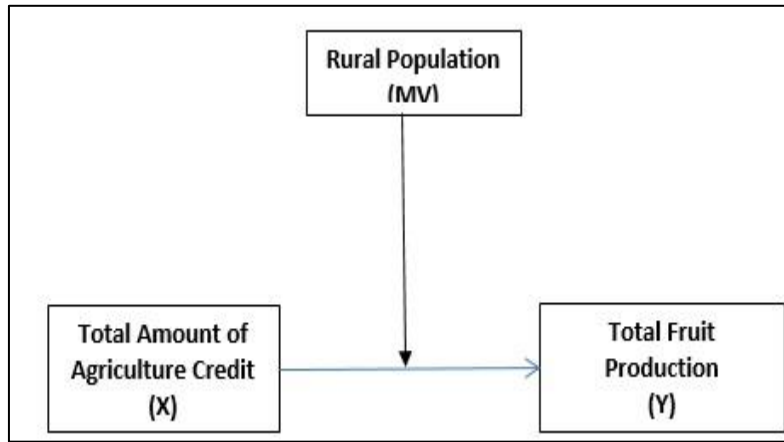
Zulfiqar et al. (2020) mentioned that access to agriculture credit is another important factor and the majority of farmers of rural areas unable to get access to the formal credit due to the lack of formal education, large distance from the place of farms to the place of bank premises, size of farms and off-farm income. This study also indicated that specialized banks and other commercial banks fail to develop the compatible product as per the demand and needs of small-scale farmers and due to these farmers have to use informal sources of financing at a higher rate of interest. Abdullah et al. (2015) that agricultural credit plays a significant role to uplift the living standard of the small farmer through the provision of economic development, provision of new technology, farm automation, enhancing agriculture production, and poverty alleviation as well. This study also indicated some obstacles for small farmers in terms of political interference, high-interest rate, provision of collateral for getting loans, and unavailability of insurance schemes in case of natural calamities or pandemic situations. The Government of Pakistan initiated various schemes for small farmers but fails to accommodate the farmers as per true letter and spirit. Khandker and Faruquee (2003) Both types of lending/credit including formal and informal equally important for small farmers but formal credit are more productive than informal loans. Therefore, the Government of Pakistan has launched various agriculture credit schemes especially for small farmers in rural areas because small farmer performance in terms of agriculture production is better than the large farmers.

In this study, it is observed that efficiency about the enhancement of fruit production is closely associated with the availability of credit facilities and a better policy of the government (Olagunju, 2007). The availability of timely agriculture machinery leads to more agriculture production and the latest machinery can be procured through the availability of agriculture credit (Saboor et al., 2009). In various studies like Malik et al. (1989), Zuberi (1989), Sarfraz and Akhtar (1992), Iqbal et al. (2003), and Afzal (2004) observed significant and positive relation between institutional agriculture credit and agriculture production. The formal institution has a positive impact on agriculture production including important major and minor crops, fruits, and livestock (Chachar, 2007). Rural population of an underdeveloped and developing country unable to increase their agriculture output due to the unavailability of collateral of securities demanded by the formal credit institutions. Agriculture credit not only enhancing agriculture production but also ensures food security and playing an important role to enhance employment opportunities in developing countries (Khan et al., 2011). Credit is more important for agricultural food items because the regular expenses in this industry are more as compare to the other agriculture sector (Vogt, 1978).

### **3. DATA & METHODOLOGY:**

As per previous studies and literature, a logical relationship between agriculture credit/finance, fruit production/output, and change in the rural-population was observed. In this study Agriculture, Credit/finance/ (X) was taken as Regressor, fruit production/output (Y) was used as a Predicted Variable, and change in the rural-population (M) was taken into consideration as moderating variable. Descriptive statistics techniques, correlation-analysis, and Regression techniques applied on times series data that are collected regarding the aforementioned variables from 2000 to 2017 (Chandio et al., 2020) and (Sher et al., 2021). The following research model was premeditated to observe the relationship and impact of Agriculture Credit/Finance (X) on Fruit Production/Output (Y) regarding moderating role of change in the rural-population (M).

**Figure 1: Conceptual Model**



**3.1. The hypothesis of the Study:**

The following hypothesis was developed based on the logical relationship that is found in literature and previous studies regarding the aforementioned variables.

**H<sub>1</sub>:** Agriculture credit/Finance (X) has an impact on the production of fruit/Output (Y) in the context of Pakistan.

**H<sub>2</sub>:** Impact of Agriculture Credit/Finance (X) on Fruit Production/Output (Y) moderate by the Rural-Population of Pakistan (MV).

**4. DATA ANALYSIS & DISCUSSIONS:**

**Table 1: Time Series Data Regarding Variables of Study:**

| Year    | (X) Agriculture Credit (Rs. In Millions) | (Y) Fruits Export (Rs. In Millions) | Rural Population (In Millions) | (MV) (Agriculture Credit*Rural Population) |
|---------|--|-------------------------------------|--------------------------------|--|
| 2000-01 | 44790                                    | 4575                                | 95.36                          | 4271174                                    |
| 2001-02 | 52314                                    | 5084                                | 97.76                          | 5114216                                    |
| 2002-03 | 58915                                    | 4815                                | 99.74                          | 5876182                                    |
| 2003-04 | 73446                                    | 5913                                | 101.34                         | 7443017                                    |
| 2004-05 | 108733                                   | 5408                                | 102.12                         | 11103813                                   |
| 2005-06 | 137474                                   | 7508                                | 103.66                         | 14250554                                   |
| 2006-07 | 168830                                   | 6894                                | 105.2                          | 17760916                                   |
| 2007-08 | 211561                                   | 9085                                | 106.73                         | 22579905                                   |
| 2008-09 | 233010                                   | 12519                               | 108.08                         | 25183720                                   |
| 2009-10 | 248120                                   | 20094                               | 109.41                         | 27146809                                   |
| 2010-11 | 263022                                   | 25017                               | 110.73                         | 29124426                                   |
| 2011-12 | 293850                                   | 32068                               | 112.02                         | 32917077                                   |
| 2012-13 | 336247                                   | 38085                               | 113.28                         | 38090060                                   |

|         |        |       |        |          |
|---------|--------|-------|--------|----------|
| 2013-14 | 391353 | 45196 | 115.52 | 45209098 |
| 2014-15 | 515875 | 44375 | 116.52 | 60109755 |
| 2015-16 | 598287 | 44607 | 117.48 | 70286756 |
| 2016-17 | 630781 | 59476 | 118.38 | 93715674 |

Figure 2: Total Agriculture Credit/Finance, Fruit Production/Output (Independent Variable Rs. In Millions) and scatter plots between variables

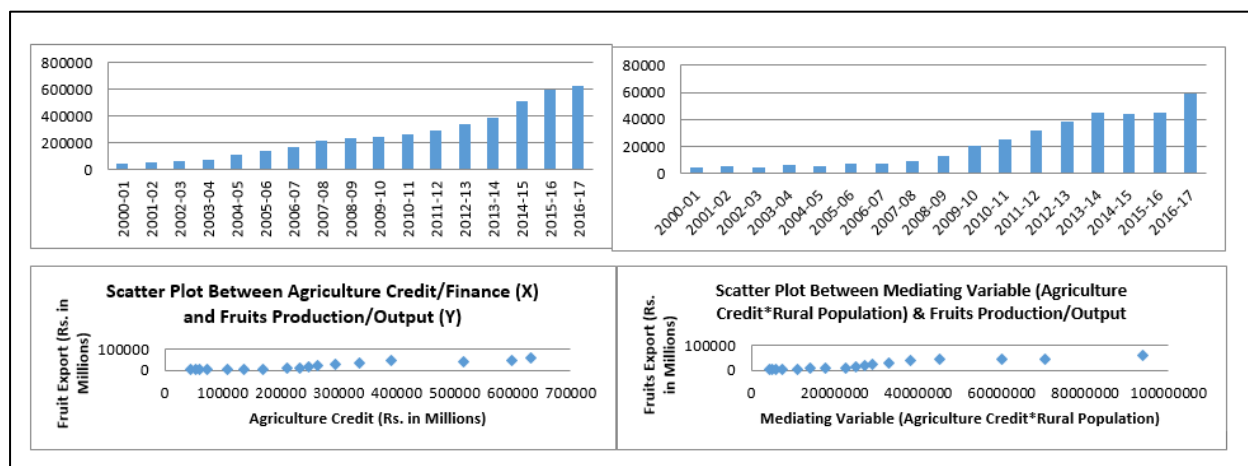


Table No. 2:- Descriptive-Statistics

| Descriptive Statistics | Agriculture-Credit (X) | Fruits-Production (Y) |
|------------------------|------------------------|-----------------------|
| Mean.                  | 5.274                  | 4.152                 |
| Median.                | 5.367                  | 4.097                 |
| Max.                   | 5.776                  | 4.655                 |
| Min.                   | 4.651                  | 3.660                 |
| Std. Dev.              | 0.357                  | 0.393                 |
| Observations.          | 17                     | 17                    |

The data indicated a positive and strong correlation between Agriculture Credit/finance (X) and Fruits Production/Output (Y) therefore both abovementioned variables suitable to apply the Regression analysis technique ( $r = .984, p < .001$ ). Whereas regression model shows excellent fit as  $F = 93.928, p < .001, R^2 = .862$  and adjusted  $R^2 = .853$  with beta value .99.

**The Predictable Regression Line**

$$\text{Fruits Production (Y)} = -1.23 + 1.021 (\text{Agriculture Credit/Finance}).$$

According to these results, value 85.3% enhancement in Fruit Production was observed due to the provision of agriculture credit/finance as the value of  $R^2$  is 0.853. Whereas the slope of a line can be asserted through  $\beta_2$  which is 1.021. It means if we increased agriculture credit/finance (X) Rs. 1 million resulting in 1.021 “000” increase in total fruit production/Output (Y).

#### **The Predictable Regression Line with rural population**

$$\text{Fruits Production (Y)} = -1.734 + 9.550 (\text{Agriculture Credit} * \text{Rural Population}).$$

As per the results 99.9% change in total fruit production/output (Y) was noted due to agriculture credit/finance (X) as the value of adjusted  $R^2$  is 0.999. The slope of the regression line was measured through  $\beta_2$  which is 9.550 it means 9.550 “000” of tons increased was observed in fruits production/output due to an increase of agriculture credit/finance Rs. 1 million.

#### **5. CONCLUSION:**

The outcomes of this research divulge that agricultural credit has a constructive impact on total fruits production with the moderate role of the rural-population (M). The findings of the study are consistent with the previous studies including Noonari et al. (2016), Chandio et al. (2020), Zulfiqar et al. (2020), Abdullah et al. (2015 and Sher et al. (2021). Our first hypothesis was Agriculture credit/Finance (X) has an impact on the production of fruit/Output (Y) in the context of Pakistan which was fully supported. Second hypothesis also gained full support as Impact of Agriculture Credit/Finance (X) on Fruit Production/Output (Y) moderate by the Rural-Population of Pakistan (MV).

## References

- Abdullah, D. Z., Khan, S. A., Jebran, K., Ali, A. J. J. o. A. E., & Sciences, B. (2015). Agricultural credit in Pakistan: Past trends and future prospects. *5(12)*, 178-188.
- Afzal M (2004). Impact of Institutional credit on Agricultural output, unpublished MPhil's thesis *G.C. University, Lahore, Pakistan*
- Akram, W., S. Munir, M.H. Hashmi and R. Saleem. (2012). Borrowing behavior towards institutional credit in Punjab-A case study of Faisalabad district. *Int. J. Acad. Res. Econ. Manag. Sci.* 1(5): 36-47.
- Akram, W., Z. Hussain, H.M. Sabir and I. Hussain (2008). Impact of Agricultural Credit on growth and poverty in Pakistan (Time series analysis through error correction model). *Eur. J. Sci. Res.* 232, 243251.
- Bashir, M. K., Mehmood, Y., & Hassan, S. (2010). Impact of agricultural credit on productivity of wheat crop: Evidence from Lahore, Punjab, Pakistan. *Pak. J. Agri. Sci.* 47(4), 405-409.
- Bashir, M. K., & Azeem, M. M. (2008). Agricultural credit in Pakistan: Constraints and options. *Pakistan Journal of Life and Social Sciences*, 6(1), 47-49.
- Boston, C. S. F. (1997). Credit Risk+: A credit risk management framework. *New York*.
- Chachar A (2007). Agricultural credit: the way forward. *Dawn group of newspapers*. www.dawn.com/2007/12/03/eb5.htm
- Chandio, A.A., J. Yuansheng, J.G.M. Sahito and S.A. Larik. (2016). Impact of formal credit on agricultural output: Evidence from Pakistan. *African J. Bus. Manag.* 10(8): 162-168.
- Chandio, A. A., Jiang, Y., Rehman, A., Twumasi, M. A., Pathan, A. G., & Mohsin, M. (2020). Determinants of demand for credit by smallholder farmers: a farm level analysis based on survey in Sindh, Pakistan. *Journal of Asian Business and Economic Studies*.
- Government of Pakistan. (2017-18). *Statistical supplement, Economic Survey*. Ministry of Finance Division,
- Gujrati, D.N. and D. Porter. (2003) *Basic Econometrics McGraw-HILL International Edition Economic Series United States Military Academy WestPoint*.
- Hanif M, S Khan and F Nauman, (2004). *Agricultural perspective and policy*. ISBN 969-8581-065 Ministry of Food, *Agriculture and Livestock (MINFAL)*, Islamabad.
- Hussain, A., M. Taqi. (2014). Impact of agricultural credit on agricultural productivity in Pakistan: An empirical analysis. *Int. J. Adv. Res. Manag. Soc. Sci.* 3(4): 125-139.
- Iqbal M., Ahmad M., & Abass K (2003). The Impact of Institutional Credit on Agricultural production in Pakistan. *Pak. Dev. Rev.* 42(4):469-485.
- Iqbal, A., Afzal, S., Akbar, N., Abbas, R. N., & Khan, H. Z. (2015). In Pakistan, agricultural mechanization status and future prospects. *American-Eurasian Journal of Agricultural & Environmental Sciences*, 15(1), 122-128.
- Iqbal, A., Afzal, S., Akbar, N., Abbas, R. N., & Khan, H. Z. (2015). In Pakistan, agricultural mechanization status and future prospects. *American-Eurasian Journal of Agricultural & Environmental Sciences*, 15(1), 122-128.
- Khan, M. N., Khan, M., Abassi, S. S., Anwar, S., Ali, M., & Naheed, S. (2013). The Effect of Zarai Taraqati Bank in Enhancing Farm Productivity through Agriculture Credit. *Research Journal of Agriculture and Forestry Sciences*, 1(8), 1-4.
- Khan, N., Shafi, M. M., Shah, M., Islam, Z., Arif, M., Javed, R., & Shah, N. (2011). Review of past literature on agriculture credit in rural area of Pakistan. *Sarhad Journal of Agriculture*, 27(1), 103-110.
- Khan, N., Shafi, M. M., Shah, M., Islam, Z., Arif, M., Javed, R., & Shah, N. (2011). Review of past literature on agriculture credit in rural area of Pakistan. *Sarhad Journal of Agriculture*, 27(1), 103-110.
- Khandker, S. R., & Faruquee, R. R. (2003). The impact of farm credit in Pakistan. *Agricultural Economics*, 28(3), 197-213.
- Malik, S. J. (1989). *Poverty and Rural Credit: The Case of Pakistan*. Pakistan Islamabad: *Institute of Development Economics*.
- Nelson, R.R. and S.G. Winter. (2009). An evolutionary theory of economic change. *Harvard University Press*.
- Noonari, S., Wagan, H., Memon, I. N., Burirro, R. A., & Bijarani, A. A. (2016) Impact of Zarai Taraqati Bank LTD (ZTBL) Credit on Agricultural Productivity in Sindh Pakistan. *Ind. Eng. Lett.* 6(1): 25-37.
- Olagunju, F. I. (2007). Impact of Credit Use on Resource Productivity of Sweet Potatoes Farmers in Osun-State, *Nigeria. J. Soc. Sci.*, 14(2): 175-178.
- Saboor Abdul, Maqsood Hussain and Madiha Munir (2009), —Impact of micro credit in alleviating poverty: An Insight from rural Rawalpindi, *Pakistan, Pak. j. life soc. sci.* (2009), 7(1): Pp90-97.
- Sarfraz AQ, Akhter HS (1992). A critical review of rural credit policy in Pakistan. *Pak. Dev. Rev.* 31(4):781-801.
- Schumpeter, J.A. (1993). The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle. *Transaction publishers*.
- Sher, A., Mazhar, S., Azadi, H., & Lin, G. (2021). Smallholder Commercialization and Urban-Rural Linkages: Effect of Interest-Free Agriculture Credit on Market Participation of Rice Growers in Pakistan. *Land*, 10(1), 7.
- Singh, I. (2016). Imperfect Information and Contract Enforcement in Informal Credit Market in Rural Punjab. *Economic Transformation of a Developing Economy*. Springer, p. 183-214.
- Vogt, D. (1978). Broadening to access credit. *Development Digest*, 6, 25-32. Yusuf, M. (1984). *Farm Credit Situation in Asia. Asian Productivity Organization*.
- Zulfiqar, F., Shang, J., Zada, M., Alam, Q., & Rauf, T. (2020). Identifying the determinants of access to agricultural credit in Southern Punjab of Pakistan. *GeoJournal*, 1-10.