Research Article

# Impact of Formal Credit on Agricultural Output: Empirical Evidence from Pakistan

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**Abstract** | The purpose of this study is to analyze the impact of formal Agricultural Credit on Agricultural Output (AGGDP). The relationship among agricultural output and agricultural formal credit, cropped area, labor force participating in the agriculture sector, trade openness has been quantified through various econometric approaches in the study. Autoregressive Distributed Lag (ARDL) Bound testing approach has been applied to analyze the long run cointegration among variables, obtaining annual time series data from 1973 to 2014. An empirical estimation of ARDL approach has indicated the evidence of long-run cointegration of model. Empirical findings of the study indicate positive (5.178151) and significant relationship between agriculture credit and agricultural output. Labor participating in agriculture has positive (14.98381) yet insignificant relation to agricultural output while trade openness has negative (-39.64926) and significant impact on agricultural output. Similarly, the relationship between cropped area and agriculture output is positive (114.1869) and significant. Vector Error Correction Model (VECM) has employed to explore short-run dynamics of agriculture production. Long run equilibrium stability has reaffirmed the short run empirical estimates. Lengthy formal credit procedure, political and bureaucratic influence and misallocation of credit utilization are major constraints in lowering overall agriculture output. Adequate farmer's friendly policies and proper legislative measures are necessary for the smooth flow of increasing agriculture output and overcoming financial constraints.

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## Introduction

World economies have confronted with numerous challenges in each sector of economy owing to ever varying global scenario. The era of mechanization in the global world has changed the picture of industrial and agricultural economies with gigantic productivity in the course of application innovative mechanization. Ever speedily increasing world population has inborn multiple challenges to all economies. Mechanization procedure to strengthening economic structure is feasible through provision of adequate financial resources in the economy. Developing countries have inadequate financial resources and increasing population with cumulative challenges of dietary requirements, essential living conveniences and squeezing available resources. Generally, developing countries have agrarian economic base regarding to productivity at the back of developed industrial and agricultural economies due to multiple structural, political and financial constraints. The acquaintance of technical and mechanization advances in industrial and agriculture sector of developing economies are crucial for capturing economic issues

of developing nations. The world developing economies like Pakistan have agriculture backbone confronting numerous questions as lower productivity in agriculture owing to conventional farming and inadequacy of technical advances. Financial constraints plays pin role in developing economies backwardness. Negative impact of financial constraints are dipping overall agricultural output which reduces farmer's income so elimination of such capital imperfections will slightly positive and significantly impact agricultural productivity (Ali, Deininger and Duponchel, 2014; Fletschner, Guirkinger and Boucher, 2009).

In Pakistan, agriculture sector plays dominant role in providing of food basket and employment to the population of the country. Agriculture sector contributes 20.9 percent of GDP and 43.5 percent employing labor force source of the country. In the current year, this sector has indicated positive recital accounting with 2.9% in contrast to 2.7% of preceding year. All subsectors have played significant role in the growth of agriculture (GOP, 2016).

Inadequate mechanization and interrelated market imperfections of agriculture are responsible for prevailing status of agriculture sector in Pakistan. Labor-intensive techniques, conventional methods of farming and various structural crises are playing dominant role in lowering over all yield and productivity of agriculture sector. Improved seeds, fertilizer, pesticides, tube well, tractors, hired labor and sowing crop timely are major determinants of potential output. Timely availability of above-mentioned inputs can play a major role in agriculture output. Proper policy measures are prerequisite for adequacy provision of financial resources. Credit borrower's have higher yield of various crops comparative to non-credit borrowers as reported in the studies of (Khan, 1981; Gul and Khan, 1993; Amir, 1999; Rehman, 2003). Rural credit and capital investment of institutional financing positively affects agricultural output as critically investigated in the studies of Qureshi and Shah (1992) and Iqbal and Munir (2003).

In agriculture sector formal and informal are two major credit sources of farmers. Relatives, friends and commission agents are informal sources of credit to farmers. Zari Taraqiti Bank Limited (ZTBL), five Commercial Banks, Seven Microfinance Banks (Khushali Bank, First Micro Finance Bank, NRSP Microfinance Bank, Pakoman Bank and Tameer Bank) four Islamic Banks, fifteen Domestic Private Banks and Punjab Provincial Cooperative Banks (PPCB) are formal agencies which disperse credit for agricultural inputs to farmers (GOP, 2014).

Generally formal institutions disburse agriculture credit in three categories short-term, medium-term and long-term. Cropping activities of purchasing seed, fertilizer, pesticides, land preparation, irrigation, and other cropping activities short-term credit is specified. Medium term credit is disbursed to implementations of farm related installation. Purchasing of machinery, tractors, installations of tubewell and construction of farm warehouses long-term loan are disbursed. Table 1

**Table 1:** *Agriculture credit disbursement through formal institutions (Rs / Millions).*

| Formal Credit Institutions | 2012-2013 | 2013-2014 | Change in credit | Percent change |
|---|---|---|---|---|
| Commercial Banks(5) | 172832.55 | 195487.81 | 22655.26 | 13.11% |
| Domestic Private Banks(15) | 69271.49 | 84813.02 | 15541.53 | 22.43% |
| ZTBL* | 67068.3 | 77919.53 | 10851.23 | 16.18% |
| MFBs(7)** | 18769.69 | 22796.48 | 4026.79 | 21.45% |
| PPCBL*** | 8304.44 | 8808.96 | 504.52 | 6.07% |
| Islamic Banks(4) | --------- | 1527.18 | -------- | ------- |
| Total | 336246.52 | 391352.98 | 55106.46 | 16.39% |

**Zari Taraqiti Bank Limited; **Micro Finance Banks; ***Punjab Provincial Cooperative Banks Limited Number of Banks Operating (5, 15, 7, 4).*

Formal credit institutions Commercial Banks, Domestic Private Banks, ZTBL, Micro Finance Banks, Punjab Provincial Cooperative Banks and Islamic banks have disbursed agriculture credit during 2012-2013 to 2013-2014 as represented in Table 1. Commercial banks have disbursement major share of total agriculture credit i-e, Rs. 195487 million in 2013-2014 and increased in percentage 13.11 during 2012-2013 to 2013-2014. Domestic private banks have disbursed Rs. 84813.02 million agriculture credits in 2013-2014 with an increase of 22.43 percent during 2012-2013 to 2013-2014. ZTBL has disbursed Rs. 77919.53 million agriculture credit in 2013-2014 an increasing 16.18 percent during 2012-2013 to 2013-2014.Total agriculture credit disbursed by all formal institutions was Rs. 391352.98 million during 2013-2014 with an increase of 16.39 percent 2012-2013 to 2013-2014.

Multiple aspects of formal credit regarding to agriculture output has focused in literature. Empirical work of Qureshi and shah (1992), Qureshi (1995), Malik et al. (1999), Ali and Malik (2015) and Azam and Azid (2015) have critically evaluated formal agriculture credit and its impact on poverty and agricultural growth. Role of cooperative formal credit programs in rural areas and its effect on agriculture output have focused in the studies of Sarwar and Khan (1986), Malik and Hina (1991), Abedullah et al. (2009) and Ahmad et al. (2011). The studies of Sidhu and Vatta (2008) and Waqar et al. (2008) have analyzed the negative impact of financial credit constrains and dynamics on agriculture output. Multiple impact of saving, public investment and financial constraints on agriculture output was investigated in the studies of Mohsin et al. (2011), Iqbal et al. (2012) and Nadeem et al. (2013). Raza and Siddiqui (2014) and Hussain et al. (2015) have indicated the significant impact of formal credit on agricultural growth of Pakistan. Formal credit significantly plays vital role in agriculture output and ultimately overall economic development while expanding financial mechanism in rural areas will have significant and positive impact on agricultural output as analyzed in the study of Chandio et al. (2017).

Significance of study regarding to credit disbursement in agriculture sector have been visualized through aforementioned facts of literature. Credit constrains are major determinants of agricultural backwardness in developing countries like Pakistan. Expanding credit mechanism in rural areas with proper policy measures of easy credit access of farmers will significantly affect agriculture output. The major focus of the study is to examine the significance of formal agricultural credit in determining agriculture output in Pakistan.

## Materials and Methods

The study has employed secondary time series data from 1973 to 2014. Statistical supplements of economic survey of Pakistan and various publications of State Bank of Pakistan (SBP) are major sources of data. Formal credit in agriculture sector has includes all types of agricultural credit disbursed from various formal institutions Commercial Banks, Domestic Private Banks, Zari Taraqiti Bank, Micro Finance Banks, Provincial banks and Islamic banks. In this study, agricultural output as dependent variable while agriculture credit, cropped area, agricultural labor and Trade openness indicated as independent variables. Following are dependent and independent variables of study.

$$Y_t = \beta_0 + \beta_1 AC_t + \beta_2 CA_t + \beta_3 LAB_t + \beta_4 TRD_t + \varepsilon_t$$

t = 1973, 1974……...2014.

$Y_t$= Agriculture output measure through Agriculture GDP at time 't' in Pakistani billion rupees.
$AC_t$= Agriculture Credit at time "t" in Pakistani million rupees.
$CA_t$= Cropped Area at time "t" in million hectares.
$LAB_t$= Agriculture Labor Force at time "t" in millions.
$TRD_t$= Trade Openness at time "t" measured by the ratio of agriculture exports to agriculture

Formal agriculture credit is considered major source to meet financial deficiencies of inputs improved seeds, fertilizer, pesticides, irrigation and improved mechanization. Cropped area has weighted up to play prominent role in overall agricultural output. Agriculture in developing countries a labor-intensive measure as agricultural labor force incorporated as prominent variable in the model. Globalization has major role in agriculture so trade openness includes in the model to find out the affect of trade openness on agriculture sector. In literature, only the study of Anwer (2010) incorporated trade openness as independent variable to find out the affect on agriculture sector. Agriculture credit incorporated as the independent variable in model based on the arguments of Carter (1989), Iqbal et al. (2003) and Afzal et al. (2005).

The stationarity of data is prerequisite for empirical estimation procedure of time series data while spurious results are expected when non-stationary time series data used in regression (Ganger and Newbold, 1974). In case of non-stationarity of time series data, long run cointegrating relationship among variables ensures validity and robustness of estimates while non-existence of cointegration leads to spurious estimates (Philips, 1986). The stationarity of data may be checked through graphical approach like correlogram and quantitative approaches like Phillips-Perron unit root test (PP), Augmented-Dickey Fuller unit root test (ADF) and Zivot-Andrews breakpoint test of unit root. Some natural shocks and various policy measures are major determinants of breaks in time series data. Identification of breakpoint is valuable for checking time series properties of data. Christiano (1992) argued, existance of breakpoint is most

common in time series data, which leads to imprecise results. Consequently, method used in this study (Zivot-Andrews breakpoint test of unit root) assumes breakpoints are unknown and it endogenizes the location of breakpoint.

Unit root testing proceeds ADF and PP tests, which are not considered suitable in presence of structural break. Zivot and Andrews (1992) sequential breakpoint selection test has null hypothesis to facilitate series integrated without an exogenous structural break against alternative that series can contain a trend-stationary process with a breakpoint occurring at some time. Three different characterization of trend break alternative considered. (A): The Crash model that allows a break in intercept. (B): The changing growth model that allows for a break in slope with two segments joined at breakpoint. (C): Mixed model.

According to these three assumptions, Zivot and Andrews's test estimates are testing equation by allowing the break to take place from first observation and serially in second, third, and so on, up to point T-1, where T stands for total number of observations used in the study. These specifications are estimated by least square method with 'k' lag length. The optimal numbers of lags are considered for each possible breakpoint (Zivot and Andrews, 1992). The assessment of breakpoint at considered observation made based on minimum t-value corresponding to its lagged value for one period. These minimum t-values compared with critical Zivot and Andrews's values at each level of significance in order to test unit root hypotheses. ZIVOT-ANDREWS unit root test has been applied in accordance with nature of time series data used in the study.

The long-run relationship among variables is measured through cointegration test. Engle and Granger have firstly introduced cointegration approach to check long run relation among variables. Stock and Watson (1988), (Johansen 1988, 1991, 1992 and 1995) Johnson and Juselius (1990), Pesaran and Shin (1999) and Pesaran et al. (2001) further modified this approach. According to application of cointegration approach Johnson and Juselius (1990) approach and Pesaran et al. (2001) approach are intensively prominent. Pesaran and Shin (1999) and Pesaran et al. (2001) approaches adopted in this study as bound testing approach for cointegration within an Auto-Regressive Distributed Lag(ARDL) framework.

In contrast to traditional approaches of cointegration ARDL bound testing approach checks presence of long-run relationships irrespective of order of integration (zero I (0)), order one (I (1) or mixed order). This test, based on Unrestricted Vector Error Correction Model (UECM) framework, has robust statistical properties and it does not limit short-run mechanisms and long run estimates to just stationarity of error term (Pattichis, 1999). Mah (2000) has recommended ARDL bounds testing approach for checking the cointegration among the variables when there is small sample.

*Estimation and findings*

The study has focused to investigate the role of formal credit in determining agricultural output. Agricultural output as dependent variable and cropped area, size of labour force working in agriculture sector, degree of trade openness and formal credit are as independent variables in the study. Dickey-Fuller (DF) or Augmented Dickey-Fuller (ADF) unit root tests and Phillips-Perron unit root tests are usually applied to measure stationary of variables. Break Point (ZIVOT-ANDREWS) unit root test has applied for stationarity of data due to structural break in data of the study. The study has employed maximum lag selection and Schwarz Information Criterion (SIC) for stationary procedure of data. Empirical findings of Break Point (ZIVOT-ANDREWS) unit root test have defined in Table 2.

Results relevant to agriculture gross domestic product, cropped area, agricultural labor and trade openness are stationary with intercept and trend at level except agriculture credit in Table 2. Break Point (ZIVOT-ANDREWS) unit root estimation has mentioned stationarity of variables at first difference. The null hypothesis of all variables except agriculture credit can rejected at level while the null hypothesis of agriculture credit variable can rejected at first difference. Mix order of integration prevails among variables some are integrated at zero I (0) order while other integrated at order one I (1).

Keeping in view the sample size and lag requirements of ARDL cointegration test, maximum four lags are allowed for selecting optimum lag length in ARDL parsimonious lag selection process. Schwarz Bayesian Information Criterion (SBIC) is followed for optimum lag selection. Table 3

**Table 2:** *Breakpoint (ZIVOT-ANDREWS) unit root test.*

| | At Level | | | |
|---|---|---|---|---|
| **Variables** | **Intercept** | | **Trend and Intercept** | |
| | Min t stat | Year of Break | Min t stat | Year of Break |
| AGGDP | -3.910955 (5) | 1998 | -4.969773(0)* | 1998 |
| CREDIT | 0.526861(7) | 2000 | -0.120787(6) | 2001 |
| CROP AREA | -3.677363(0) | 1998 | -5.553468(9)** | 1997 |
| LAB | -0.733917(4)* | 2006 | -5.112339(2)* | 2004 |
| TRD | -3.799700(0) | 2000 | -6.602375(7)*** | 1999 |
| | At1st Difference | | | |
| D(AGGDP) | -8.278917 (0)*** | 2005 | -7.874441(0)*** | 2005 |
| D(CRED) | -4.075344(1) | 2004 | -7.872767(4)*** | 1998 |
| D(CROPAR-EA) | -9.708258(0)*** | 2011 | -9.993533(0)*** | 2010 |
| D(LAB) | -6.628248(0)*** | 2004 | -6.458662(0)*** | 2002 |
| D(TRD) | -8.064895(0)*** | 2000 | -8.000800(0)*** | 2000 |

**significant at 10%; ** significant at 5%; *** significant at 1% level of significance; Lag values in reported in parentheses; we may reject the null hypothesis of unit root selected on the basis of SBIC Criteria.*

**Table 3:** *Model selection criteria (Lag selection).*

| Specification | AIC | SBIC* | HQ | Adj. R-sq |
|---|---|---|---|---|
| ARDL(1, 1, 1, 0, 1) | 26.764297 | 27.152147* | 26.902291 | 0.970333 |
| ARDL(4, 1, 1, 0, 1) | 26.766243 | 27.283375 | 26.950235 | 0.971688 |
| ARDL(1, 2, 1, 0, 1) | 26.771020 | 27.201964 | 26.924347 | 0.970652 |
| ARDL(4, 2, 1, 0, 1) | 26.776824 | 27.337051 | 26.976149 | 0.971768 |
| ARDL(1, 2, 1, 0, 4) | 26.779353 | 27.339580 | 26.978678 | 0.971696 |
| ARDL(1, 1, 1, 0, 4) | 26.794135 | 27.311267 | 26.978127 | 0.970887 |
| ARDL(1, 1, 1, 0, 2) | 26.796793 | 27.227737 | 26.950120 | 0.969886 |

**Note:** ** indicate the criteria used for lag selection and minimum value of the selected criteria for ARDL lag length given in column 1.*

Schwarz Bayesian Information Criterion (SBIC) for lag selection of ARDL approach has been followed in Table 3. Table 3 has elaborated the model selection Akaike Information Criteria (AIC), Schwarz Bayesian Information Criterion (SBIC), HQ and Adjusted R square. The ARDL (1, 1, 1, 0, 1) model is selected through Schwarz Bayesian Information Criteria (with minimum value of SBIC) and this selected model is used for estimation in Table 4.

**Table 4:** *ARDL estimation dependent variable AGGDP selected model: ARDL (1, 1, 1, 0, 1).*

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| AGGDP(-1) | 0.739684 | 0.104299 | 7.091973 | 0.0000 |
| CRED | 11.51126 | 3.142207 | 3.663433 | 0.0009 |
| CRED(-1) | -11.48547 | 3.282927 | -3.498547 | 0.0014 |
| CROPAREA | -24.45544 | 41.90127 | -0.583644 | 0.5636 |
| CROPAREA(-1) | 91.60586 | 43.18455 | 2.121265 | 0.0417 |
| LAB | -6.378270 | 32.52104 | -0.196127 | 0.8458 |
| TRD | -7.041944 | 10.55536 | -0.667144 | 0.5095 |
| TRD(-1) | -18.54049 | 10.42096 | -1.779154 | 0.0847 |
| C | -351.8043 | 376.5753 | -0.934220 | 0.3572 |
| R-squared | 0.977241 | Mean dependent var | | 676.9636 |
| Adjusted R-squared | 0.971551 | S.D. dependent var | | 813.4581 |
| S.E. of regression | 137.2046 | Akaike info criterion | | 12.87201 |
| Sum squared resid | 602402.9 | Schwarz criterion | | 13.24816 |
| Log likelihood | -254.8762 | Hannan-Quinn criter. | | 13.00898 |
| F-statistic | 171.7532 | Durbin-Watson stat | | 2.142203 |
| Prob(F-statistic) | 0.000000 | | | |

***Note:** p-values and any subsequent tests do not account for model selection.*

Autoregressive Lag Distributed (ARDL) cointegration model lags of dependent variable agriculture GDP (Agriculture output) at lag(1) and independent variables Agriculture Credit at lag(1), Cropped Area at lag(1), Labor(Agriculture labor) at lag(0), Trade variable at lag(1) have properly mentioned in Table 4.

Empirical estimates of ARLD cointegration test are presented in Table 5. Null hypothesis considers the absence of cointegration in the variables of model. Wald test has employed for hypothesis estimation of the study. Wald space-based F-statistic value is 3.599143 which is greater than the upper bound value 3.52 at 10 percent level of significance.

**Table 5:** *ARDL Bound testing approach cointegration (1, 1, 1, 0, 1).*

| **Null Hypothesis: No long-run relationships exists** | | |
|---|---|---|
| **Wald space based F-statistic = 3.599143** | | |
| **Level of Significance** | **Lower Bound Value** | **Upper Bound Value** |
| 10 percent | 2.45 | 3.52 |
| 5 percent | 2.86 | 4.01 |
| 1 percent | 3.74 | 5.06 |

Empirical findings have rejected the null hypothesis

of no cointegration among variables and accepting alternative hypothesis of presence cointegration among variables of the model. Bound testing approach estimates has proved long run relation among Agriculture Gross Domestic Product (Agriculture output), credit, cropped area, labor and trade. Long run elasticities of Agriculture Gross Domestic Product (Agriculture output) with its components have accounted below in Table 6.

**Table 6:** *Long run relationship.*

| Dependent variable: AGGDP | | | |
|---|---|---|---|
| Variable | Coefficient | t-Statistic | Prob. |
| C | -1054.746 | -1.626569 | 0.1123 |
| CRED | 5.178151 | 2.803946 | 0.0080 |
| CROPAREA | 114.1869 | 2.122834 | 0.0405 |
| LAB | 14.98381 | 0.273512 | 0.7860 |
| TRD | -39.64926 | -2.500247 | 0.0170 |

Autoregressive Lag Distributed cointegration approach long run coefficient estimates of study model have presented in Table 6. Findings of the study indicates agriculture credit, cropped area and agriculture labor positively and significantly affects agriculture GDP (Agriculture output) while variable of trade negatively affects agriculture GDP. Agriculture credit has significantly played vital role in agriculture gross domestic product (agriculture output). Agricultural inputs seed, fertilizer, pesticides, mechanization of tractor, tube well and other farm related activities availability are only possible with adequate provision of formal credit. Formal credit has significant and positive impacts on agriculture GDP (Agriculture output). Empirical findings have indicated one million increases in formal credit will increase 5.178151 billion in agriculture GDP and results are similar with the studies of Iqbal (2003), Afzal (2005), Sial (2011), Omojimite (2012) and Hussain (2015).

Agricultural Cropped area has prominent effect on agriculture output. Empirical estimates of study have indicated as cropped area positively while insignificantly effect on agricultural output. According to findings of the study, one million hectare increase in cropped area will increase 114.1869 billion in agriculture output results are inconsistent with the studies of Ahmad (2011), Sial (2011) and Hussain (2015). Agricultural labor has positively while insignificantly affects agricultural output. Results of study have represented as one million increase in agriculture labor force increases 14.98381 billion in agriculture output. These findings are similar to studies of Raze (2014) and Hussain (2015). Findings of study have mentioned trade negatively affects agricultural output as one million increases in trade negatively affect the -39.64926 billion in agriculture output. These results are similar with the studies of Bashir (2003) and Hussain et al. (2006) which have mentioned their concerns related to trade openness in agriculture sector. Table 7

**Table 7:** *Short run estimates (Vector Error Correction Mechanism).*

| Dependent Variable: DAGGDP | | | |
|---|---|---|---|
| Variables | Coefficient | t-Statistics | Prob |
| D(CRED) | 4.320862 | 2.204618 | 0.0341 |
| D(CROPAREA) | -15.42459 | -0.394632 | 0.6955 |
| D(LAB) | 7.010573 | 0.271823 | 0.7874 |
| D(TRD) | 6.162596 | 0.667930 | 0.5086 |
| ECM(-1) | -0.209641 | -1.927228 | 0.0621 |
| C | 13.90770 | 0.500522 | 0.6198 |

There is a presence of long run cointegration in the model as stated with F-Statistics value as mentioned in the Table 6. Short run analysis of study has estimated using the Vector Error Correction Mechanism as mentioned in Table 7. Vector Error Correction Mechanism coefficient measures speed of adjustment of model restored long run equilibrium after disequilibria occurs due to shocks. Estimated value of Coefficient of ECT-1 (-0.209641) with negative sign indicate movement back to equilibrium within a year. Diagnostic tests of the study, which has applied to check the validity of assumption of Serial Correlation LM test, Heteroskedasticity test ARCH, Heteroskedasticity White test and Model Specification test as elaborated in Table 8.

**Table 8:** *Diagnostic tests.*

| | F-statistic | Probability |
|---|---|---|
| Serial Correlation LM Test: Breusch-Godfrey | 0.369109 | 0.5479 |
| Heteroskedasticity Test: ARCH | 0.501377 | 0.4832 |
| Heteroskedasticity Test: White | 1.661765 | 0.1466 |
| Model Specification Test: Ramsey RESET | 1.651817 | 0.2082 |

Estimations of model specification test through Ramsey Reset have mentioned the model well specified. Results of Heteroskedasticity test has indicated residual obtained from short run model normally dis-

tributed absence of Heteroskedasticity. Serial correlation and autoregressive conditional Heteroskedasticity have found no problem.

## Conclusions and Recommendations

The study has focused to find out the role of institutional credit on agricultural output. Agricultural output as dependent variable while cropped area, size of labor force working in agriculture sector, degree of trade openness and agricultural formal credit have incorporated as independent variables in the study. Zivot-Andrew unit root test has employed for the stationarity of data. The study has used Autoregressive Distributed Lag approach for long run empirical estimation. Findings of long run coefficients have indicated formal credit and cropped area positively and significantly, affects agriculture output while labor force participating in agriculture positive while insignificant effects on agriculture output. Results revealed the role of trade openness has negative and statistical significant in determining agriculture output. Vector Error Correction Mechanism (VECM) has employed for empirical estimation of short run dynamics for the long run equilibrium among variables. Empirical findings have indicated the stability of long run equilibrium.

Adequate provision of agriculture Credit is prerequisite for facilitating smooth flow of agricultural inputs improved mechanization (tube well, tractor, land-leveling machine etc.), optimal use of improved seeds, fertilizer, pesticides and other farm inputs. Complicated and lengthy credit attaining procedure, misappropriate utilization of agriculture credit, bureaucratic and political influence are major financial constraints of credit which have negative impact on overall agriculture output. An easy access of credit procedure with proper and timely availability, proper utilization of credit need to monitor through proper managing should ensure. Barren land and uncultivated areas should bring under cultivation through the provision of financial resources and innovative technology to farmers for long term at low interest based credit schemes. Political influence and lengthy bureaucratic procedures consider constrain in the disbursement of financial agriculture credit prominently small and middle class farmers. Competent authorities must need to ensure removing complexities of credit procedure, fast processing and equity based credit disbursement.

## Author's Contribution

The concept and design of research were developed by Dilshad Ahmad with the help and guidance of Muhammad Irfan Chani and Muhammad Afzal. Dilshad Ahmad conducted the trails collected and analyzed the primary and secondary data and prepared the first draft of manuscript. The draft manuscript was studied and amended according by all the authors before submission for publications. All authors read and approved the final manuscript.

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