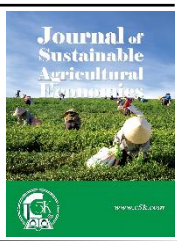
Journal of Sustainable Agricultural Economics
"Volume 1, Issue 2, Year 2025"
website: https://www.c5k.com



Research Article

The Role Of Microfinance In Promoting Sustainable Agriculture

AFM Rafid Hassan Akand[1], Arif Ahmed Sizan[1*], Towsif Alam[2], Md Mohaimin Rashid[3] and Hafsa Kamal[1]

[1]Department of Business Administration, Westcliff University, 17877 Von Karman Ave, 4th floor, Irvine, CA 92614, USA;

[2]Department of Marketing Analytics and Insights, Wright State University, 3640 Colonel Glenn Hwy, Dayton, OH 45435, USA;

[3]Department of Business Administration, International American University, 3440 Wilshire Blvd, STE 1000, Los Angeles, CA 90010, USA;

**Corresponding Author: arif.ahmed1199@gmail.com*

ARTICLE INFO

Article history:
07 Oct 2025 (Received)
18 Oct 2025 (Accepted)
25 Oct 2025 (Published Online)

Keywords:
Manuscript
Page number
Front size
Format
Journal

ABSTRACT

Sustainable Agriculture faces growing global challenges, including food security and environmental sustainability, necessitating technological innovation to optimize production and a formal economic structure to strengthen and empower the workforce and small farmers to meet the challenges of the ever-growing world agriculture. This study investigates the potential of Microfinance to help small-scale farmers meet their economic challenges to fulfill their smart agriculture endeavours, like buying technologies, financial literacy to overcome barriers like cost, awareness, and digital literacy, and optimum agricultural yield. Using the Local Microfinance Institutions (MFI) small loans for buying equipment, pesticides, crop seeds, and learning modern methods of agriculture with the collaboration of MFIs. This integration not only promotes sustainable agricultural practices but also demonstrates measurable benefits, fostering trust and adoption among smallholder farmers. The study underscores the transformative role of MFIs in advancing global agriculture, advocating for inclusive financial strategies to overcome socio-economic disparities and ensure food security. Future research should explore the role and potential of MFIs to grow and lift up the small farm holders, to stand up to fulfil their agricultural and economic needs, to eradicate food and economic insecurity in the world.

DOI: https://doi.org/10.63471/jsae_25002

1. Introduction

Microfinance, defined as the provision of small loans and other financial services to economically disadvantaged individuals like poor farmers, little businessman, and service sectors, is a revolutionary tool in global development. Initially focused on providing small business loans (microcredit) to those excluded from traditional banking, microfinance has evolved to include savings mobilization, insurance, and money transfers. Its transformative potential lies in empowering marginalized populations, particularly smallholder farmers, to overcome barriers to financial access and adopt sustainable agricultural practices. Microfinance plays a significant role in promoting sustainable agriculture by equipping small-scale farmers with essential financial tools to adopt eco-friendly and resource-efficient farming methods. These tools enable farmers to enhance productivity, adapt to climate change, and contribute to rural economic development while preserving the environment (Carter et al., 2007). In Bangladesh (South Asia), the modern microfinance movement was in the 1970s as a response to the prevailing poverty conditions among its vast rural population. Astonishing growth rates in Bangladesh, particularly during the 1990s, created a new dimension for microfinance worldwide as microfinance institutions grew to include millions of clients. The start of the Twenty-first century reinforced this trend as the Bangladesh numbers continued to grow impressively; in India, a substantial microfinance system based on Self-Help Groups (SHGs) developed. Other countries of the region made slower and later starts, but have since established active microfinance sectors (Morduch, 1999).

2. Related Work

The intersection of microfinance and sustainable agriculture has been a subject of considerable academic interest, with numerous studies exploring the potential of microfinance institutions (MFIs) to empower smallholder farmers and promote environmentally friendly farming practices. This section reviews key literature and findings from previous research, highlighting the role of microfinance in addressing

*Corresponding author: Email (Name of Author)

Cite: Main Author, Co-Authors (2025). Manuscript title. *Journal of Sustainable Agricultural Economics,* 1(2), pp. 1-XY.

the challenges faced by small-scale farmers in developing countries (Yunus, 2003).

2.1 Microfinance and Agricultural Productivity:

Several studies have demonstrated the positive impact of microfinance on agricultural productivity. For instance, a study by Zeller et al. (1997) found that access to microcredit significantly improved agricultural output among smallholder farmers in Bangladesh. The study highlighted that microfinance enabled farmers to invest in better seeds, fertilizers, and irrigation systems, leading to higher yields. Similarly, a study by Khandker (2005) in India revealed that microfinance participation increased household income and agricultural productivity, particularly among women farmers (McKernan, 2002).

2.2 Financial Inclusion and Sustainable Practices:

The role of microfinance in promoting sustainable agricultural practices has also been widely studied. A report by the International Fund for Agricultural Development (IFAD, 2010) emphasized that microfinance institutions could play a crucial role in promoting eco-friendly farming techniques, such as organic farming, crop diversification, and soil conservation. The report noted that financial inclusion through microfinance allowed farmers to adopt these practices by providing them with the necessary capital and resources.

2.3 Risk Mitigation and Insurance:

Another critical area of research has been the role of microfinance in mitigating risks associated with agriculture. Studies by Dercon et al. (2014) and Giné et al. (2008) have shown that microinsurance products offered by MFIs can protect farmers against natural disasters, crop failures, and other unforeseen events. These insurance products not only provide a safety net for farmers but also encourage them to invest in sustainable practices, knowing that their investments are protected.

2.4 Gender Empowerment and Microfinance:

The role of microfinance in empowering women in agriculture has been a significant focus of research. A study by Mayoux (2001) highlighted that microfinance programs targeting women farmers led to increased income, improved household welfare, and greater participation in decision-making processes. Similarly, a study by Pitt and Khandker (1998) in Bangladesh found that women who accessed microfinance were more likely to invest in sustainable agricultural practices, such as organic farming and crop diversification.

2.5 Challenges and Limitations:

While the potential of microfinance in promoting sustainable agriculture is well-documented, several studies have also highlighted the challenges and limitations. For instance, a study by Bateman (2010) argued that microfinance alone is not a panacea for poverty alleviation and that its impact on sustainable agriculture depends on the broader socio-economic and policy context. Similarly, a study by Hulme and Mosley (1996) noted that high-interest rates and lack of financial literacy among borrowers could limit the effectiveness of microfinance programs.

2.6 Case Studies from South Asia:

Several case studies from South Asia have provided valuable insights into the role of microfinance in promoting sustainable agriculture. For example, a study by Rahman et al. (2017) in Bangladesh found that microfinance programs led by organizations like Grameen Bank and BRAC significantly improved agricultural productivity and livelihoods among smallholder farmers. Similarly, a study by Sharma and Zeller (1999) in India highlighted the role of Self-Help Groups (SHGs) in promoting sustainable farming practices and improving access to markets.

The existing literature underscores the transformative potential of microfinance in promoting sustainable agriculture, particularly in developing countries. However, it also highlights the need for a holistic approach that integrates financial services with education, training, and policy support to maximize the impact of microfinance on agricultural productivity and sustainability.

3. Methodology

The analysis of institutional credit in Pakistan's agricultural sector is conducted through a structured methodological approach that involves data collection, preprocessing, statistical analysis, and trend evaluation. This methodology ensures a comprehensive understanding of the financial support provided to the agricultural sector and its impact on sustainable farming practices.

3.1. Data Analysis

To analyse the impact of financial support on agriculture, two datasets have been sourced from the article *"The Impact of Institutional Credit on Agricultural Production in Pakistan."* These datasets provide critical insights into the role of institutional credit in agricultural growth and the contribution of various financial institutions in formal agricultural credit distribution. By examining these datasets, we can better understand the trends, effectiveness, and challenges associated with agricultural financing in Pakistan(State Bank of Pakistan, 2023).

The first dataset focuses on Institutional Credit as a Percent of Agricultural GDP and Credit per Cropped Hectare over the years. It highlights how much institutional credit was provided to the agricultural sector in proportion to the total agricultural GDP. Additionally, it includes two financial indicators: Nominal Credit per Cropped Hectare, which represents the actual disbursed credit in Rupees without adjusting for inflation, and Real Credit per Cropped Hectare, which accounts for inflation to provide a more accurate measure of purchasing power over time.

The second dataset examines the Percent Share of Various Financial Institutions in Formal Agricultural Credit, categorizing the contributions of different entities in providing agricultural financing. Key institutions include ZTBL/ADBP (*Zarai Taraqiati Bank Limited/Agricultural Development Bank of Pakistan*), Commercial Banks, the Federal Bank for Cooperatives, and *Taccavi Loans*. ZTBL/ADBP historically dominated agricultural credit distribution, playing a vital role in funding farmers. However, over time, the share of commercial banks in agricultural lending increased, reflecting a shift in credit sources from specialized institutions to broader banking channels. The Federal Bank for Cooperatives, which once contributed significantly to agricultural financing, saw a decline in its share, possibly due to restructuring in the cooperative banking system. Similarly, *Taccavi* Loans, government-backed emergency financial aid for farmers, showed a diminishing presence in recent years, potentially due to policy shifts or inefficiencies in their allocation (Ghalib et al., 2011; Government of Pakistan, 2023). Together, these datasets provide a valuable perspective on how institutional credit has evolved in Pakistan's agricultural sector. They highlight the importance of financial support for sustainable farming, the role of various lending institutions, and the economic factors influencing credit distribution. By analysing these financial trends, we gain deeper insights into how microfinance and institutional lending contribute to agricultural development, enabling policymakers to formulate strategies that ensure efficient and impactful credit distribution for sustainable agriculture.

3.2. Statistical & Trend Analysis

- Descriptive Statistics: Mean, min, and max values were calculated to summarize financial trends.
- Trend Analysis: Time-series graphs were used to track credit distribution over decades.
- Correlation Analysis: Relationships between credit variables were examined to understand financial patterns.

3.3. Institutional Contribution Analysis

The role of ZTBL/ADBP, Commercial Banks, the Federal Bank for Cooperatives, and *Taccavi* Loans was assessed through comparative analysis, evaluating shifts due to policy changes and economic conditions.

3.3. Visualization & Interpretation

Data insights were presented using line graphs, bar charts, and scatter plots to highlight key trends and institutional contributions.

3.5. Conclusion

Findings reveal how Institutional credit supports agricultural sustainability, providing insights for improving financial policies and farmer accessibility to credit.

4.Discussion

4.1. Access to Capital:

The small farmers of South Asia often lack savings and access to formal financial systems. Therefore, they often reach their hands to landlords, private loaners, family loans or bank loans. The high interest rates and less crops yield in such cases make their life like a menace of economic deprivation, making their life even more miserable financially. Here along with it the dual nature of credit sources in such countries—formal (e.g., banks and cooperatives) and informal (e.g., moneylenders and traders). MFIs can collaborate with banking resources, government empowerment initiatives to provide comprehensive financial solutions, ensuring that smallholder farmers have the resources needed for sustainable agriculture. These financial services empower farmers to invest in sustainable practices, such as crop diversification, soil conservation, and organic farming. For instance, small loans allow farmers to purchase green technologies, including solar-powered irrigation systems, biogas digesters, and drip irrigation systems, which improve efficiency and minimize environmental impact.

In Pakistan, Microfinance institutions (MFIs) began gaining prominence in Pakistan during the late 1990s. Early initiatives were led by organizations such as the Aga Khan Rural Support Programme (AKRSP) and the Orangi Pilot Project (OPP), which introduced microcredit to communities with the aim of poverty alleviation through community development These efforts laid the foundation for the establishment of specialized MFIs and microfinance banks (MFBs) in the formal sector.The formal microfinance sector in Pakistan was significantly shaped by the ‘’Microfinance Sector Development Programme (MSDP)’’ launched in 2000. This program aimed to broaden the scope of microfinance and accelerate its development to provide sustainable financial services to the poor. The overarching motto of MFIs in Pakistan has been ‘poverty reduction and social mobilization’, empowering economically disadvantaged individuals by providing access to credit and financial services(Government of Pakistan, 2023). This initiative helped Pakistan, where approximately ‘93% of farmers own less than five acres of land’, underscoring the critical need for accessible financial services. Microfinance was to be considered as a need of the hour, a report by the Pakistan Microfinance Network (PMN) highlights that there were over ‘’7.4 million active microfinance borrowers’’ in Pakistan as of 2020, with a significant portion engaged in agriculture(Beck & Levine, 2004).

Country	Active Borrowing In Millions
Pakistan	7.4
India	49.0
Bangladesh	32.0
Philippines	10.5

Table 1 Active Microfinance Borrowers in developing Countries

Country	Baseline Productivity (yield in tons/hectare)	Productivity growth after microfinance (%)
Pakistan	1.8	+15%
India	2.3	+18%
Bangladesh	1.6	+20%

4.2. Encouragement of Innovation:

To meet modern challenges of food scarcity, soil problems, seasonal challenges and crop eating insects and so on, innovation is the need to secure and fulfill our agricultural needs, by safeguarding over fields and taking innovative measures that can help us out in these situations. Financial support from MFIs enables farmers to experiment with innovative techniques and technologies, such as precision farming and organic agriculture. Many MFIs provide training programs that improve farmers' business skills, enabling them to access markets and secure better prices for their produce. This holistic approach ensures that farmers can sustain their operations in the long term and it not only enhances productivity but also promotes environmental sustainability (Binswanger & Rosenzweig, 1986; Khandker, 2005). MFIs in Pakistan, including Islamic microfinance institutions, like akhuwat, meezan bank are offering tailored financial products like *Qard Hasan* (benevolent loans) and *Mudarabah* (profit-sharing agreements) to rural communities. These financial services enable farmers to invest in modern agricultural technologies and practices. For instance, the adoption of precision agriculture techniques, such as smart irrigation systems, has the potential to save up to 12.5 million acre-feet of water annually in Pakistan, buying and use of modern machinery like tractors, harvesters, threshers and others has time and effort reducing and more productive professional gains. It also adds to their business independence and boosts the socio-economic status of their work.(Editorial, Dawn)

4.3. Economic Empowerment:

Moreover, microfinance plays a pivotal role in rural economic development by improving the livelihoods of farmers and adding more manpower to the agricultural sector. Many farmers lack the knowledge to effectively manage loans and savings, highlighting the need for education and training alongside financial services. With better access and understanding of their financial resources, farmers can increase their income, reinvest in sustainable practices, and strengthen local economies. This empowerment is particularly evident among women, who are often at the forefront of agricultural production in rural areas. Financial inclusion through microfinance enables women to implement sustainable practices and drive positive environmental and social change. It has proved to play a pivotal role in empowering rural communities in countries like Pakistan, particularly women, by providing financial resources and fostering economic independence. It has enabled income diversification, increased asset ownership, and strengthened local economies through institutions like Kashf Foundation and Akhuwat Foundation. However, to maximize its impact, integrating financial services with education and training is essential. By equipping farmers with the necessary skills to manage loans and savings effectively, microfinance can drive sustainable agricultural practices, enhance livelihoods, and contribute to the long-term development of the agricultural sector.

Table 2 how MFIs has boosted agricultural productivity:

4.4. Risk Mitigation:

Microfinance institutions also bundle their services with agricultural insurance and savings plans. These additional offerings safeguard farmers against natural disasters and unforeseen challenges, like; Draughts, Earthquakes, low agricultural yield, crop eating insects, and so on. It eventually provides a safety net that encourages further investment in sustainable agriculture to encourage the farmers. By promoting both economic stability and environmental sustainability, microfinance creates a virtuous cycle of growth and conservation.

Microfinance institutions (MFIs) in Pakistan have increasingly integrated agricultural insurance and savings plans into their financial services, aiming to mitigate the myriad risks faced by farmers. Notably, organizations such as the Kashf Foundation and Khushhali Microfinance Bank offer bundled microinsurance products alongside their loan offerings, encompassing life, health, and agricultural coverage. These comprehensive financial products provide a safety net against challenges like droughts, earthquakes, low agricultural yields, and pest infestations, thereby enhancing the resilience of the agricultural sector(Burgess & Pande, 2005).

The integration of insurance and savings mechanisms within microfinance services not only stabilizes farmers' incomes but also encourages investment in sustainable agricultural practices. This holistic approach fosters a cycle of economic stability and environmental sustainability, as farmers are more likely to adopt conservation-friendly methods when financial risks are mitigated. Additionally, the Pakistan Microfinance Network (PMN) reports a 19% increase in micro-savings, indicating a growing trend among farmers to secure their financial futures.

5. Results

The results from different dataset in which credits compared with years and also investments of different institutions toward the agriculture are discussed.

5.1. Data Exploration and Model Implementation

***5.1.1. Real Time Analysis of the MFIs progress in Promoting sustainable agriculture can be shown Figure 01*:**

This chart illustrates the trends in agricultural credit over time using three key indicators: Credit to Agriculture GDP Ratio (%), Nominal Credit per Hectare, and Real Credit per Hectare. The nominal credit per hectare (orange line) shows a sharp increase, particularly after the mid-1990s, indicating a rise in financial support for agriculture. However, the real credit per hectare

(green line), which accounts for inflation, exhibits fluctuations and a decline after the late 1980s, highlighting the impact of inflation on the actual value of credit received. Meanwhile, the credit to agriculture GDP ratio (blue line) remains relatively stable, suggesting that while credit has increased, its share relative to agricultural GDP has not changed significantly. This trend underscores the importance of considering both inflation-adjusted credit and overall credit distribution policies when evaluating agricultural financing.

Overall, The data suggests that while agricultural credit has increased substantially in nominal terms, real credit availability has been affected by inflation. The stability of the credit-to-GDP ratio implies that while more credit is being disbursed, its effectiveness in supporting agricultural productivity may need further evaluation.

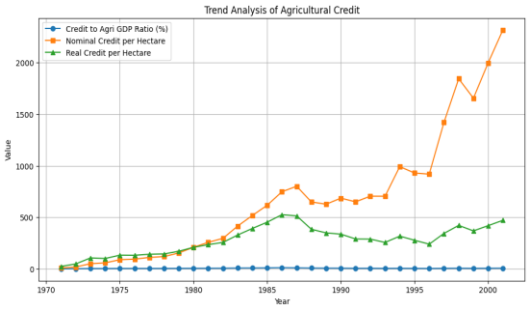


Figure 1 Real Time Analysis of the MFIs progress in Promoting sustainable agriculture can be shown

5.1.2. We can observe in the following Figure 02 correlation matrix how these MFIs has helped in boosting agriculture GDP ratio:

The correlation matrix in Figure 02 visually represents the relationships between key agricultural credit indicators. A strong positive correlation (0.91) between Year and Nominal Credit per Cropped Hectare indicates that credit allocation has increased significantly over time. However, the correlation between Year and Real Credit per Hectare (0.73) is lower, suggesting that inflation has eroded some of the actual financial support. Additionally, the high correlation (0.87) between Credit to Agricultural GDP Ratio and Real Credit per Hectare implies that real financial support has been linked to the overall agricultural sector's performance. However, the weak correlation (0.29) between Nominal Credit and the Credit-to-GDP Ratio suggests that simply increasing credit in nominal terms does not necessarily translate into proportional economic growth.This highlights the importance of inflation-adjusted credit policies to ensure that financial support remains effective in boosting agricultural productivity.

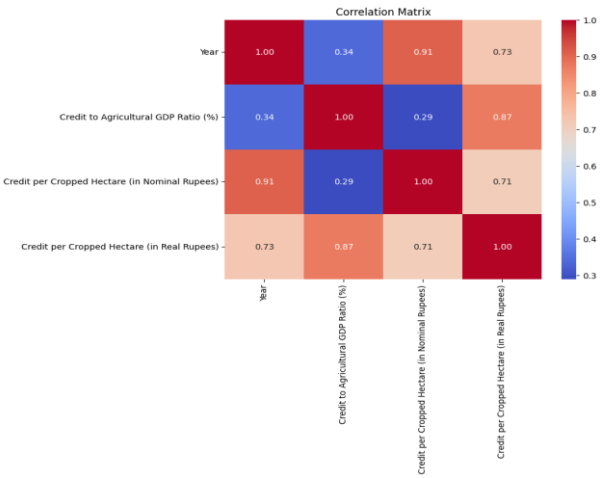


Figure 2 correlation matrix how these MFIs has helped in boosting agriculture GDP ratio

5.1.3 Analysis of Credit to Agricultural GDP Ratio and Implications for Agricultural Finance in Figure 03:

The histogram in Figure 03 illustrates the distribution of credit to agricultural GDP ratio, showing that most values fall between 3% and 7%, with a peak around 4% to 6%. This suggests that agricultural financing typically remains within this range, while extreme values either too low or too high are relatively rare(Islam, 2014). A low credit allocation could indicate limited access to funding for farmers, restricting their ability to invest in better technology, seeds, and fertilizers. On the other hand, excessively high credit levels might lead to repayment challenges if not supported by strong agricultural output and market stability.

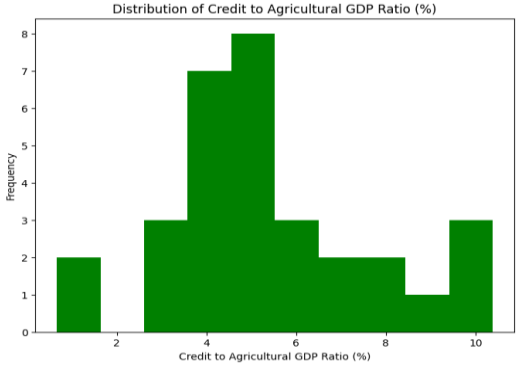


Figure 3 Analysis of Credit to Agricultural GDP Ratio and Implications for Agricultural Finance

5.1.4 Analysis After Model Implementation in Figure 04:

The actual vs. predicted year values plot in Figure 04 provides insights into the reliability of a predictive model, which can be linked to analysing microfinance's role in promoting sustainable agriculture. The strong alignment between actual and predicted values, as represented by the line of best fit, suggests that financial interventions, such as microfinance, can be effectively modelled to assess their impact on agricultural sustainability. If microfinance is strategically allocated based on predictive insights, it can help farmers enhance productivity,

adopt sustainable farming practices, and mitigate financial risks associated with seasonal variability and climate change.

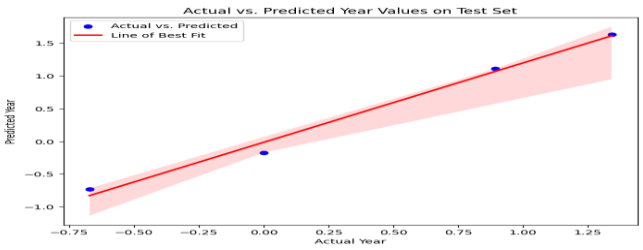


Figure 4 Analysis After Model Implementation

5.2. Overall Analysis:

The Statistics reveal key insights into agricultural credit distribution trends over time. The Credit to Agricultural GDP Ratio had a mean of approximately 5.71%, with a peak of 11.56% in 1986-87 and a low of 0.67% in 1971-72. This indicates that agricultural credit, as a proportion of GDP, significantly increased in the mid-1980s before experiencing a decline. Meanwhile, Credit per Cropped Hectare (Nominal Rupees) showed a consistent upward trend, averaging 775.46 and reaching a peak of 2318.19 in 2001-02, driven largely by inflation and economic growth. However, when adjusted for inflation, the Real Credit per Cropped Hectare showed a fluctuating pattern, with a mean of 324.19, peaking at 525.58 in 1986-87, and declining afterward, reflecting inflation-adjusted credit availability (Mahajan & Ramola, 2012).

The Trend Analysis highlights the major shifts in agricultural credit distribution. The Credit to Agricultural GDP Ratio peaked in 1986-87, indicating a period of substantial credit allocation. However, after this peak, the ratio declined, suggesting potential shifts in government policies or economic conditions. On the other hand, Nominal Credit per Cropped Hectare showed a steady rise, largely due to inflation and economic expansion. In contrast, Real Credit per Cropped Hectare, which accounts for inflation, increased up to 1986-87, but fluctuated afterward, indicating that while credit amounts increased, their real purchasing power varied due to economic conditions.

The Correlation Analysis reveals interesting relationships among the variables. There is a strong positive correlation (0.98) between Nominal and Real Credit per Cropped Hectare, indicating that while nominal credit values rose consistently, real credit also followed a similar pattern, albeit with fluctuations. Additionally, the Credit to Agricultural GDP Ratio has a moderate correlation (~0.56) with both credit per hectare variables, implying that while credit growth contributed to agricultural GDP, other economic factors also played a role in shaping these trends. Overall, this analysis suggests that 1986-87 was a pivotal year in terms of agricultural credit, witnessing the highest credit-to-GDP ratio and peak real credit values. However, post-1986-87, the declining trend in the Credit to Agricultural GDP Ratio indicates potential policy shifts, economic adjustments, or changing investment priorities in the agricultural sector. The steady rise in nominal credit values reflects economic expansion, but real values fluctuated, emphasizing the impact of inflation. These insights highlight the importance of adjusting credit policies to ensure sustainable agricultural financing in the long run (Hermes & Lensink, 2007).

5.3 Analysis and Results of Microfinance Banks Data

The following real-time data shows the different public-private partnership of the mentioned banks and how these credit loans have uplifted the poor farmers and provided them sufficient financial help.

5.3.1 Analysis of the Distribution of Agricultural Credit Sources in Figure 05

The Figure 06 represents multiple histograms with KDE (Kernel Density Estimation) curves representing the distribution of various agricultural credit sources in Pakistan. The key observations from each distribution are as follows:

I. Distribution of ZTBL/ADBP:

The histogram of Zarai Taraqiati Bank Limited (ZTBL), formerly known as the Agricultural Development Bank of Pakistan (ADBP), shows a right-skewed distribution. Most of the values are concentrated between 30 and 60, with a peak around 50-60. The KDE curve suggests an increasing trend followed by a decline, indicating a typical distribution where most farmers rely on this source for agricultural financing.

II. Distribution of Commercial Banks

The distribution of commercial banks' loans appears highly skewed to the right, with a long tail. A significant proportion of loans are concentrated in the lower range, with only a few data points in the higher range (above 1000). This suggests that while commercial banks do offer agricultural credit, a large proportion of farmers receive relatively smaller loans.

III. Distribution of ADBP + Commercial Banks

The histogram of combined ADBP and commercial bank loans shows a relatively normal distribution. The majority of data points fall between 70 and 90, with a peak around 80-85. This suggests that integrating commercial banks with agricultural credit institutions results in a more balanced and stable credit distribution.

IV. Distribution of Federal Bank for Cooperatives

The histogram is highly skewed to the right, with most values concentrated in the lower range (below 200). Very few data points exist beyond 1000, indicating that cooperative banks contribute minimally to agricultural financing.This suggests a lack of widespread reliance on cooperative banks for funding.

V. Distribution of Taccavi Loans

The distribution of Taccavi loans is highly right-skewed, indicating that most loans are in the lower range (below 10). A few extreme values (outliers) are present beyond 30, but they are rare. Taccavi loans, which are traditionally government-provided relief loans for distressed farmers, appear to be underutilized or insufficiently distributed.

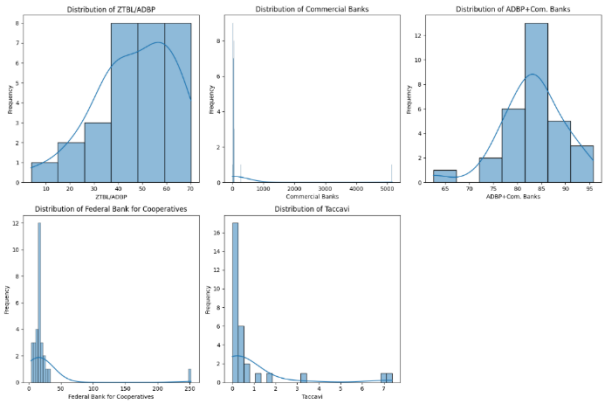


Figure 5 Analysis of the Distribution of Agricultural Credit Sources

5.3.2 *Analysis of Agricultural Microfinance Over Time According to Figure 06:*

These line plots depict the evolution of different agricultural financing sources over time, which is critical for understanding how microfinance impacts smallholder farmers and promotes sustainable agriculture. However, there appears to be an issue with the x-axis, as the year values seem incorrectly plotted (e.g., starting around 1000 instead of a more realistic modern period) (Rahman, 1999). Ignoring that issue, we can extract some meaningful insights:

I. ZTBL/ADBP Over Time

The trend shows initial volatility followed by a gradual decline, indicating that ZTBL/ADBP's role in agricultural financing may be shrinking. Possible reasons: shifts in policy, competition from commercial banks, or challenges in loan accessibility for small farmers.

Implication: If ZTBL/ADBP's role declines, small farmers may lose an essential financing source, necessitating an expansion of microfinance institutions (MFIs) and government-backed credit programs.

II. Commercial Banks Over Time

The chart initially shows extreme fluctuations but later indicates a gradual increase in commercial bank lending. This suggests that banks have become more active in agricultural finance over time, possibly due to government incentives or improved financial inclusion strategies.

III. ADBP + Commercial Banks Over Time

The line remains relatively stable at a high level, showing that the combination of ADBP and commercial banks provides a constant flow of agricultural credit.

This stability suggests that a blended financing approach can ensure consistent funding availability for farmers.

Implication: Strengthening partnerships between development banks, commercial banks, and microfinance could ensure a more sustainable credit supply.

IV. Federal Bank for Cooperatives Over Time

A sharp spike followed by near-zero activity suggests that cooperative financing has declined significantly. Cooperatives should be revitalized with microfinance support and digital lending solutions to restore their role in small farmer credit.

Implication: Strengthening cooperative financing through subsidies, microfinance partnerships, and digital banking could improve accessibility for marginalized rural communities.

V. Taccavi Loans Over Time

The sharp drop and then a near-flat trend indicate that Taccavi loans have largely disappeared from the agricultural finance landscape. These loans were historically used for disaster relief and emergency agricultural support, meaning their absence could leave farmers vulnerable to climate shocks and economic downturns.

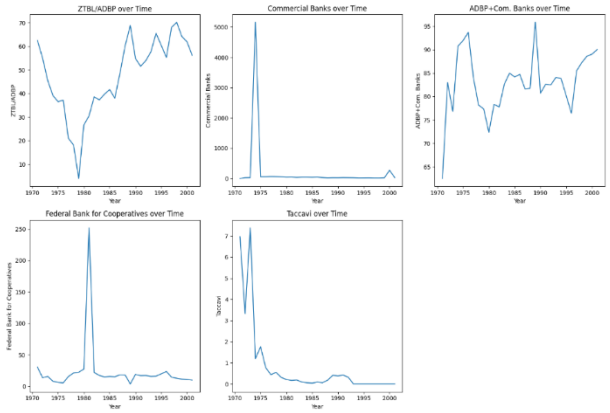


Figure 6 Analysis of Agricultural Microfinance Over Time

6.Conclusion

This study highlights the crucial role of microfinance and institutional credit in promoting sustainable agriculture in Pakistan. By analysing Credit to Agricultural GDP Ratio, Credit per Cropped Hectare (Nominal & Real), and the contribution of financial institutions, it is evident that access to credit significantly impacts agricultural productivity and rural development.

The findings suggest that while credit availability has increased over time, real credit values fluctuate due to inflation, economic conditions, and policy changes. The peak credit distribution in the 1980s was followed by a decline, emphasizing the need for consistent financial support and policy interventions to sustain agricultural growth. Institutions like ZTBL/ADBP, Commercial Banks, and Cooperative Banks have played a pivotal role in financing farmers, but challenges remain in ensuring equitable credit access.

To enhance sustainable agriculture, financial institutions must focus on expanding microfinance services, providing low-interest loans, and developing policies that support small-scale farmers. Strengthening financial accessibility will not only boost agricultural productivity but also contribute to environmental sustainability and rural economic resilience.

References

Beck, T., & Levine, R. (2004). Finance, Inequality, and the Poor. *Journal of Economic Growth*, *9*(1), 5–38.

Binswanger, S., & Rosenzweig, M. R. (1986). Behavioral and Material Determinants of Production Relations in Agriculture. *Journal of Development Studies*, *22*(3), 503–539.

Burgess, R., & Pande, R. (2005). Do Rural Banks Matter? Evidence from the Indian Social Banking Experiment. *American Economic Review*, *95*(3), 780–795.

Carter, M. R., Little, P. D., Mogues, T., & Negatu, W. (2007). Poverty Traps and Natural Disasters in Ethiopia and Honduras. *World Development*, *35*(5), 835–856.

Ghalib, A. H., Malki, I., & Imai, K. (2011). *The Impact of Microfinance and Its Role in Easing Poverty of Rural Households: Estimations from Pakistan* (Issue Discussion Paper Series No. 240).

Government of Pakistan. (2023). *Pakistan Economic Survey 2022–23*.

Hermes, N., & Lensink, R. (2007). The Empirics of Microfinance: What Do We Know? *The Economic Journal*, *117*(1), F1–F10.

Islam, M. S. (2014). The Role of Microfinance in Sustainable Agriculture: A Case Study of Bangladesh. *Asian Journal of Agriculture and Development*, *11*(2), 39–57.

Khandker, A. (2005). Microfinance and Poverty: Evidence Using Panel Data from Bangladesh. *World Bank Economic Review*, *19*(2), 263–286.

Mahajan, S., & Ramola, R. (2012). Microfinance in India and Its Impact on Rural Livelihoods. *Journal of Rural Development*, *31*(2), 129–148.

McKernan, R. I. (2002). The Impact of Microfinance Programs on Self-Employment Profits: Do Noncredit Program Aspects Matter? *Review of Economics and Statistics*, *84*(1), 93–115.

Morduch, J. (1999). The Microfinance Promise. *Journal of Economic Literature*, *37*(4), 1569–1614.

Rahman, A. (1999). Microcredit Initiatives for Equitable and Sustainable Development: Who Pays? *World Development*, *27*(1), 67–82.

State Bank of Pakistan. (2023). *Annual Report: The State of Pakistan's Economy 2022–23* (Issue SBP Reports).

Yunus, M. (2003). *Banker to the Poor: Micro-Lending and the Battle Against World Poverty*. PublicAffairs.