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Contents

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2 Executive summary

Pakistan has a large agricultural sector that accounts for more than 20% of the country's gross domestic product (GDP) and 40% of jobs. At a time when the Asian region is consuming greater amounts of food with higher quality, this presents a significant export opportunity. However, most farm produce currently serves local consumption and inefficient farming practices dominate the small farm sector. The limited investment in farm improvement and slow uptake of innovative farm practices are hampering farm income and productivity growth for smallholders in the smallholders' agricultural sector. Understanding sources of credit market failure and estimating the gap between credit demand and supply can inform policy design to promote innovation in financial services for farmers.

This project investigated two proven levers of smallholders' wealth creation in Pakistan in the form of more efficient credit markets and schemes that promote entrepreneurial opportunities for women. Understanding the success factors and barriers to effectiveness in these two areas is important to design more effective financing schemes and policies. This study aimed to:

- Provide an informed summary of credit access issues of small farmers
- Explore smallholders' credit constraints
- Identify the research and development priorities
- Recommend strategies and actions that can help smallholders

A key finding from the research is that productivity on farms in most rural areas is low. Improving productivity requires modernizing farming methods, but the effectiveness of government development programs to do so depends on farmers accessing finance to make these changes possible.

Despite the increase in sources of formal and informal agricultural financing in recent years, smallholders of land still have limited access to formal credit sources. Only a fraction of agricultural credit is available for high valued crops and livestock.

The constraints identified by the study show that many farmers have a poor understanding of the financial options that are available. The credit that is accessed is commonly spent on farm cash flow rather than assets. Less than 10% of credit is currently used to purchase equipment to improve productivity.

Limited access to lending opportunities exists for female smallholder farmers, and this is a key impediment to improving agricultural productivity.

Innovation in credit services is showing a great deal of promise and reform of the regulatory framework to allow new financial services can accelerate the provision of microfinance. Our survey also shows latent demand for Islamic financing, which is a largely unmet business opportunity at the present time.

The study also highlights the following:

- Financial institutions are offering only limited financial products to farmers and there is limited innovation and technology-led products. All products and agricultural finance manuals are based on conventional banking practices, such as financing inputs of seed, fertiliser and pesticides—a typical production loan.
- Very little financing is available for loans for capital improvement, such as irrigation systems and machinery.
- Most of the available financing schemes do not provide any advisory services or technology transfer. Commercial banks and other financial institutions neither

provide any financing for agricultural enterprise development nor support value-chain financing that could help farmers to create value.

- Less than 10% of farmers having access to finance for technology adoption and receiving extension services have improved farm productivity and profitability. This is of concern because capital investments, such as equipment and land purchases, are likely to have greater effect on productivity improvement over time.
- In addition, no agricultural financing is available for post-harvest and value-chain business opportunities that may create higher profits.
- Women have low levels of awareness of possible sources of finance and there is a huge difference in financial services when comparing men and women. On the other hand, interest rates are higher for formal agricultural microfinance. There are few profitable opportunities for agricultural investment or knowledge concerning these opportunities.

Policy Implications and Recommendations

- Combining credit with agricultural extension services (training) will help smallholders to maximize their income and productivity through better use of inputs (such as seed and fertilisers) and market information. It will help prices to transform their traditional farming practices into best practices for better income and improved productivity.
- One policy response is to reward financial institutions for innovation in credit services. This has been achieved by regulators in other countries. Competition and incentives for innovation will drive credit providers to experiment with lending products in combination with suppliers of equipment and other farm inputs.
- The provision of advisory services and technology transfer bundled with the financing could enable better utilization of credit given to farmers.
- Designing credit schemes for women in rural areas is also a challenge. Whereas women are often labourers on farms they rarely are in decision making positions. One option to empower women as entrepreneurs is to provide credit for activities such as livestock husbandry that have traditionally been the domain of women.
- The introduction of digital financing can help to deliver cost-effective agricultural credit to smallholders and outreaching to larger farmers.
- Further research-based evidence is needed to support the policy decisions that will enable innovative financial services to meet the needs of the smallholder agricultural sector in Pakistan.

3 Introduction

Agriculture is a significant contributor to Pakistan's economy, accounting for more than 20% of GDP (Economic Survey, 2015/16) and employing more than 40% of the country's labour force. Despite having huge potential to contribute to economic development and addressing food security issues, the agricultural sector in Pakistan faces significant challenges that impede its productivity and profitability.

Modernizing the farming sector to improve national food security and alleviate rural poverty is a priority of Pakistan governments at all levels but a key to sustainable change is to enable farmers to make investments to take advantage of productive opportunities. Recently, Steen et al. (2016) showed that limited investment in farm improvement and slow uptake of innovative farm practices are hampering farm income and productivity growth for smallholders in the horticultural sector. The study also found that linking farmers to efficient input services, such as credit, extension and purchased inputs, could improve smallholders' productivity and profitability.

Food security has become the core to 'Pakistan Vision 2025' and 'Punjab Growth Strategy 2018' policy agenda that embrace new directions to raise productivity of the horticultural sector (Government of Pakistan, 2015; The Government of Punjab, 2015). Achieving these goals entail addressing smallholders' needs and the issues they face, especially by providing them better access to finance and developing entrepreneurial skills.

Credit is an important enabler for expanding smallholders' opportunities to increase their farm productivity and profitability and can play a vital role in improving food security and agricultural productivity (Duflo, 2006; Fakudze, 2015; World Bank, 2008). Despite the increase in sources of formal and informal agricultural financing in recent years, smallholders still have limited access to formal credit sources in developing economies and Pakistan in particular (Hussain and Thapa, 2012; Amjad and Hansu, 2007; Haq et al., 2013). This creates a credit market failure with a significant gap between credit demand and supply. Formal financial institutions such as commercial banks are reluctant to provide services to the smallholders, particularly in the horticultural sector, because of perceptions of risk. Agricultural finance risk varies with the farming systems (e.g., perennial horticulture versus cereals) and information asymmetries between lenders and financiers may account for a large proportion of the market failure in these credit markets.

The coexistence of formal and informal agricultural credit markets in developing economies is a common phenomenon. There are two dominant explanations for the creation of informal credit as a result of excessive government regulation of formal credit and credit rationing resulting from information asymmetries between lenders and borrowers (Hoff and Stiglitz, 1990). Although most of the literature focuses on supply-side factors affecting the provision of agricultural credit, some studies have identified demand-side drivers of smallholders' credit (e.g., Zander, 1994; Foltz, 2004; Boucher and Guirkinger, 2005; Ashraf et al., 2009), such as high transaction costs (including interest rates), complicated application processes and difficulties in securing loan collateral.

Understanding sources of credit market failure and estimating the gap between credit demand and supply can inform policy design. However, effective policy design also requires evidence on ways to change the lenders' approach to credit risk management. Recently, various formal institutions have introduced different agricultural financing schemes based on conventional and Islamic modes of finance. These services are offered by commercial banks, microfinance institutions (e.g., National Rural Support Program-NRSP), and non-government organisations (NGOs). These institutions are offering conventional (interest-based) and Islamic (interest-free) loans to smallholders for different pre- and post-harvest activities, including purchasing inputs, levelling land, purchasing livestock and marketing of produce. Disappointingly, these lending institutions charge varying fees ranging from 15% to 40% depending on the nature and duration of the

credit.[1] It is essential to identify the most cost-effective credit sources that could help smallholders to improve the financial performance of their farms.

The livestock and dairy sectors in Pakistan are predominantly operated by women, delivering about 80% of the total milk production in the country (Garza et al., 2014). However, they face many constraints, such as limited inputs, inadequate veterinary health facilities and credit accessibility (Burki and Khan, 2004; Burki et al., 2007). The limited participation of female smallholder farmers in farm-management decision making is a key impediment to improving agricultural productivity. The prevailing literature shows that women's work is often undervalued in developing economies, with income being diverted to the household and work confined to family enterprises (Kabeer, 2012; Mammen and Paxson, 2000; Rogers, 2005).

The capacity for women to find new business opportunities and create wealth for their families in developing economies is well documented (Naude, 2011) and many development schemes and policies aim to create more opportunities for women (e.g., access to markets financial services). What is less well understood is why many of these schemes fail to achieve their objectives and what can be done to ensure that these investments have long-term positive outcomes (Afrin et al., 2009). Given the increasing activity in promoting women's entrepreneurship there is an urgent need for the evaluation and analysis of financing schemes that help to promote the economic empowerment of women. This study explores how access to credit and entrepreneurial opportunities for farmers, in general, and for women, in particular, can help smallholders to find pathways to improve agricultural productivity and reduce poverty. The project examines the efficiency of financial lending practices in the agricultural sector and determines the best lending practices that could be enhanced to benefit smallholder farmers to improve their productivity and profitability. Some studies have shown that institutional factors such as collateral requirements are inhibiting the smallholder's access to credit facilities (e.g., Hussain and Thapa, 2012). Some studies focus on informal sector lending, such as commission agents (e.g., Haq et al., 2013), but no study is available that focuses on the empirical comparison of existing financing schemes (e.g., production versus value chain financing) in the context of the smallholders' horticultural sector. Although Khandker and Faruqee (2003) provide an empirical analysis of farm credit on household welfare in Pakistan their study was limited to credit from Zarai Tarqiati Bank, formerly known as Agricultural Development Banks, which largely provided loans to large landholders rather than smallholders (Zuberi, 1989). There is, therefore, a need to estimate the cost effectiveness of various available financing sources for smallholders. An in-depth examination of these financing sources enables analysis of the financial viability of existing loan schemes at the farm level and relate them to farm productivity and profitability. This provides evidence and important insights to help policy makers to design pro-smallholders' financing schemes.

This study aims to address this evidence gap to support effective policy and financial innovation. Using interviews, surveys and literature reviews, the report identifies where credit services are failing to meet farmers' needs and why this is happening. The report shows that developing innovative financial services for women on smallholder farms has enormous opportunity and that innovations based on Islamic lending are achieving good outcomes.

The report concludes with recommendations for policy makers to facilitate innovation and reform in the financial sector with the aim of providing better credit services for small-scale farmers. To continue the development of evidence-based policy, a number of recommendations are made for the study of policy experiments and the evaluation of programs using robust research techniques.

[1] These financing schemes provide from PKR 5000 to PKR 150,000 to smallholders for up to 24 months.

4 Objectives

The project's ultimate aim was to investigate two proven productivity levers for Pakistani smallholders, namely more efficient credit markets and schemes that promote entrepreneurial opportunities, especially for women. Understanding the barriers and success factors in these two areas enable the design of more effective development schemes.

To achieve this goal, we set the following objectives:

1. Analyse smallholders credit sources, their financial viability in different farming practices and their associated risks;
   1.1. To review the existing financing schemes (e.g., commercial banks versus microfinance institutions; conventional versus Islamic finance systems);
   1.2. To identify demand- and supply-side constraints of credit facilities;
   1.3. To assess the feasibility of introducing new incentive measures to reduce financial risk and encourage effective risk-taking by smallholders;
   1.4. To develop survey tools for the analysis of the impact of credit on farm performance;
2. Investigate the effects of various financing modes (including formal and informal) on farm performance by gender and other socioeconomic categories (e.g., education and income);

   2.1 To evaluate financial viability of different financing modes available to smallholders for different agricultural activities (e.g., production, marketing, etc.);

   2.2 To analyse the determinants of credit choice by the farmer groups;

   2.3 To examine the risk factors influencing the financial viability of these various schemes;

   2.4. To measure the impact of credit sources and gender-specific differentials of alternative credit schemes on farm productivity and profitability;

3. Build research capacity of researchers of local institutions and universities;
   3.1. To engage local academic staff in developing survey tools to capture data on horticultural and livestock sectors;
   3.2. To provide field survey training to local university staff and students for the collection of quality data; and
   3.3. To improve the skills of economic analysis of the local researchers by involving them in preparation of research papers, policy briefs and presentations.

5 Methodology

We employ a mixed methods strategy to examine the smallholders' credit constraints and their impact on farm productivity and profitability. For this, we use both qualitative and quantitative analysis. The overall approach of the project involved the following steps:

- A desktop review of existing and past agricultural policies was completed the team of researchers from the University of Queensland, the University of Agriculture Faisalabad, Shah Abdul Latif University, and the University of Sindh. This include a review of existing government policies on credit services to smallholders and the identification of major constraints in credit access and bottlenecks to enterprise development in the horticultural sector.
- Focused group interviews were conducted with farmers' groups and management of financial institutions in Punjab and Sindh with the help of researchers from Shah Abdul Latif University and AGAHE Pakistan. These interviews were transcribed into English for analysis.
- Survey tools were developed by modifying the Cambridge Small Business Survey to capture the impact of credit schemes on productivity and profitability of farmers' groups. This survey tool was finalized in collaboration with National Agricultural Research Centre in Islamabad.
- Three-day survey training programs were conducted in Punjab and Sindh. Rigorous training was provided to 40 graduates and five faculty staff from different universities. The questionnaire was pre-tested before collecting the data.
- A field survey to collect farm-level sample data from different districts of Punjab and Sindh was administered by academic staff from local partner universities and the National Agricultural Research Centre.
- Economic analyses of credit policies and women's enterprise development was be conducted by researchers from the University of Queensland and other collaborating institutions.

5.1 Qualitative analysis

The qualitative analysis consisted of analysis of the data from the focus group interviews with farmers and the financial institutions. We selected both male and female farmers from different districts of Punjab and Sindh. The focus group data were collected by using a semi-structured questionnaire. Female participants from four rural villages in the Khairpur District were selected to participate in four different focal group discussions. Similarly, female and male participants were selected from the two districts, Vehari and Hasilpur, in Punjab.

We also conducted one-on-one interviews with management of financial institutions to assess supply-side credit constraints. These include development financial institutions, commercial banks (conventional and Islamic), microfinance financial institutions, rural support programs, and charity organisations. We also collected data from these institutions using a structured questionnaire.

5.2 Econometric Analysis

The quantitative analysis was based on the estimation of various econometric models, using the survey data collected from the different regions of Punjab and Sindh. These included frontier analysis, logistic analysis, and econometric estimation using hurdles modes. More specifically, we examined the farmers' credit choices of various available financing modes on farm productivity and profitability. In addition, we analysed the

determinants of formal and informal credit access. The examination of the determinants of credit default for different types of credit can provide insights into devising various instruments that lenders can use as instruments for improved payment systems (Chan and Thakor, 1987; Ocurut et al., 2004). An analysis of financial viability of different farming and livestock practices (e.g., vegetables versus fruit) was conducted. Furthermore, we compared the costs of borrowing and the financial viability of different existing financials schemes (e.g., formal vis-à-vis informal credit and conventional vis-à-vis Islamic credit). The study also identified demand- and supply-side issues related to the credit schemes (e.g., financial, regulatory, socio-cultural).

5.3 Survey Strategy and Data Collection:

We adopted a multistage sampling strategy to finalise the survey sample within different districts in Punjab and Sindh. During the first stage, we identified the clusters (areas) of horticultural and dairy sector activities in Punjab and Sindh, where formal and informal credit had been disbursed through various channels. Formal credit channels included commercial banks (both private and state-owned commercial banks) and microfinance institutions (e.g., Kaushali Bank); semiformal sources of financing included rural support programs (such as the National Rural Support Program), NGOs and charity organisations (e.g., Kashf Foundation and Akhuwat) and informal credit sources comprised input dealers, commission agents, money lenders and relatives/friends. Commercial banks and microfinance institutions offer both interest-based and interest- free loans for agricultural and livestock farming activities. The amounts of these loans to smallholders vary from PKR 10,000 to PKR 150,000. These loans are extended for up to 24 months with variable charges on different loan categories. During the second stage, relevant districts in Punjab and Sindh were selected to implement the survey strategy. In this way, we adopted a multistage sampling strategy (i.e., region, district and village levels).

Table 1: Sample Distribution among different Agro-zones

Province	District	Borrowers	Non-borrowers	Total
	Dadu	31	33	64
	Khairpur	47	34	81
Sindh	Sanghar	96	30	126
	Muzaffar Garh	96	54	150
	Sargodha	124	76	200
Punjab	Vehari	176	122	298
Total		570	349	919

6 Achievements/Outputs

6.1 Outputs

- A desktop study to identify existing financial services and modes of financing offered by various institutions.
- Focus group meetings with farmers' groups (both men and women) to identify demand-side issues for credit access and women's enterprise uptake.
- Development of survey tools and database generation.
- Training of university staff graduates for the field survey and data collection.
- Creation of a substantial and statistically significant household-level data set on smallholders' practices.
- Econometric analysis of credit policies (under different scenarios) on smallholders' productivity and profitability.
- Preparing selected case studies on the financial viability of the credit schemes and their gender-specific differentials of credit access.
- Policy briefs on financing and enterprise development issues.
- Journal publications on credit analysis and women's enterprise development.
- Final project report and media reports.

1. **Publications**

- The project team produced journal articles and submitted them to reputed academic journals including the *World Development*, *Journal of Rural Studies* and *International Journal of Ethics*.
- One of the articles has already been published (attached in the Appendix) whereas two others are under review.
- In addition, five more working papers are in progress in collaboration with other partner institutions.

2. **Conference presentations**

- Presentations at AARES Conferences 2018 and 2019.
- Presentations at the State Bank of Pakistan 2018.

3. **Media coverage**

- Articles and interviews in leading national Urdu and English newspapers.
- TV interviews and discussion on agricultural financing issues in Pakistan.

4. **Student Supervisions**

- Two master theses have been completed under the supervision of researchers in this project. These students were enrolled at the University of Agriculture, Faisalabad. Two more students are near to completion of their theses at Shah Abdul Latif University and Sindh University.

5. **Collaborations**

- This project led to further eight collaborations with regulators, financial institutions and organisations. These include the State Bank of Pakistan, Market Development Facility Fund, Pakistan Agricultural Coalition, AGAHE Pakistan, Khushahli Bank, Bank Alfalah, Global Assets Management, and Pakistan Microfinance Network.

6.2 Achievements

Engagement with stakeholders including policy makers, technocrats, community, financial institutions, and media

- Policy seminar on 4 January, 2018 in the Avari Hotel Lahore, which was attended by 120 people including the Finance Minister, Dr. Ayesha Ghaus Pasha, Mrs Margaret Adamson, Australian High Commissioner to Pakistan, Mrs Naela

Chohan, Pakistan High Commissioner to Australia, secretaries of agriculture and livestock, management of financial institutions, NGOs, academia, and other stakeholders.

- The presentations to the Prime Minister and the Chief Minister of the Reform Committee by Shabbir Ahmad and John Steen were well received and applauded.
- Report to the launch ceremony held on 22 October, 2018 in the Avari Hotel Lahore, which was attended by 170 people including minsters for agriculture and finance, secretaries of agriculture and livestock, management of financial institutions, and other stakeholders. The event was widely coved by the media.
- Follow-up meetings with Sindh and Punjab agriculture departments, the Chief Minister of the Reform Committee, the Minister of Agriculture and the Minister of Finance
- Meetings with financial institutions, including Khushali Bank, and other microfinance institutions.
- Meeting with the Chief Economist of the State Bank of Pakistan to design future strategies for financial and interventions to improve farm practises and productivity.
- Meeting with international organisations including the International Food Policy Research Institute, Asian Development Bank, and Department for International Development (DFID) for designing future policy research on agricultural investment policy.

7 Key Results and Discussion

Access to financial services is crucial to provide funds, access to technology and promoting better management of farm practices. The terms on which credit is provided and the other support that comes with the credit are important for effective outcomes. The identified agricultural financing issues and their impact on farm productivity and profitability are discussed in this study. This project also addressed the question of what types of credit services are most effective and how they positively affect farm income and social outcomes, such as empowerment of women in rural communities. We surveyed nearly 1000 smallholder farmers in Punjab and Sindh to explore about credit, financial services, technology adoption, and farming practices. These were mixed farms that included horticulture, livestock and grain.

The findings show that limited investment in farm improvement and slow uptake of innovative farm practices are hampering farm incomes and productivity growth. The majority of borrowing farmers used credit for operational purposes to smooth out their cash flows throughout the year rather than productivity-enabling capital investments. This is of concern because capital investments, such as equipment and farm enterprises, are likely to have greater effects on productivity improvement over time.

The study focused on both supply- and demand-side issues of agricultural credit and the determinants that are affecting efficient and effective use of available credit schemes. The summary of findings is provided below.

7.1 Supply-Side Issues: An Institutional Perspective

Formal credit markets in the agricultural sector have grown rapidly in recent years. According to the State Bank of Pakistan Statistics, in the year 2017/18, banks disbursed more than PKR 900 billion to 3.27 million farmers at the end of fiscal year, 2017-2018. However, most of the credit (more than 90%) has been directed to production loans rather than capital improvement.

Despite the tremendous growth in agricultural credit supply very little credit is available for farm implements, such as machinery and tools that are capable of increasing farm productivity. The majority of farmers in Pakistan hold less than five acres of land and require significant investment for technology adoption and improved farm operations. This requires innovation in credit services that would enable farmers to share equipment to maximize the utilization of these assets.

Focus-group discussions with senior management of different financial institutions identified several obstacles to the growth of the credit supply and its effectiveness in the productivity of the agricultural sector. There is a significant gap between the supply and demand for credit, which needs government attention to ensure efficient delivery of credit to smallholders. Some specific issues are highlighted as follows:

7.1.1 Lack of Agricultural Financing for Products and Advisory Services

Banks are offering only limited financial products to farmers and there is limited innovation and technology-led products. All products and agricultural finance manuals are based on conventional banking practices, such as financing inputs (seed, fertiliser and pesticides)—a typical production loan. Very little financing is available for loans for capital improvement, such as irrigation systems and machinery. Most of the available financing schemes do not provide any advisory services or technology transfer. Commercial banks and other financial institutions do not provide any financing for agricultural enterprise

development and do not support value chain financing that could help farmers to create value.

7.1.2 Lack of financial Innovation

Agricultural financing needs to induct specialised staff to assess the needs of farmers; however, the banks currently lack specialised staff to make assessments of credit worthiness and farming plans. In the absence of such expertise, the agricultural financing departments of most of the banks face many challenges of product development, credit administration and risk management. The high cost of interest for farmers reflects the lending inefficiencies created by the lack of farming knowledge.

7.1.3 Growth in Microfinancing

The recent growth in the microfinance industry has created agricultural credit opportunities for smallholders in Pakistan. In the year 2016/2017, the total microfinance reached PKR 192 billion out of which 40% of the credit was allocated to the agricultural and livestock sector. Despite the significant growth in the segment of the industry that caters for smallholders, there are various regulatory challenges that hinder the expansion of microfinance to remote rural areas.

Microfinancing institutions and banks contribute only 15% of the formal agricultural credit in Pakistan which implies that there is room for significant growth if the challenges involved can be addressed. Microfinance institutions face many challenges including liquidity constraints, adverse selection, asymmetric information, the moral hazard problem and uncertainty. One of main criticisms is that the interest rates of lending of microfinance institutions are too high, which vary from 18% to 36%. The recent growth in Islamic microfinancing has captured almost 16% of the microfinancing market and is also demonstrating innovative lending models.

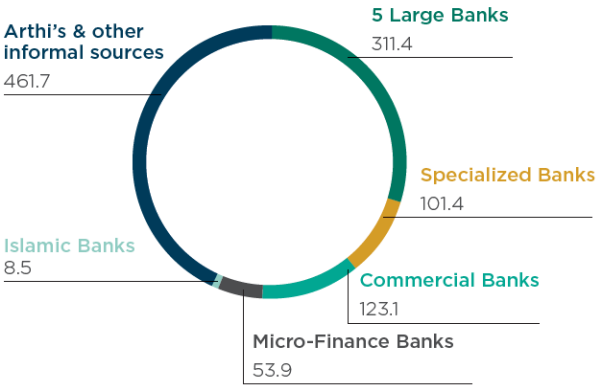

Figure 1: Sources of agricultural finance share (PKR in billion)

In sum, the supply-side constraints include:

- Liquidity constraints
- Effective implementation of financial schemes
- Loan default due to asymmetric information, moral hazard and adverse selection problems

Given the importance of agricultural finance in poverty reduction and economic growth there is need to increase the supply of credit, which can be achieved through improved and innovative financial infrastructure for smallholders' farm activities. This calls for policies and regulatory frameworks to encourage the provision of credit to farmers to invest in yield-improving technologies, leading to increased agricultural outputs.

7.2 Demand-Side Issues

7.2.1 Obstacles to Better Credit Facilities for Farmers

We examined the available credit services in both the crop and livestock sectors and identified the key barriers to credit facilities and productivity improvement for farmers, which are described as follows:

Financial constraints

Cash flow problems: One crucial factor that can influence the decision for a lender to provide credit is cash flow constraints. Repayment of the loans is required over a comparatively short period of time. This can create a cash flow problem (in particular, for innovative projects) because it usually takes some time before many investments in agriculture provide an adequate cash flow to service loans. In general, the poorest agriculturalists have little or no capacity to draw on other sources of income or assets to service debts if the cash flow from a financial agricultural investment is insufficient to cover the instalments agreed to for debt repayment.

Creditworthiness: The main criterion adopted by lenders for giving loans to the farmers who participated in the focus group discussion appears to be their creditworthiness. Timely repayments of previous loans usually establish this. However, it can be difficult for first-time borrowers to obtain a loan. In some cases, this can be overcome by having a surety or sureties. Some group loans contain an element of this type of insurance.

High cost of borrowing: The reluctance of farmers to take loans is also an indicator that higher loan repayments can be a deterrent for poor women. Given their poor socio-economic conditions, farmers did not seem interested in loans because of the high cost of borrowing and their inability to repay.

Short- versus long-term loans: Loans made to women in households with little agricultural land are relatively short term, for example, for periods of one to two years. Long-term loans that might increase agricultural wealth are rare. Perhaps, this is because of insufficient collateral of borrowers to cover the bigger long-term loans, should they default.

Social networks and women agricultural loans

It was found that social community networks influenced the ability of women to obtain loans and other means for agricultural development. When women formed connections with other women who had successfully obtained credit, they were also more likely to be successful with their applications. However, it was also observed that poverty reduced the level of the availability of resources (time and money) to engage in social networks. Conversely, as the degree of poverty of these households declines, the chances of social networks being formed, for this purpose, increase.

7.2.2 Smallholder Farmers' Credit and its Utilization

In the current study, we surveyed nearly 800 Punjab smallholders about credit, financial services and farming practices. These were mixed farms that included horticulture, livestock and grain.

Of those surveyed, 47% had taken some form of loan in the past three years. Whereas there are many formal and informal avenues for credit, microfinance banks (44%), microfinance institutions(MFIs)/non-government organizations (NGOs) (23%) and specialised banks (14%) accounted for most of the lending activity to these farmers.

The majority of borrowing farmers used credit for operational purposes to smooth out their cash flows throughout the year. For example, farmers used credit to buy seeds and fertiliser and then repaid this loan at harvest time. A small number of farmers (less than 10%) used loans for capital investments. This is of concern because capital investments, such as equipment and land purchases, are likely to have greater effect on productivity improvement over time. Increasing credit for productive capital investment would be beneficial policy for agricultural development.

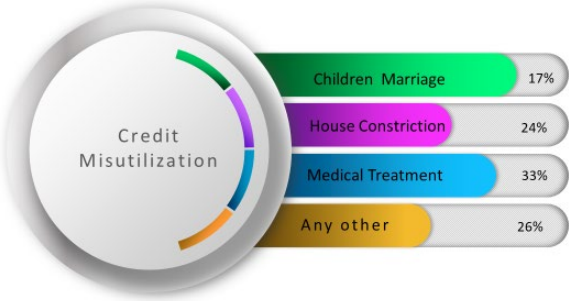

Figure 2: Use of credit on non-farm activities

Latent Demand for Islamic Finance

Only 17% of farmers had received a loan from an Islamic finance provider, which means that the demand for Islamic finance is currently not being met and could be discouraging some farmers from seeking finance because of religious reasons. The evidence for this can be seen in responses from non-borrowing farmers. Only 11% of non-borrowers would consider conventional microfinance compared with nearly half (48%) who would accept Islamic microfinance. Among Islamic finance providers, Qarde Hasan (71%) and Murabha (13%) were the most common forms of credit for smallholders.

7.2.3 Awareness of Government Assistance and Financial Literacy

Farmers with experience of banks and financial services were more likely to be borrowers of money. Without experience and understanding of banks and lending, borrowing is difficult.

Punjab Province has introduced schemes to assist borrowing but awareness of this among smallholders is low. Only 23% of borrowers and 11% of non-borrowers were aware of the Punjab Kissan Package and less than half of these borrowers were registered for the package. This suggests problems with communication and access to these programs.

- More than 230,000 borrowers have benefitted from the Punjab Kissan Package.
- 23% of borrowers and 11% of non-borrowers were aware of the Punjab Kissan Package.
- 12% of borrowers were registered for the Punjab Kissan Package or the Prime Minister interest-free loan.

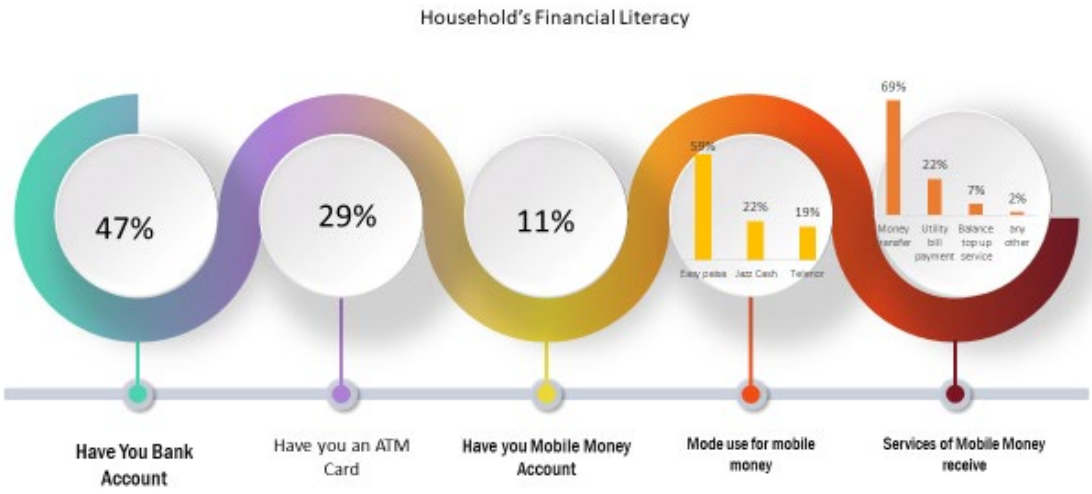

Figure 3: Farmers' financial literacy indicators

7.3 An Econometric Analysis

7.3.1 Impact of Credit on Farm Productivity: An Econometric Analysis

The econometric analysis of the survey data showed that considerable improvements in farm productivity occurred where there was efficient use of agricultural financing. Results based on labour and land productivity modelling showed that crop financing translated into higher productivity, whereas this effect was much lower for livestock. This indicates that credit services for livestock investments are not meeting current requirements and need improvement. Significantly, livestock are most commonly managed by women and the provision of financial services to women is at a low level in rural Pakistan.

The econometric results also highlight the following:

- Small farmers are losing half of their farm production because of poor farm practices.
- Farmers could also improve their productivity by approximately 30% by better managing inputs to farms, such as water, fertiliser and pesticides.
- The provision of advisory services by the financial institutions had a large positive effect on productivity outcomes.
- Likewise, access to advisory services by livestock holders significantly improved their profitability.
- A small fraction of farmers had access to extension and advisory services bundled with credit, and, when this occurred, it translated into higher productivity and profitability of both crop and livestock farms.

7.3.2 Impact of Credit on Fertiliser Applications

Most of the soils in Pakistan are deficient in nitrogen, phosphorus (about 80% to 90%) and about 30% in potassium. One of the reasons for the limited use of fertilisers is lack of capital investment. The findings reveal that access to credit has considerable impact on fertiliser demand. It is also notable that, among institutional sources, private loans are

more efficient in meeting fertiliser demand than public loans. The analysis showed the following:

- Credit access and intensity had a positive impact on fertiliser demand by farmers in Pakistan.
- Government subsidized loans and non-institutional credit had no impact on fertiliser demand.
- A large number of farmers did not benefit from the rural credit schemes.
- There are potential benefits of privatizing the credit market, introducing agriculture insurance, and providing better extension and information services to minimize the agricultural production risk (Shee and Turvey, 2012).
- There is a need to build farmers' capacity for efficient and balanced fertilisation for all necessary nutrients.

7.3.3 Determinants of Credit Choice

To identify factors influencing the credit choices of smallholders, we conducted multinomial logistic regression analysis. We included both formal and informal sources of credit as choice sets in our analysis. Formal sources included specialised banks, commercial banks, microfinance institutions, NGOs, and charity organisations. Informal sources included input dealers, commission agents, friends and relatives. We controlled for education, age, farming experience and farm versus non-farm income sources to see if there were any significant differences in credit choices among those farmers. Results show that farmers' education had a significant positive effect on the decisions of famers to obtain agricultural credit from banks (particularly, specialised banks, such as Zarai Tarqiati Bank). Similarly, farming experience had a positive relationship with credit choice.

7.4 Women Financial Literacy and Access to Financial Services

- Women's participation in decision making in agricultural practices is low.
- In district Sanghar, the majority of women just participate in planting crops, because the farmers mostly work on a crop-sharing basis.
- Women actively participate in animal health care, buying animals, and selling animal products.
- Women did not participate in getting loans and were not fully acquainted with banks.

Women were reluctant to seek credit because of:

- A lack of profitable opportunities for agricultural investment;
- Ignorance about profitable opportunities for agricultural investment;
- Risks in farming practices given their difficult economic circumstances;
- A lack of awareness of possible sources of finance;
- A dearth of social capital and networking among women;
- Difficulties in establishing creditworthiness, especially for first-time borrowers; and
- High rates of interest and service charges.

7.4.1 Women Financial Autonomy

To assess financial autonomy for women and their role in farming decision making, we constructed an index using five indicators from the survey. These include: i) use of income from livestock; ii) use of income from livestock products; iii) apply for a loan; iv) loan utilization; and v) use of farm income to meet farm and household needs. The findings show a very low index indicating that women farmers have, on average, very little financial

autonomy in both Punjab and Sindh. However, women having greater financial autonomy also have more access to financial services and participate more in household decision making. We also contrasted women's empowerment index using the principal component method. We used 17 different indicators (k1-k17) from the survey to construct a women decision-making index and note that women with greater access to credit had a greater empowerment index. Similarly, women's financial autonomy index was positively correlated with access to financial services.

Table 1: Gender gap in access to financial services (%)

Gender	Has Bank Account	Used Mobile Banking	Applied for Loan
Male	**47.3**	**24.1**	**46.7**
Female	**6.5**	**2.3**	**6.5**

7.4.2 Women Involvement in the Livestock Sector: MDF Case Study

- Women are involved in looking after animals and have relatively more influence over income from livestock and livestock products.
- The Market Development Facility (MDF) designed a tailor-made loan product for female rural livestock farmers in partnership with the NGO, Kashf Foundation.
- A sample was collected from our survey areas in Punjab and Sindh.
- Kashf not only provided loans, but also provided technical training on financial literacy, animal husbandry and business development.

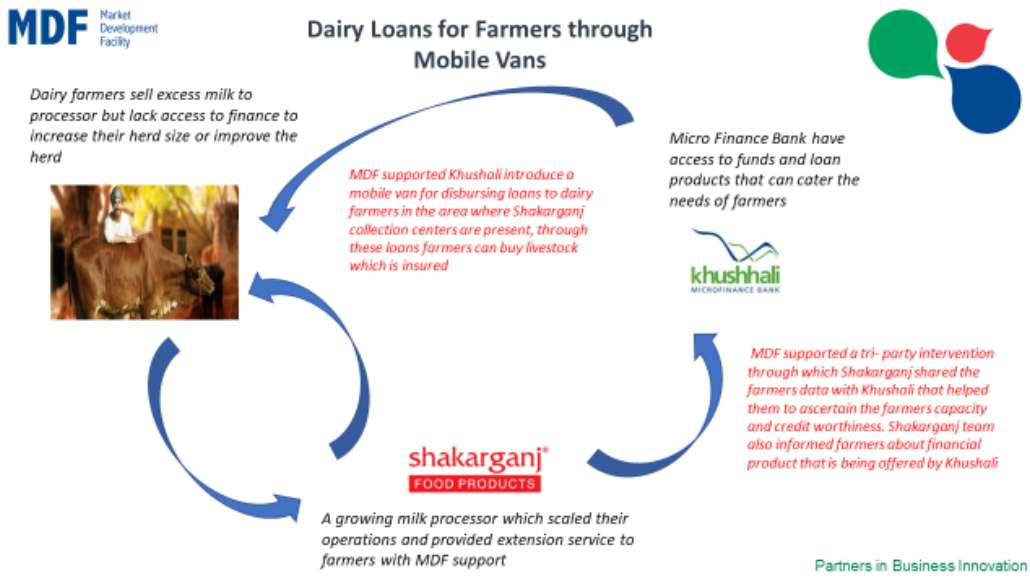

Figure 4: Mobile loans for women dairy farmers

8 Impacts

This small research activity aimed at identifying agricultural financing issues faced by smallholders and evaluating the existing financing schemes. This ambitious project also addressed the question of what types of credit services were most effective and how can they positively affect the farm productivity, income and social outcomes such as empowerment of women in rural communities. Through this activity, we were able to engage a wider community, policy makers, and other stakeholders to find strategies for devising effective policies to overcome those constraints faced by the marginalised farming community.

The findings provide very clear policy implications how effective lending schemes can increase farm productivity and profitability. These findings provide guidelines on how efficient financing, together with advisory and extension services, insurance, technology adoption, and infrastructure in different production environments, can have far-reaching impacts on incomes of farmers and their productivity, thereby, alleviating poverty.

There has been wide dissemination of the findings with agricultural reforms committees, both at provincial and federal levels, and the government took these policy suggestions seriously and included them in their 100-days reform agenda as well as long-term policy measures. The findings of the study have been well received by government departments and other stakeholders. Our report-launching ceremony was attend by 170 people including ministers, heads of 27 financial institutions (including commercials banks, microfinance institutions, senior management of regulatory bodies (State Bank of Pakistan and Security Exchange Commission of Pakistan) and charity organisations, NGOs, officials of agriculture and livestock departments (secretaries, director-generals, and associated staff), academicians, and farmers' organisations.

The event was widely covered by the media, there being more than 20 national and local TV channels (some covered the event live). The event was also covered by national English and Urdu newspapers. There were several columns written by the project team, as well as local columnists, on the issue.

Future agricultural financing strategy was discussed during follow-up meetings with many stakeholders including the Sindh Agriculture Minister, the Sindh Secretary for Agriculture , the Punjab Finance Minister, the Chief Economist, the State Bank of Pakistan, Punjab Department of Agriculture, the Prime Minister and the Chief Minister Agricultural Reforms Committees, Pakistan Poverty Alleviation Fund, Asian Development Bank, the International Food Policy Research Institute, and heads of various financial institutions. All of the above-mentioned stakeholders suggested future interventions to introduce innovative agricultural financing products and capacity-building programs to improve agriculture and showed their willingness to make in-cash and in-kind contributions for further research in this area.

We also received appreciation letters from ministries of agriculture in Punjab and Sindh as well as the Pakistan Agricultural Research Council in which they suggested designing innovative financing models and showed their willingness and support for such projects in the future.

9 Conclusions and Recommendations

This small research activity delivered a range of outcomes, but it also demonstrated the need for further policy research. There are several opportunities that can be pursued to further develop microfinance as a lever for value creating in the Pakistan agricultural sector. Furthermore, there is strong demand to do so from the Pakistan government and other stakeholders, especially in the finance sector.

9.1 Summary of Findings

This small research activity highlights the following findings:

- Financial institutions are offering only limited financial products to farmers and there is limited innovation and technology-led products. All products and agricultural finance manuals are based on conventional banking practices, such as financing inputs (seed, fertiliser and pesticides)—a typical production loan.
- Very little financing is available for loans for capital improvement, such as irrigation systems and machinery.
- Most of the available financing schemes do not provide any advisory services or technology transfer. Commercial banks and other financial institutions do not provide any financing for agricultural enterprise development and do not support value-chain financing that could help farmers to create value.
- Less than 10% of farmers having access to finance for technology adoption and receiving extension services have improved farm productivity and profitability. The limited capital investments, such as equipment and land purchases and other forms of technology adoption, are likely to impede productivity improvements over time.
- Women have low levels of awareness of possible sources of finance and there is a huge difference in financial services when comparing men and women. On the other hand, interest rates are higher for formal agricultural microfinance. There is an absence of profitable opportunities for agricultural investment or knowledge concerning these opportunities.
- In addition, no agricultural financing is available for post-harvest and value-chain business opportunities that may create higher profits.

9.2 Recommendations

- Combining credit with agricultural extension services will help smallholders to maximize their income and productivity through better use of inputs (such as seed and fertilisers) and market information. It will help prices to transform their traditional farming practices into best practices for better income and improved productivity.
- One policy response is to reward financial institutions for innovation in credit services that supports lending practices to smallholders. This has been achieved by regulators in other countries. Competition and incentives for innovation will drive credit providers to experiment with lending products in combination with suppliers of equipment and other farm inputs.
- The provision of advisory services and technology transfer, together with financing, could enable better utilization of credit made available to farmers.
- Innovation in credit services is showing considerable promise and the examination of the regulatory framework to allow new financial services can accelerate the

provision of microfinance. Our survey shows a high level of latent demand for Islamic financing that is a largely unmet business opportunity at the present time.

- Designing credit schemes for women in rural areas is also a challenge. Although women are often labourers on farms they rarely are in decision-making positions. One option to empower women as entrepreneurs is to provide credit for them in activities such as livestock husbandry, in which they have mainly been involved.
- The introduction of digital financing can help deliver cost-effective agricultural credit to smallholders and outreach to the community of larger farmers.

10 References

10.1 References Cited in the Report

Afrin, S., Islam, N., and Ahmed, S. U. (2009). A multivariate model of micro credit and rural women entrepreneurship development in Bangladesh. *International Journal of Business and Management*, 3(8): 169.

Ashraf, N., Giné, X., and Karlan, D. (2009). Finding missing markets (and a disturbing epilogue): Evidence from an export crop adoption and marketing intervention in Kenya. Discussion Paper Series, Economic Growth Center Yale University.

Boucher, S.R. and Guirkinger, C.,2005. Risk, wealth, and sectoral choice in rural credit markets. *American Journal of Agricultural Economics,* 89(4): 991–1004.

Burki, A. A., Khan, M. A., and Bari, F. (2004). The state of Pakistan's dairy sector: An assessment. *The Pakistan Development Review, 43* (2), 149–174.

Burki, A., and Khan, M. (2007, November 21). *Milk districts and efficiency of smallholder dairy producers in Pakistan*. Retrieved June 25, 2013, from Pide: http://www.pide.org.pk/psde23/pdf/Abid%20A.%20Burki.pdf

Duflo, E., Glennerster, R., and Kremer, M. (2006). Using randomization in development economics research: a toolkit. Technical Working Paper 333, *National Bureau of Economic Research.* http://www.nber.org/papers/t0333

Fakudze, C.D. and Machethe, C.L. (2015). Improving smallholder livestock farmers' incomes through value chain financing in South Africa. *Development in Practice*, 25(59): 728–736.

Foltz, J. D..2004. "Credit market access and profitability in Tunisian agriculture." Agricultural Economics. 30: 229–240.

Garza, M., Anis, A., and Bokhari, S. (2014). Women empowerment through the dairy sector in Pakistan. http://graduateinstitute.ch/files/live/sites/iheid/files/sites/public_relations/geneva-challenge/docs/Women%20Empowerment%20through%20the%20Dairy%20Sector%20in%20Pakistan.pdf

Haq, A., Aslam, A., Chaudhry, A., Naseer, A. Muhammad, K., Mushtaq, K., and Farooqi, M. (2013). Who is the "Arthi"? *Working Paper*, International Growth Centre. F-37042-PAK-1.

Hoff, K., and Stiglitz, J. 1990. Imperfect information and rural credit markets: Puzzles and policy perspectives. *World Bank Economic Review*, 4(35): 235–250.

Hussain, A., and Thap, G. B. 2012. Smallholders' access to agricultural credit in Pakistan, *Food Security*, 4(1): 73–85.

Kabeer, N. (2012). Women's economic empowerment and inclusive growth: labour markets and enterprise development. SIG Working Paper 2012/1, International Development Research Centre (IDRC). https://www.idrc.ca/sites/default/files/sp/Documents%20EN/NK-WEE-Concept-Paper.pdf

Mammen, K., and Paxson, C. (2000). Women's work and economic development. *The Journal of Economic Perspectives*, *14*(4): 141–164.

Naudé, W. (2011). Entrepreneurship is not a binding constraint on growth and development in the poorest countries. *World Development*, 39(1): 33–44.

Rogers, B. (2005). The domestication of women: Discrimination in developing societies. Routledge. Rome. www.fao.org/docrep/015/i2438e/i2438e00.pdf

Shee, A. and Turvey, C.G. (2012), "Collateral-free lending with risk-contingent credit for agricultural development: indemnifying loans against pulse price risk in India", Agricultural Economics, 43, 5, 561-574.

Steen, J. T., Ahmad, S., Verreynne, M-L., Battese, G. and Burki, A. (2016). Farmers' capabilities, productivity and profitability: A case study of smallholders in selected agro-zones in Pakistan. Canberra, ACT, Australia: ACIAR.

World Bank (2008). World Development Report 2008: Agriculture for development. New York: Oxford University Press.

Zander, R. (1994). Barriers to credit access in rural Sri Lanka. Financial landscapes reconstructed. The Fine Art of Mapping Development, Boulder, Colorado, Westview Press, pp 12.1–12.8

Zuberi, H. (1989). Production function, institutional credit and agricultural development in Pakistan, Pakistan Development Review, 28: 43–56

10.2 List of Publications Produced by the Project

Published articles: (1)

Tisdell, C., and Ahmad, S. (2018) Microfinance: economics and ethics. *International Journal of Ethics and Systems*, 34(3), 372-392, https://doi.org/10.1108/IJOES-02-2018-0028

Papers submitted to academic journals: (2)

Journal of Rural Studies

World Development

Working Papers: (3)

Ahmad, S., Shankar, S., Steen, J., Verreynne, M-L., Burki, A.A. (2018). What Drives Smallholders' Productivity in Pakistan's Horticultural Sector?, Discussion Paper 597, School of Economics, The University of Queensland.

Tisdell, C., and Ahmad, S. (2017). Microfinancing in developing countries: an assessment taking particular account of the views of Becker and Posner. Working Papers on Social Economics, Policy and Development 64, School of Economics, The University of Queensland.

Tisdell, C., Ahmad, S., Nadia, A., Steen, J. and Verreynne, M-L. (2017). Loans, Wealth Creation and the Socioeconomic Situation of Women in the Taluka Area of the Khairpur District, Sindh, Pakistan: A Study Based on Interviews with Female Focal Groups. Social Economics, Policy and Development 62, School of Economics, The University of Queensland.

Conference presentations: (2)

Kouser, S., Ahmad, S., and Steen, J. (2019). Farmers access to credit and its impacts on fertiliser demand in Pakistan, Australian Agricultural and Resource Economics Society Conference, Melbourne, 12–15 February, 2019.

Ahmad, S., Dai, X., O'Donnell, C. J., Verreynne, M-L., and Steen J. (2018). Technology Adoption and Smallholders Productivity: An Empirical Evidence of Smallholders Horticultural Practices in Developing Economy. Australian Agricultural and Resource Economics Society Conference, Adelaide, 8–10 February, 2018.

MS theses: (2)

- Evaluation of Agricultural Credit Choices and Their Determinants in Punjab, Pakistan by Maria Shabbir **(University of Agriculture Faisalabad)**
- The impact of agricultural credit on farm productivity and profitability by Mariam Idrees **(University of Agriculture Faisalabad)**

Work in progress: (5 papers)

- Adoption of Technologies and Agricultural Productivity Using Smallholders' Horticultural Sector Survey in Pakistan
- Impact of Microfinance on Livelihood: An Empirical Analysis of Household Survey Data in Pakistan
- Social network and women access to agriculture finance: A case study from selected districts of Punjab and Sindh
- Impact of credit on farm productivity and profitability in Pakistan
- Farmers access to credit and its impacts on fertiliser demand in Pakistan
- Evaluation of agricultural credit choices and their detriments: A systematic review

11 Appendixes

11.1 Appendix 1:

Questionnaire (attached)

11.2 Appendix 2:

Final Project Report (attached)

11.3 Appendix 3:

Media report (attached)

11.4 Appendix 4:

Abstracts and policy briefs (attached)