



**AgEcon** SEARCH

RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

*No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.*



Investing in rural people

# Inclusive finance and inclusive rural transformation

by  
**Calum G. Turvey**  
Cornell University

**10** IFAD  
RESEARCH  
SERIES



The IFAD Research Series has been initiated by the Strategy and Knowledge Department in order to bring together cutting-edge thinking and research on smallholder agriculture, rural development and related themes. As a global organization with an exclusive mandate to promote rural smallholder development, IFAD seeks to present diverse viewpoints from across the development arena in order to stimulate knowledge exchange, innovation, and commitment to investing in rural people.

The opinions expressed in this publication are those of the authors and do not necessarily represent those of the International Fund for Agricultural Development (IFAD). The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of IFAD concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The designations “developed” and “developing” countries are intended for statistical convenience and do not necessarily express a judgement about the stage reached in the development process by a particular country or area.

This publication or any part thereof may be reproduced for non-commercial purposes without prior permission from IFAD, provided that the publication or extract therefrom reproduced is attributed to IFAD and the title of this publication is stated in any publication and that a copy thereof is sent to IFAD.

**Author:**

Calum G. Turvey

**© IFAD 2017**

All rights reserved

ISBN 978-92-9072-709-5

Printed January 2017



Investing in rural people

# Inclusive finance and inclusive rural transformation

by  
**Calum G. Turvey**  
Cornell University

A decorative graphic in the bottom-left corner consisting of several orange-colored wheat stalks of varying heights and orientations, some with grain heads and some without.

**10** IFAD  
RESEARCH  
SERIES

# Acknowledgements

The author is grateful for the feedback and commentary from Hans Binswanger-Mkhize and Michael Hamp, and other contributors to the IFAD *Rural Development Report 2016: Fostering Inclusive Rural Transformation*. Direct or indirect benefits and critiques were provided by Jock Anderson, Rui Benfica, Julio Berdegue, Regina Birner, Karen Brooks, Pierre-Marie Bosc, Constanza Di Nucci, Michael Hamp, Jikun Huang, Karim Hussein, David Lopez, Steven Were Omamo, Tom Reardon, Abdelkarim Sma, Brent Swallow, Kimberley Swallow, Carolina Trivelli and David Tschirley. The author is also grateful to IFAD staff for providing financial and technical support for the preparation of this paper.

## About the author

**Calum G. Turvey**, PhD is the W.I. Myers Professor of Agricultural Finance in the Dyson School of Applied Economics and Management, College of Agriculture and Life Sciences and Cornell College of Business. He holds a PhD from Purdue University and a BSc (Agriculture) and MSc from the University of Guelph. He has published nearly 150 papers, most of which are geared to issues of agricultural finance, risk and insurance. His research has covered credit and risk issues in Canada, China, Dominica, Dominican Republic, India, Mexico and the United States of America. He is the editor of the *Agricultural Finance Review*.

Oversight: Paul Winters, Director of Research and Impact Assessment Division, and Ashwani Muthoo, Director of Global Engagement, Knowledge and Strategy Division.

Advisory Board: Fabrizio Bresciani, Shirley Chinien, Edward Heinemann, Bruce Murphy, Richard Pelrine, Lauren Phillips, Tomas Rosada and Abdelkarim Sma.

Editorial Management Team: Rui Benfica, Helen Gillman and Anja Lesa.

# Abstract

This paper provides an overview of concepts, issues and research on the relationship between financial inclusion and inclusive rural transformation. When considering how the growth of demand for financial services is related to the broader processes of structural and rural transformation, the evidence shows that agricultural credit provides positive returns, but still with small farm and gender biases. Liberalization of financial markets may not have had the desired spillover effects into rural credit, so there may be justification for public intervention. Effective microcredit programmes might also need to be coupled with outreach and technical assistance in order to achieve desired goals and objectives.

In addressing how innovations in rural finance contribute to making access to financial services and rural transformation more inclusive, the report focuses on demand relationships. Farmers who use credit have moderately inelastic to elastic demands. Policies that curb interest rates or otherwise lower the cost of credit may encourage credit demand. Research on risk rationing suggests a behavioural aspect to credit that needs to be considered. Policies that fail to consider collateral and risk may fail if risk-rationed farmers will either not borrow at all, or borrow less than optimal amounts of credit.

Policies targeting inclusive finance for inclusive transformation should be targeted towards specific problems. If subsidies are required, they must be smart – in the sense of minimizing market distortions – and are best targeted towards lenders as incentives to increase loans in poverty or underserved communities, women borrowers and indigenous peoples. When markets fail, agriculture governments should consider state-run government-sponsored enterprises. Finally, agricultural lenders, including microfinance institutions, must reconsider their approach to disciplined savings and lending activities. Many farmers with credit demand will not borrow because the payment terms do not consider the risk or match the liquidity cycle of planting and harvesting.

# Table of contents

<b>Acknowledgements</b> .....	2
<b>Abstract</b> .....	3
<b>Introduction</b> .....	5
Objectives and overview .....	6
<b>Rural financial inclusion and the broader processes of structural and rural transformation</b> .....	9
The current state of credit access and agricultural finance .....	9
Financial inclusion defined .....	10
Promoting financial depth and breadth through inclusive financial policies .....	12
Measuring financial inclusion .....	12
Microfinance and agricultural development .....	15
Credit constraints and the returns to credit access .....	18
Agricultural credit and gender bias .....	19
<b>The demand for financial services in the processes of structural and rural transformations</b> .....	21
Introduction .....	21
Credit and credit demand .....	21
Risk rationing .....	23
<b>Strategic challenges in financing structural and rural transformation</b> .....	24
Smart subsidies and tax incentives .....	24
Government-sponsored enterprises .....	25
Interlinked and risk-contingent credit .....	25
Flexible microfinance .....	26
<b>Summary and conclusions</b> .....	28
<b>References</b> .....	30

# Introduction

In transitioning and transformational economies, what occurs in the rural region is of great economic significance, especially in developing regions where large proportions of the population are involved in agriculture and are poor. Central themes on the role of credit in agriculture and economic development include the importance of credit in agricultural production; the role of institutions and credit policies on credit supply; and the relationship between risk, collateral, production and credit. Many developing countries have, over the past 40 years, attempted to alleviate this perceived inadequacy of credit by providing highly subsidized and controlled finance (including interest-rate caps) through the creation of specialized credit institutions, not all of which worked as planned (Adams and Vogel, 1986; IFAD, 2001, Chapter 6; Meyer, 2011). The role that government plays is often a tenuous one. Weak governance structures and regulatory oversight are to blame in many cases, corruption in other cases, and adverse selection and moral hazard in other cases. On the other hand, within the past 20 years, global financial markets have matured. Developing structures have put into place strong regulatory frameworks with regular monitoring of risk. Information technologies permit credit assessments, and accountability is at the individual or branch level.

In the process of rural transformation, access to credit can stimulate the production of commodities, encourage the use of inputs such as fertilizer and breeding stock, encourage investment in modern technologies and irrigation, and provide financial services to specific targets, such as low-income households, women, indigenous or under-represented peoples, cooperatives or specific producer groups.<sup>1</sup> Thus, the financial system plays a critical role in any economic transformation since it becomes a critical (if not the primary) provider of capital to generate growth. On a global scale, transitioning or transforming countries might show rapid economic growth, but underlying this growth is extraordinary inequality in the distribution of the economic gains. This inequality might arise not only from income disparities, but also from who are the winners and the losers. In many countries, cultural, political, religious, gender and racial divides can all conspire to exclude one or more groups from sharing in the benefits from economic growth. Understanding the role that access to credit and financial services plays in rural transformation is important: Will more inclusive access to financial services ultimately lead to more inclusive rural transformation? What roles should be played by markets? And what roles should be played by government?

To place the problem in context, figures 1-4 plot out the linkages between the percentage of agricultural contribution to gross domestic product (GDP) and four financial measurements. Figures 1 and 2 show the cross-country relationships between the percentage of agriculture's contribution to GDP and the percentage of all rural borrowers and rural savers from/at a formal financial institution, while figures 3 and 4 plot two metrics of financial inclusion: the number of bank branches and the number of automated teller machines (ATMs) per 100,000 people.

1. See, for example, Feder (1985); Binswanger and Sillers (1983); Carter (1988); Carter and Olinto (2003); Petrick (2004); Foltz (2004); Bernhardt and Backus (1990); and Eswaran and Kotwal (1990).



The differences across countries are largely structural, with each country having evolved its own system of banking and regulatory environment, capital controls and credit policies according to its political economy and comparative advantage.

What is important to understanding the relationship between inclusive finance and inclusive rural transformation is that figures 1-4 show an inverse relationship between financial services and agriculture's contribution to GDP increases. Causality is not implied because there are dynamic and endogenous economic relationships involved. For example, in poor countries low savings rates lead to low deposit rates, which constrains the amount of credit available for loans. Savings programmes in poor areas are thus designed around increasing deposits so that banks can make loans more profitably, and with savings substituting for collateral in some models, lowering risk. How these programmes evolve is determined by the rate that agricultural and rural transformation takes place, but will be tempered by interest rates, monitoring and administration costs, collateral, asymmetric information and risk.

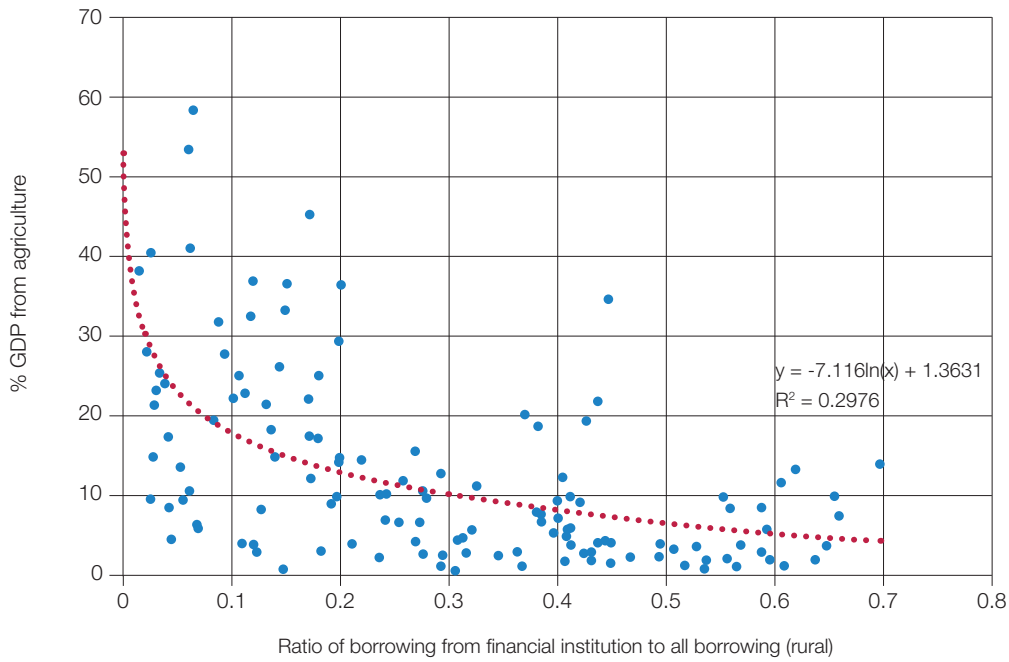
### Objectives and overview

To understand the interplay of demand and supply factors for rural finance and, in particular, greater inclusiveness in access to it, this chapter addresses three broad questions:

- (i) How is the growth of demand for financial services related to the broader processes of structural and rural transformation?
- (ii) How do innovations in rural finance contribute to making access to financial services and the rural transformation more inclusive, and what are the adverse (exclusion) effects of such changes?
- (iii) What are the key strategies, institutional changes, policies and investments that can support one or both relationships?

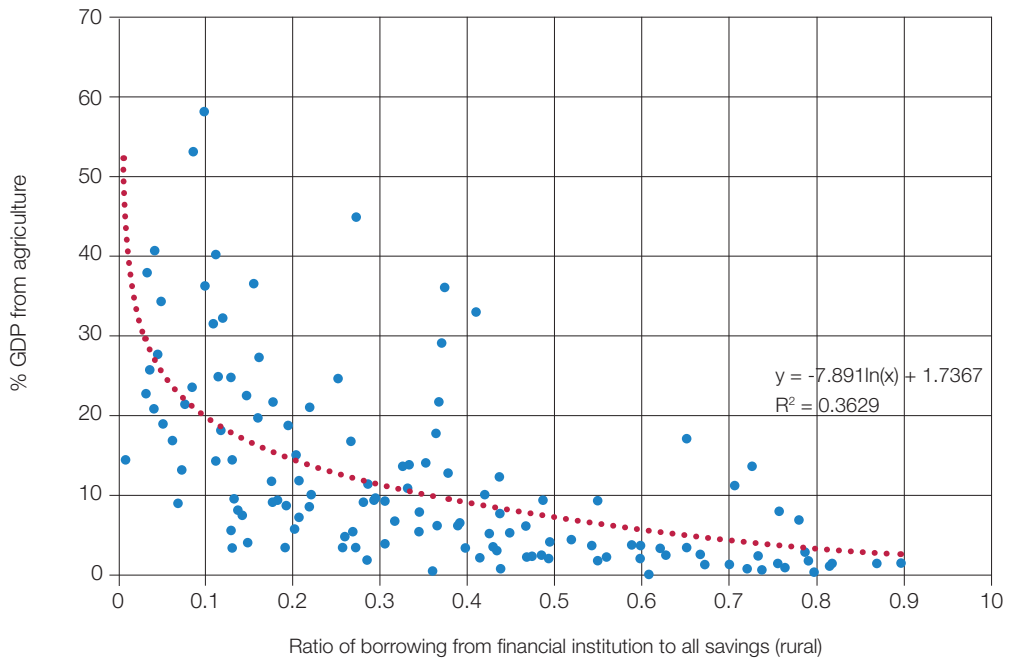
To address the first question requires understanding the interactions between agricultural productivity and credit. It highlights factors affecting demand and supply and reviews the literature on agricultural credit demand. It discusses risk rationing, an important barrier to demand, and reviews a broad literature showing the empirical relationship between agricultural productivity and credit. In addressing the second question, a number of alternative financial innovations and structures are explored, including group lending and microfinance that have evolved over time to address credit issues. The third question addresses the future of agricultural and rural finance. Going forward, governments should continue to pursue openly inclusive policies for agricultural finance. Significant barriers still need to be overcome. First, for both borrowers and lenders, covariate and systematic risks increase financial risks significantly. This increased risk reduces credit supply, credit access and credit demand. This suggests that credit policies should be risk balanced and flexible.

Figure 1: Agricultural GDP (%) and rural borrowing from formal financial institutions



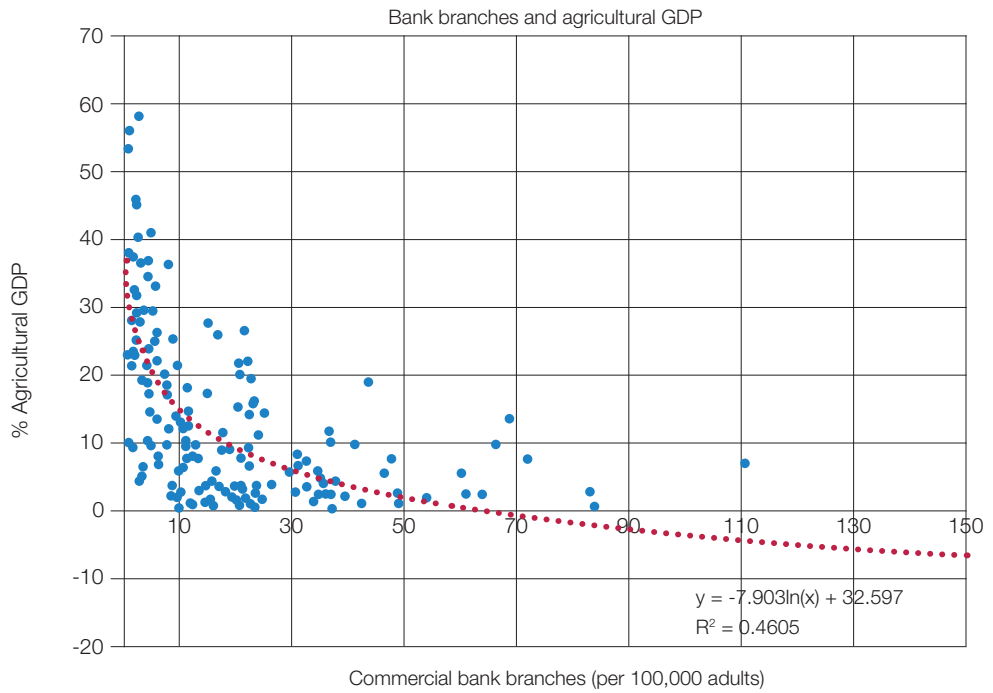
Source: World Bank; Global Findex (Global Financial Inclusion database), 2015.

Figure 2: Agricultural GDP (%) and rural savings at formal financial institutions



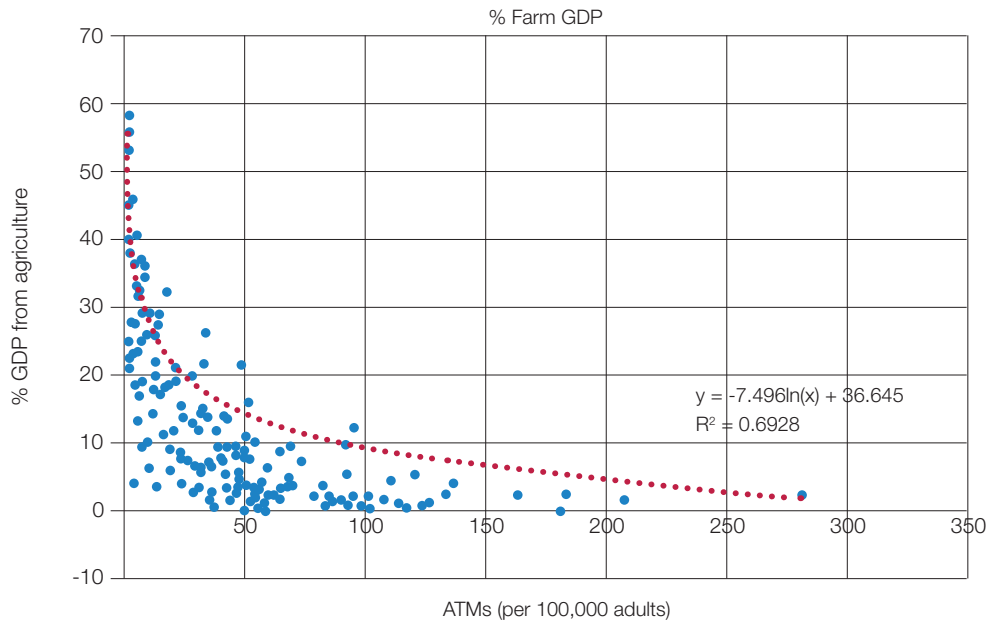
Source: World Bank; Global Findex (Global Financial Inclusion database), 2015.

Figure 3: Cross-country relationship between agriculture's contribution to GDP and commercial bank branches



Source: World Bank; Global Findex (Global Financial Inclusion database), 2015.

Figure 4: Cross-country relationship between agriculture's contribution to GDP and automated teller machines (ATMs)



Source: World Bank; Global Findex (Global Financial Inclusion database), 2015.

# Rural financial inclusion and the broader processes of structural and rural transformation

## Box 1: Some challenges to agricultural finance in development

1. Reaching rural clients efficiently and cost effectively.
2. Maintaining liquidity in agriculture-dependent areas amid seasonal income cycles, economic crisis and regulatory constraints.
3. Mitigating covariant agricultural risk.
4. Adapting loan products to meet the specialized needs of rural borrowers.
5. Overcoming poor lending precedents and improving the repayment culture.
6. Developing technical capacity at the local level.

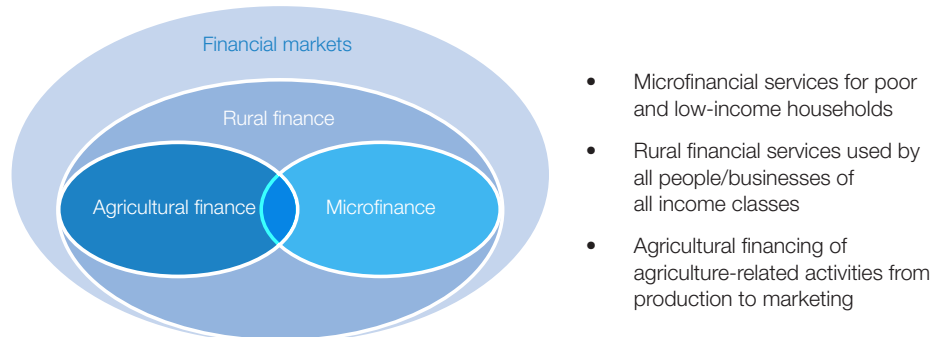
Source: CGAP and IFAD, 2006.

## The current state of credit access and agricultural finance

Providing financial services to agricultural and rural populations, particularly in the developing world, has many challenges that are not so common in urban financial markets. Some of these challenges, identified by the Consultative Group to Assist the Poor and the International Fund for Agricultural Development (CGAP and IFAD), 2006, are listed in box 1. The challenges deal with distance and remoteness, seasonality, risks, liquidity, financial education and technical capacity. Overcoming these challenges is critical to addressing barriers to financial inclusion in rural and agricultural communities in developing countries.

In this section, we address the question of how the growth of demand for financial services is related to the broader processes of structural and rural transformation. A critical link to inclusive rural transformation is an inclusive financial system. The general structure of the financial system is depicted in figure 5. Within the financial system affecting rural transformations is lending for rural development and enterprises, of which a subset is for agricultural purposes. The nature of rural and agricultural lending can be through formal banks and lenders, cooperatives and so on, but an emerging source of credit and financial services is through microfinance institutions (MFIs). While microfinance is significant in many rural areas, many MFIs do not lend to agriculture at all. This section first provides an overview of inclusive finance with a particular emphasis on rural financial inclusion. While not exhaustive, it explores several important areas, including the role of MFIs, credit constraints and the returns to credit access, and small farm and gender biases in agricultural credit.

Figure 5: The financial market



Source: IFAD, 2010, see Meyer, 2011.

### Financial inclusion defined

Given the potential benefits of the access and use of agricultural credit, and the social costs of credit rationing, credit constraints or credit supply, development goals seek out more inclusive financial arrangements for rural and agricultural regions. Financial inclusion can be defined as the delivery of banking services at an affordable cost to the vast sections of disadvantaged and low-income groups (Dev, 2006); or a process that ensures ease of access, availability and usage of the formal financial system for all members of an economy (Sarma and Pais, 2011; Beck, Ross and Loayza, 2000; Beck, Demirgüç-Kunt and Peria, 2007; Beck, Demirgüç-Kunt and Levine, 2007; Chakravarty and Pal, 2013) with reasonable cost, fair and safe financial services (such as credit, deposits and insurance). Increased access to credit does not imply increased use of credit. Financial inclusion, therefore, is aligned with both access and usage (Beck and Demirgüç-Kunt, 2008; Demirgüç-Kunt, Beck and Honohan, 2008). As a matter of balance, inclusive finance policies are designed to balance growth and redistribute capital resources through policy interventions using the tax system, regulation, capital controls, guidance and moral suasion. From this point of view, inclusive finance can be seen as a mechanism to facilitate the expansion of financial depth in parallel with, rather than in tandem to, credit supply in the more profitable factor markets. It is, as Lin (2011) suggests, the process of industrial upgrading by addressing externality and coordination issues.

*“What we need now is to move from a system in which the poor participate in officially-led development programmes towards one in which governments and external donors support people-initiated development. That must be the true objective of all of us: the empowerment of the poor, allowing them to gain greater control over their lives and futures.” Fawzi H. Al-Sultan, President of IFAD*

*Conference on Hunger and Poverty, 1995.*

Source: IFAD, 2001.

In a recent essay, Stiglitz (2011) states that government not only has a restraining role with respect to strong financial regulations, but also has a constructive and catalytic role in promoting entrepreneurship, providing the social and physical infrastructure, ensuring access to education and finance, and supporting technology and innovation. The role of financial sector development and income inequality is an important part of the financial inclusion discussion, but it is a murky discussion, especially from an evidentiary point of view. One can see the conflict that arises with what are viewed as financially repressive policies and policies targeted towards rural and agricultural development and financial inclusion. Markets will favour high return, low-risk sectors of the economy, and any policies to divert credit to seemingly lower return and higher-risk sectors will repress the free market on interest rates and thus reduce the supply of credit. With neo-liberal financial policies, the first-stage beneficiaries are generally the urban-industrial class and not the rural poor. Until it is the farmers “turn” in this pecking order to borrow surplus funds, they are relegated to menial and backward production practices and often enough trapped in persistent poverty or close to it.<sup>2</sup> Thus, if financial inequality rises generally against poorer households (at least in the short run), this is exacerbated for largely agrarian economies, as illustrated in figures 1-4. Economic transition can be more inclusive with developed infrastructure, and more so if that were coupled with inclusive finance. On the other hand, the social benefits of the financial inclusion policy are not likely to be high without the right institutions and infrastructure in place (Lin, 2011).

*The choice is not between an imperfect government and a perfect market. It is between imperfect governments and imperfect markets, each of which has to serve as a check on the other; they need to be seen as complementary, and we need to seek a balance between the two—a balance which is not just a matter of assigning certain tasks to one, and others to the other, but rather designing systems where they interact effectively (Stiglitz, 2011: 233).*

#### Box 2: 10 goals of inclusive finance

1. To promote broad-based urban consumer/industrial and rural household/ agricultural and industrial development.
2. To promote consumer protections and financial system integrity.
3. To alleviate poverty through public-private relationships.
4. To reduce income disparities and income inequality within and between rural and urban areas.
5. To improve access to financial services by poor, vulnerable and less privileged people.
6. To promote financial services that are gender-neutral and culturally sensitive.
7. To broaden financial services for those without access.
8. To deepen financial services for those with minimal access.
9. To improve financial literacy.
10. To design/develop/promote targeted financial products to meet the needs of farm households and other rural borrowers.

2. See, for example, Sahn and Alderman (1988); Schultz (1993); Thomas and Strauss (1996); Carter and May (2001); Carter and Barrett (2006); Morduch (1994, 1995); and Carter and Olinto (1993).

## Promoting financial depth and breadth through inclusive financial policies

Many countries are explicitly addressing the problem of financial inclusion by creating new institutions, laws, regulations and guidance on rural financial sector reforms. At the turn of the millennium, IFAD, the World Bank (2003), the International Monetary Fund and other donor organizations came to the realization that financial markets were not going to develop in step with the urban-industrial pace. There was a need to deliver financial services to the poor, to enable them to access and secure financial assets, and to develop linkages with NGOs and private-sector partners for service delivery. They too sought a shift in the structure of institutions and the laws, customs and administrative practices that determine whether the poor benefit from increased access. Many countries followed suit. Box 2 lists ten common goals that governments are targeting in their inclusive financial policies and programmes. Kenya's Vision 2030, for example, lays out a strategy to upgrade financial services to world-class standards by promoting savings, lowering the cost of capital, increasing the supply of investable funds, encouraging bank branches in rural areas, developing and aligning banking services with information communication technology, including mobile technology, and to promote quasi-banking institutions, such as MFIs, savings and credit organizations, and rotating savings and credit associations. A recent report from the Asian Development Bank describes actions in five Asian countries, including China, India, Thailand, Indonesia and the Philippines. In keeping with the IFAD declarations on income inequality and rural poverty, the Asian Development Bank report highlights how governments and banking authorities, often with the help from NGOs and donor agencies, have developed a host of financial institutions, including agricultural banks, village banks, credit unions, cooperative banks, microfinance institutions, and related services such as agency banking, postal savings, point of sale, full-function ATMs, and mobile and e-banking. Some of these activities are directed at savings, deposits and withdrawals, while others are directed at credit access.

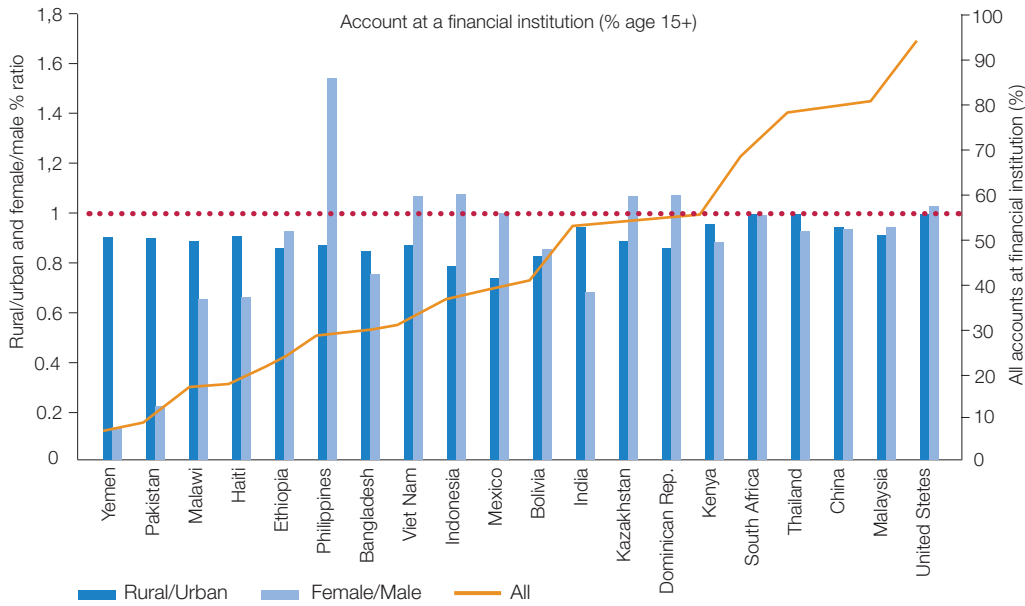
## Measuring financial inclusion

A significant effort has been made at measuring financial inclusion, including financial depth and breadth. The most comprehensive measures can be found in the Global Findex database (Demirgüç-Kunt and Klapper, 2012), which provides numerous measures on use (as opposed to access) of financial services. These include metrics related to holdings of formal accounts at formal institutions, frequency of use and mode of access, the purpose of the accounts (business or personal), access to debit or ATM, receipt of funds from wages, government or remittances, savings activities, formal and informal borrowing and purpose of loans (agricultural or personal), credit card usage, and insurance.

Figures 6 to 9 illustrate some measures of inclusive finance for a subset of 20 nations. Figure 6 shows the frequencies of people with accounts at formal financial institutions for a selection of countries (right-hand axis) and the relationship between rural and all respondents and women to men on the left-hand axis. Figure 7 shows borrowings from formal financial institutions as a percentage of all borrowings, and figure 8 shows savings activities at formal institutions and/or savings clubs, such as rotating savings and credit associations. All three figures show wide disparities in access/usage of financial institutions, borrowing and savings across countries. Critically important is the observation that parity between rural and all households or women and men is conditioned on the breadth of access to financial institutions and must be interpreted in context. For example, in figure 6, given that a respondent has an account at

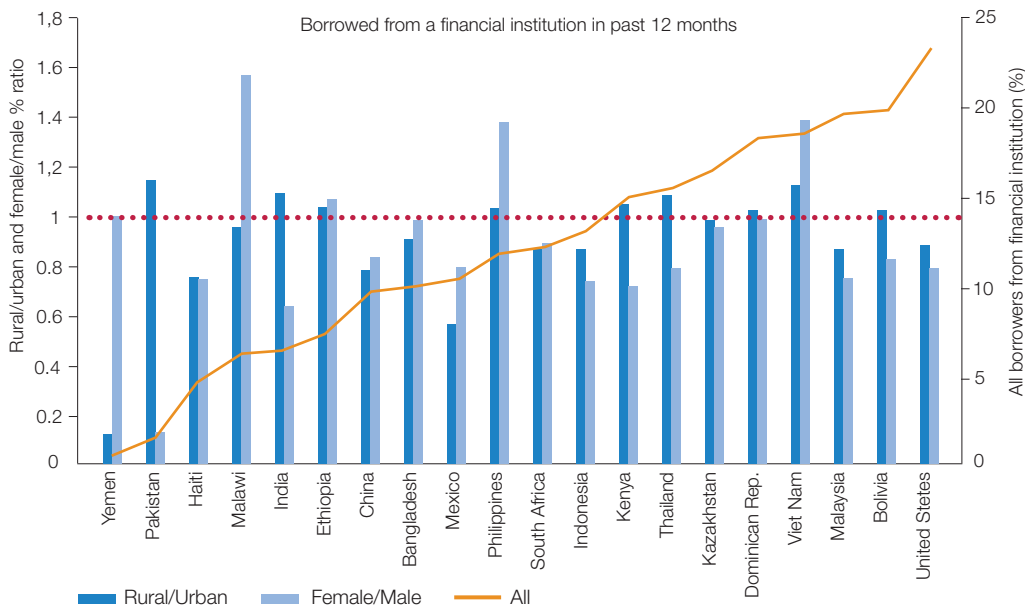
a financial institution, one might compare approximately 90 per cent rural parity in Yemen equivalent to rural parity in China, but such measures are meaningless when only 6.45 per cent of Yemeni versus 79 per cent of Chinese have accounts. Nor, as in figure 7, can near-gender parity in Yemen be meaningfully or beneficially compared with 79 per cent gender parity in the United States of America, when only 0.42 per cent of Yemeni respondents borrowed from a financial institution compared with 23.25 per cent in the United States of America.

Figure 6: Holding account of any kind at a formal financial institution



Source: World Bank, Global Findex (Global Financial Inclusion database), 2015.

Figure 7: Rural and gender parity in borrowing from financial institutions in past 12 months



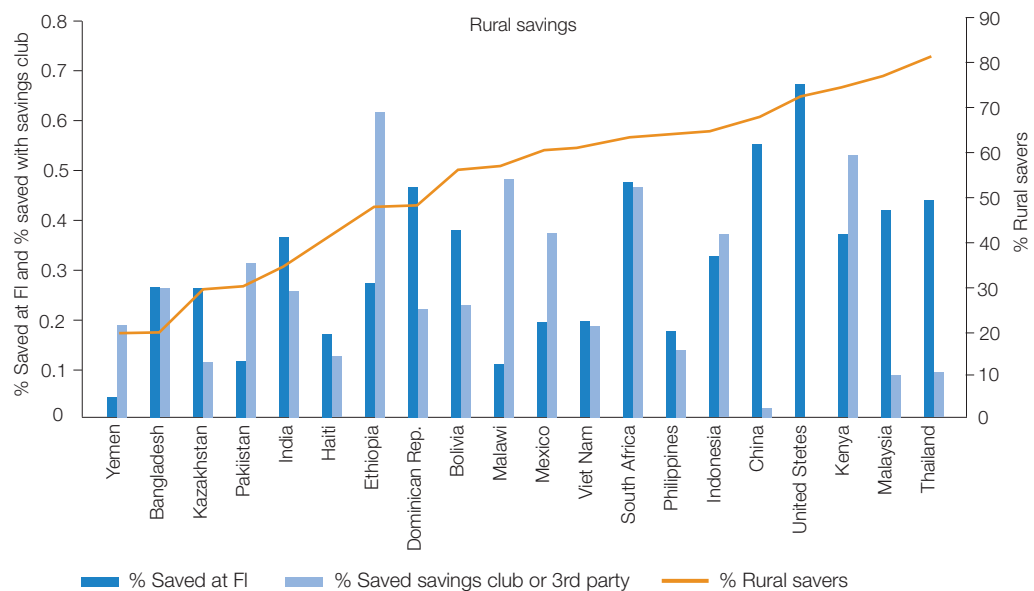
Source: World Bank, Global Findex (Global Financial Inclusion database), 2015.



In the absence of formal institutions, rural households have found alternative mechanisms for savings and borrowing. Figure 8 examines the relationship between formal savings and savings clubs or savings with third-party individuals. The comparison is not exhaustive with other savings mechanisms, such as hoarding or investing excluded, but the figure shows a wide variance in the two mechanisms. Savings clubs are popular in African nations, such as Ethiopia, Kenya, Malawi and South Africa, but virtually non-existent in China, and in much lower amounts in Latin America, Eastern Europe and Asia. Figure 9 shows equal diversity in terms of sources of credits, with the Dominican Republic and India relying heavily on informal sources and many others regions borrowing from friends and relatives. Closer analysis of these data points also suggests that borrowing formally and borrowing informally are statistical substitutes, as are familial borrowing and formal borrowing; however, there is no statistical relationship between informal and familial borrowing.<sup>3</sup>

What is meaningful is the recognition that in many developing countries financial inequality and barriers to inclusiveness are linked to financial sector development and financial breadth. These observations are in line with other assessments, including Demirgüç-Kunt and Klapper (2012) and Dabla-Norris et al. (2015), that provide some evidence that relaxing financial constraints leads to improved GDP. But to what effect is largely dependent upon each country and its respective legal, regulatory and institutional frameworks, and supporting information environment. The institutional framework should not exclude the strength of culture and social networks that rely on informal sources of credit as a form of risk-sharing and reciprocity.

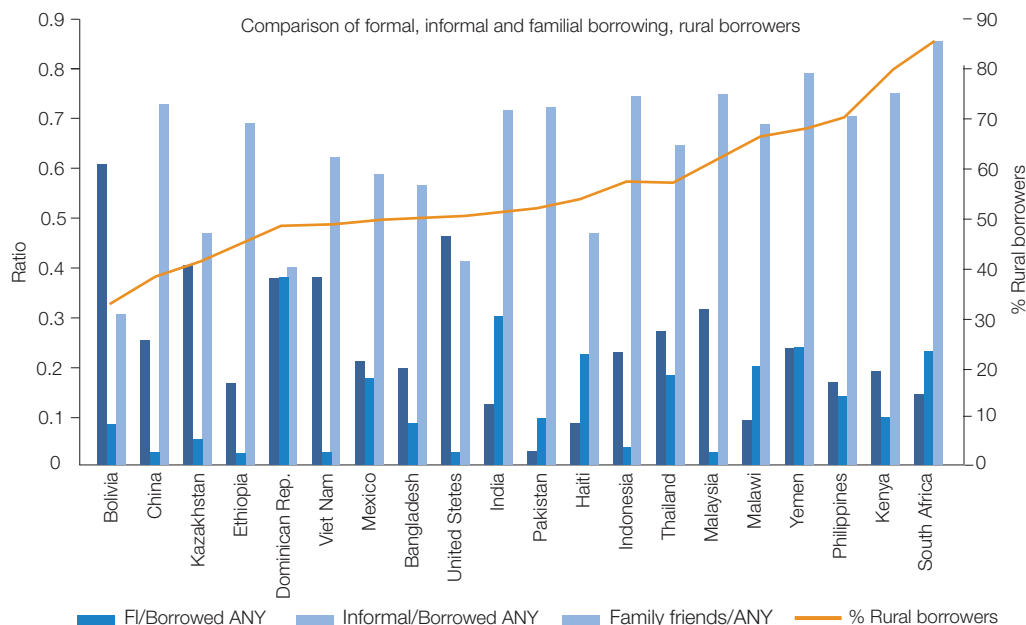
Figure 8: Savings mechanisms for rural savings, including formal financial institutions and savings clubs or third-party individuals



Source: World Bank, Global Findex (Global Financial Inclusion database), 2015.

- While evidence suggests a bias against small farms in the formal sector, this does not necessarily imply that informal borrowing is a consequence of credit rationing. For a variety of reasons, including reciprocity, risk-sharing and kindness, Chinese farm households may believe these social arrangements provide greater inclusion than the formal system, and in fact may crowd out the formal sector (Turvey and Kong, 2010; Turvey et al., 2010).

Figure 9: Credit sources for rural borrowers from formal financial institutions, informal financial institutions and family and friends



Source: World Bank, Global Findex (Global Financial Inclusion database), 2015.

## Microfinance and agricultural development

As the role of agricultural development projects from development banks shifts towards market-driven private or public-private financial relationships, access to MFIs and agricultural credit funds are becoming increasingly important (Hartarska and Holtmann, 2006). In this process, Zeller (2006) discusses the importance of friends and relatives, informal moneylenders and pawn brokers, tied credit (in marketing channels), solidarity groups, Grameen-style group-lending programmes, credit unions, state ownership, village banks and so on. Because many MFIs tend to shy away from agricultural production, these various specialized financial institutions are targeted towards agricultural development, rural development, village development and regional development. In most cases, the borrower must have some “skin in the game” in the form of cooperative shares, contributions to group savings, savings on deposit at an institution or joint liability. MFI group-based lending was seen as an important innovation since group cohesion controlled for adverse selection and peer pressure reduced moral hazard. This same mechanism is important for a number of aligned credit products, such as credit cooperatives and mutual and rotating savings and credit associations. But there is also a strong relationship between savings and other financial products (such as insurance) and services and loans (Gonzalez-Vega, 1994), and Hartarska and Holtmann (2006) point out that MFIs and lending operations, such as Bank Rakyat in Indonesia and Equity Bank in Kenya, owe much of their growth to savings activities. Despite significant developments in MFIs, CGAP and IFAD (2006) identified ten features of microfinance for agricultural development (see box 3), which capture the essential elements of providing microfinance to agriculture.

Not all of these are implemented by MFIs, but as a set of guidelines they are consistent with observed practices and the research literature on the subject.

Meyer and Nagarajan (2006) describe several studies on rural MFIs and agricultural development, and report mixed results ranging from slightly positive impacts on consumption and consumption smoothing, and some impact on education for boys. An important observation is that the greatest impact of MFI borrowing was with the first loans and diminishing returns thereafter, which could indicate that even in small amounts the credit's value is highest for farms operating in the range of increasing returns to scale. While training/extension and outreach appear to help in things like loan repayment and group retention, the evidence is scant that these lead to higher asset or income accumulation. What is strongly evident is that to attract rural clients into an MFI, and also to attract an MFI to rural clients, financial products have to focus on managing risks and adapting to the long cycles of agricultural production and the remoteness of agricultural and rural communities. Some MFIs have made this attempt. The Grameen Bank attempted to link microloans to livestock in the 1990s, but the costs were prohibitively high and pooling of risk was inefficient. Other MFIs such as BASIX in rural India have partnered with local insurers.

#### Box 3: 10 features of microfinance for agriculture

1. Repayments are not linked to loan use.
2. Character-based lending techniques are combined with technical criteria in selecting borrowers, setting loan terms and enforcing repayment.
3. Savings mechanisms are provided.
4. Portfolio risk is highly diversified.
5. Loan terms and conditions are adjusted to accommodate cyclical cash flows and bulky investments.
6. Contractual arrangements reduce price risk, enhance production quality and help guarantee repayment.
7. Financial service delivery piggybacks on existing institutional infrastructure or is extended using technology.
8. Membership-based organizations can facilitate rural access to financial services and be viable in remote areas.
9. Index insurance can protect against the risks of agricultural lending.
10. Agricultural microfinance must be insulated from political interference.

Source: CGAP and IFAD, 2006.

But as Meyer and Nagarajan (2006) point out, successful microfinance development may need more than the provision of savings, credit and insurance facilities. MFI success might also be dependent upon outreach, technical assistance and market development. For example, in India, the MFI SRIJAN recognized that simply providing financial services to unbanked rural areas without financial education or technical assistance would be futile (Pal, Pradhan and Bais, 2015). The district of Bundi in Rajasthan, India, is a poor area with little technical knowledge of agriculture and with a high reliance on moneylenders. Starting with 50 women farmers in 2008, and working jointly with Bunge Ltd, SRIJAN took a multiple-pronged approach to microfinance, which included outreach and technical assistance to the scientific growing of soybeans. In 2009, SRIJAN organized self-help groups of women, scaled up soybean production, and provided access to credit. By 2010, the number of farmers involved in the soybean project reached 3,000, and a decision was made to start a collective organization that could procure seed and other inputs in bulk at a lower cost and to gain market power in negotiating prices. By 2013, with over 13,000 members, Samriddhi Mahila Crop Producer Company Limited (SMCPCL) expanded its services to warehousing. These actions served to reduce business risks while smoothing consumption. As of 2014-2015, SMCPCL was mobilizing self-help groups to establish small businesses of their own.

Examples such as SRIJAN notwithstanding, a key question is whether microfinance has actually been transformative? Recent research suggests that the actual gains may be modest at best and not the panacea that experts have hoped for. The question at this point is critical because it brings into question whether financial inclusion is a real driver of inclusive rural transformation. There is no doubt (as illustrated in figures 1-4) that there exists a statistical linkage between various forms of financial inclusion and economic growth and prosperity, but the causal link is somewhat elusive and mixed. In the agricultural finance literature, for example, much emphasis is on factors leading to supply of, or demand for, credit, but it is not often clear whether access to credit (or savings facilities) leads to improved household income or whether it is the higher-income household that is better able to acquire credit. An abundance of evidence suggests that firms with more (but not excessive) debt generally have higher incomes and higher productivity.

In a review of six randomized control trial (RCT) studies, Banerjee, Karlan and Zinman (2015) conclude that the microfinance promise, at least in terms of credit, has not been realized to the full potential hoped for. Results from the RCTs indicated, with some heterogeneity across studies, that take-up rates of microcredit are modest, that in general the adoption of microcredit was not transformative to borrowers and was not transformative to business growth and entrepreneurship. On this latter point, there are some indications of increases in investments, but no evidence that these increases (or any other factor) leads to statistical evidence of improvements in household income, consumption or poverty reduction. Some evidence supports benefits on freedom of choice and lifestyle issues, but not strongly and not universally. There is some evidence that borrowers substitute other forms of borrowing (e.g. informal loans in India), for MFI loans, but no evidence that having received an MFI loan borrowers then seek out additional sources of credit.

In one of the RCTs conducted in rural Amhara and Oromiya, Ethiopia, Tarozzi, Desai and Johnson (2015) randomized households into three treatments – microlending only, family planning programmes (FPP) for contraceptive use and both microlending and FPP – and a control (neither treatment). Of the households that received loans, 83 per cent was used

for productive purposes. However, upon examining the treatment effects, they found no statistical (at the mean) evidence that increases in borrowing led to non-farm business creation, improved non-farm business monetary outcomes, improved revenues from crop sales, and increased land cultivated. The impact on the volume of livestock holdings was wide and both positive and negative, with no statistical gain on average, but the value of sales was positive and significant. No impact was observed on wages, self-employment income, other income, labour supply, women's time spent on economic activities or women empowerment, and schooling attendance.

Studies such as these should be interpreted with great care, and only as a cautionary note about becoming overenthusiastic about the role of microfinance in economic development. Sometimes it works, and sometimes it does not; but if the general conclusion is that microfinance is not transformative, then entirely new principles on delivering inclusive financial programmes, including credit, will need to be re-evaluated. However, a significant number of agricultural studies examining inframarginal linkages have shown substantial gains in input use, productivity, income, and assets for households using credit when compared with those without.<sup>4</sup>

### Credit constraints and the returns to credit access

Inclusive transformation also requires that all members of the economy are involved in change, yet most studies show a bias against small- and low-income and/or low-wealth households. In a study of 595 farmers in the Brong Ahafo region of Ghana, Awunyo-Vitor et al. (2014) found that farmers do face credit restrictions, with rationing less likely for households with off farm income, larger farm sizes, larger savings and a commercial orientation. Abaru et al. (2006) found that credit demand of peasant farmers in Uganda was not well met relative to other income classes. Other barriers to access include property rights and the rights of collateral. Simtowe, Diagne and Zeller (2008) found in a study of Malawi farmers that farms with larger landholdings had higher credit constraints, which is perhaps due to availability of credit supply or unsecured property rights. In a Ugandan study of women borrowers, it was found that credit access was reduced for cotton, beans and rice, which are distinct from other crops in that the input demand bundles were larger than for other crops. Thus, lenders may be more inclined to restrict lending to crops they believe require substantial cash outlays (Abaru et al., 2006).

When credit is constrained or rationed and the benefits from credit do not materialize, farmers must cope in ways that are not economically or socially optimal. Figure 10 tabulates responses from a selection of countries for people who find obtaining emergency funds impossible. Groupings include rural in proportion to all respondents, the ratio of women to men, and the ratio of poor (lower 40 per cent) to rich (upper 60 per cent). In all regions without exception, lower-income households are more likely to be unable to obtain emergency funds as with rural households, and, with a few exceptions, women find it more difficult than men. Strikingly, these observations hold even for well-developed economies, such as the United States of America, which, along with China, shows a significant bias against low-income households.

4. See, for example, Feder et al. (1990, China); Binswanger and Khandker (1995); Foltz (2004, Tunisia); Boucher et al (2008, 2009, Peru); Baiyegunhi, Fraser and Darroch (2010, South Africa); Duflo, Kremer and Robinson (2008, 2011, Western Kenya); Tadesse (2014, Ethiopia); Dong, Lu and Featherstone (2012, China); McKenzie and Woodruff (2008 in Mexico and 2009 in Sri Lanka for small non-farm businesses); Banerjee and Duflo (2008, India); and Ciaian, Falkowski and D'Artis (2012, Central and Eastern European transition economies).

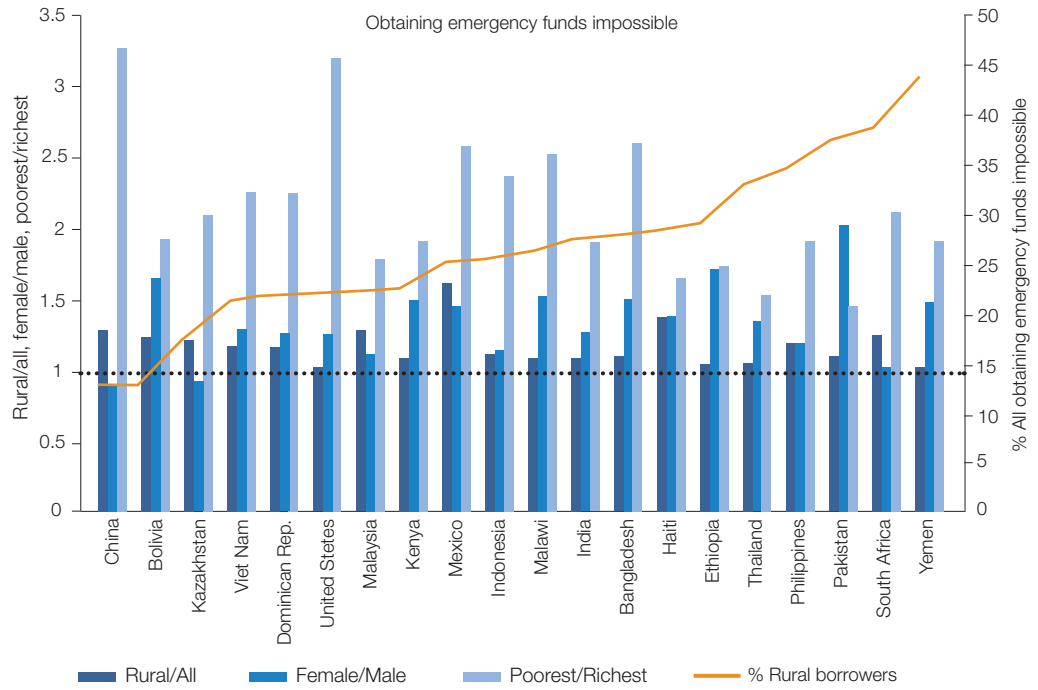
Biases in credit access have significant impacts on how households cope. For example, when Chinese and Indian farmers were asked how they would respond to increased credit constraints, approximately 90 per cent of farmers would substitute farm labour for wage labour, about 76 per cent would reduce agricultural inputs, 55 per cent would reduce health care and education expenditures, and 21 per cent of Chinese and 52 per cent of Indian farmers would reduce food consumption. The sale of productive assets would be a last resort (Kumar, Turvey and Kropp, 2013). Thus, not only do credit constraints impact optimal input use, productivity and incomes, but the coping mechanisms that come with the lack of credit have significant impacts on social welfare.

### Agricultural credit and gender bias

Figures 7, 8 and 10 include measures of gender parity for having an account at a financial institution, obtaining a loan from a financial institution, and ability to obtain emergency funds across 20 countries. In only 8 out of 20, 5 out of 20 and 2 out of 20 cases, respectively, was gender equal or favourable to women. With financial inclusive policies directed towards gender equality, it is evident that more can be done. For example, Abaru et al. (2006) reported that despite the intention of Uganda's rural farmers scheme with an intent of using 60 per cent of available funds for women, women had higher repayment rates and higher loan approval rates, but, without explanation, lower disbursement rates. Furthermore, women applicants (at 17 per cent of total) were far fewer than men, so the 60 per cent loan target could never actually be met. Low disbursement rates might have arisen because lenders ultimately felt that women were riskier borrowers (which was not supported by the data), or perhaps because women simply were more prudent in using only the loan amount required rather than the approved or available.

A similar result was found in a study of 200 women farmers in Ghana, where the Bank of Ghana has been encouraging rural banks since the 1970s (Akudugu, Egyir and Mensah-Bonsu, 2009). While only 26 per cent of rural loans went to agriculture, near parity was observed for women (44 per cent). In terms of volume of agricultural loans granted, lending to women was higher (54 per cent), but non-agricultural rural loans went mostly to men (59 per cent). Even so, of those women who did not apply for credit, or those that applied but did not receive credit, a critical barrier was not having a savings account with the rural bank. Thus, women (and supposedly men too) had little knowledge of lending processes (lack of financial education), or who for one reason or another could not accumulate savings, were excluded from borrowing. Another factor affecting these Ghanaian women farmers was the distance to rural banks, which stresses how activities such as mobile or agency banking could impact financial inclusion in a positive way. These examples highlight the need to investigate inclusiveness and borrowing behaviour, and to develop financial education programmes for both borrowers and lenders on gender issues.

Figure 10: Relationship between impossibility of obtaining emergency funds for rural households, women to men, and lower-income households



Source: World Bank Global Findex (Global Financial Inclusion database), 2015.

# The demand for financial services in the processes of structural and rural transformations

## Introduction

Access and use of credit, as discussed in sections above, show promising returns to investing in inputs and technology. Yet, in many jurisdictions, the cost of capital (interest rates, distance, application costs, etc.) or the collateral requirements ration farmers out of the credit markets. This section discusses whether and how innovations in rural finance contribute to making access to financial services and the rural transformation more inclusive, and what are the adverse (exclusion) effects of such changes. To do this, this section delves deeper into some of the more important demand characteristics that has driven, or that will ultimately drive, successful rural transformation through inclusive financial services. At some level, all three – savings, credit and insurance – affect credit demand. Savings products, for example, can be used not only for planned expenditures such as agricultural investment, education or celebrations, but can also be drawn down to smooth consumption or meet other unexpected outcomes such as crop failures, natural catastrophes, illness and the death of a main provider, and so on. Savings programmes for the rural poor are generally designed to smooth consumption and to provide a mechanism to cover emergencies and other unexpected emergencies. While the savings themselves are a source of liquidity, when savings motives are other than precautionary, they can also be used as financial collateral against emergency loans. Perhaps even more important is that the accumulation of savings in deposit-taking institutions increases the overall supply of credit and reduces credit rationing. Thus, the relationship between household savings and lenders is an important part of the financial deepening process. While financial services include savings facilities, agency banking, information communication technology and mobile banking, and so on, the focus here is on two critical aspects of credit demand. These demand characteristics are not exhaustive, but important and broadly applicable. The demand for credit with a particular focus on empirical estimates of demand elasticities is examined first. This discussion is broadly applicable to understanding price rationing in credit markets. Second, risk-rationing is discussed, which offers a utility-centric behavioural approach to credit demand by identifying risk aversion and collateral loss as major barriers to credit demand and use. This provides insights into certain behavioural characteristics of non-price rationing in credit markets.

## Credit and credit demand

Surprisingly, little has been written on factors affecting the demand for agricultural credit in developing countries, how demand is affected by interest rates changes, and how risk affects demand. Access to credit is important, not only for meeting the direct needs of agricultural production and household needs such as housing, education and health care, but also for the available untapped credit reserves that are available as an important source of liquidity



(Barry, Baker and Sanint, 1981) to deal with idiosyncratic or personal shocks. In other situations, a farmer may not use all of the credit made available, holding some back as a reserve to ensure that under no circumstances would working assets or inventory need to be sold at depressed prices.

It is generally assumed that credit demand is highly inelastic, but empirical evidence suggests that this may not hold true generally.<sup>5</sup> That demand characteristics are heterogeneous and become more elastic as interest rates decrease has important policy implications (Meyer, 2011). First, it is often argued that because interest rates are highly inelastic, then imposing interest rate ceilings or providing subsidies in support of transformative policies will have little effect on borrowing behaviour. But if credit demand is elastic, or increasingly elastic as interest rate falls, then interest rate policies can influence credit demand. This would be especially beneficial if policymakers wished to encourage specific types of technology or induce farmers to switch to different forms of agriculture. The effect is to increase the returns from the new investment to the farmer, thereby removing risk or cost barriers relative to the status quo.

In an interesting RCT directed towards agricultural lending, Beaman et al. (2014) investigated the relationship between binding liquidity constraints and credit demand among Mali farmers. The authors provided cash grants to unbanked villagers in communities without access to credit, and in communities with access to credit randomized similar grants to borrowers and non-borrowers alike. The proposition was that in the presence of existing liquidity constraints, the investment returns from a cash injection in unbanked villagers would be higher than those in banked communities. In the banked communities, borrowers will already have self-selected into the credit market to exploit higher average returns, while non-borrowers would have achieved the higher returns to investment through savings or other means. In either case, the hypothesis was that farmers in banked communities did not face the same liquidity constraints as those in unbanked communities. The findings show that relaxing liquidity constraints in unbanked villages induced a small increase in land cultivated and labour, but increased fertilizer and chemical use by 14 per cent and 19 per cent, respectively. This investment response was not found in banked communities, suggesting that because credit was available and used, or not used because of alternative sources of liquidity (e.g. savings or informal credit), farmers were already optimizing input use. These results are in line with classical production and credit models of agricultural economics. Binswanger and Khandker's (1995) study of liquidity constraints and self-selection in India found that the elasticity of fertilizer use with respect to credit ranged from 0.25 to 0.39

5. Estimates of credit demand and credit demand elasticities are quite rare and estimated using varied techniques, which make comparison difficult. Nonetheless, the evidence suggests that credit demand elasticities should not be assumed highly inelastic. Estimates of credit demand elasticities for agricultural and non-agricultural borrowers include Weersink, Vanden-Dungen and Turvey (1994, United States rural farmers, United States Department of Agriculture, USDA, survey data) with elasticity estimates between -0.84 and -0.69; Bell, Srinivansan and Udry (1997, Punjab rural farmers, World Bank survey data) with an elasticity estimate of -0.22; Kochar (1997 a,b, India rural farmers using Government of India survey data) who found credit demand inelastic; Gross and Souleles (2002, United States of America credit card holders bankcard issuer account archives) who found a short-run elasticity estimate of -0.80; Dehejia, Montgomery and Morduch (2012, Bangladesh microentrepreneurs credit cooperative data) with elasticity estimates between -1.04 and -0.73; Karlan and Zinman (2008, South Africa working poor RCT with loan contract data) found elasticity estimates between -0.51 and -0.14; Turvey et al. (2012, Chinese farmers based on experimental build in field survey) mean elasticity of -0.6 and 20 per cent above -0.75 and 15 per cent above -0.1; and Bogan, Turvey and Salazar (2015, Dominican Republic microentrepreneurs with MFI, by survey and experiment) had mean elasticity of -1.0. Verteramo-Chiu, Khantachavana and Turvey (2014, 730 farm households in the Shaanxi province of China and 372 farmers in northeastern Mexico, choice experiment in household surveys) find heterogeneous elasticity measures from highly inelastic to highly elastic, more elastic at lower interest rates; at high interest rates quantity rationed farmers are more inelastic (less sensitive) than price rationed farmers; risk rationed farmers highly inelastic at high rates, but have more elastic demands at lower interest rates.

(a 1 per cent increase in credit demand increased fertilizer demand by between 0.25 per cent and 0.39 per cent), which accounted for a significant portion of overall supply response to credit, with significant spillover effects into non-agricultural employment and non-farm output.

### Risk rationing

Risk rationing is an important consideration to understanding credit demand in rural transformation and can explain many anomalies, puzzles and observations from many field studies that have observed farmers' reluctance to use credit when credit was available to them.<sup>6</sup> Risk rationing refers to situations in which farmers have a real demand for credit, or have access to credit but will not avail themselves of credit because of an aversion to losing collateral (Boucher, Carter and Guirkinger, 2008; Verteramo-Chiu, Khantachavana and Turvey, 2014). The risk-rationing paradigm not only accounts for liquidity constraints, but also explains why, when faced with increasing investment return opportunities, farmers do not use accessible credit. The impact on credit demand can be substantial, with numbers of risk-rationed farmers ranging from 6.5 per cent (China); 8.6-25 per cent (Peru); 12 per cent (Nicaragua); 16 per cent (Honduras); 32 per cent (Guatemala); to 35 per cent (Mexico). Consequently, many farmers unable to cope with the risk of significant production shocks avoid making risky investments in high return technologies, preferring instead to remain in low-technology regimes with near subsistence levels and often stuck in chronic poverty traps (Carter and Barrett, 2006; Barrett et al. 2007; Dercon, 2004; Eswaran and Kotwal, 1990).

6. General studies include Binswanger (1980); Binswanger and Sillers (1983); Eswaran and Kotwal (1990); Morduch (1995); Bell, Srinivansan and Udry (1997); Swain (2002); Bhattacharyya (2005); Skees and Barnett (2006); and Castellani (2014). Specific tests for risk rationing include Verteramo-Chiu, Khantachavana and Turvey (2014, China and Mexico); Barham, Boucher and Carter (1996, Guatemala); Boucher, Guirkinger and Trivelli (2009, Peru); Fletschner, Guirkinger and Boucher (2012, Peru); and Boucher, Carter and Guirkinger (2008, Peru, Honduras, Guatemala).

# Strategic challenges in financing structural and rural transformation

This section addresses the third question, What are the key strategies, institutional changes, policies and investments that can support one or both relationships? Several solutions are presented to the farm credit problem, including smart subsidies and tax incentives, government-sponsored enterprises, risk-contingent credit and flex loans. Intervention policies should recognize that there is no one-size-fits-all credit policy, that there is great heterogeneity across farmers and regions so that policies should recognize that not all farmers are alike, and that credit products for farmers should be designed for farming (Turvey, 2013). This is not an exhaustive set of policy interventions. Governments have many tools at their disposal. Instead, the focus is on interventions and policies that relate closely to the issues discussed above which target specific aspects of the farm credit problem in agricultural development.

## Smart subsidies and tax incentives

The notion that inadequate savings dampens deposits and leads to credit rationing was discussed in the Introduction. In these regions, subsidies to induce demand would be ineffective because of inadequate credit supply. Thus, in low-income areas characterized by low savings rates one policy option is to encourage lenders to increase the supply of credit by transferring funds from urban areas with substantial deposits. Available tools include tax policy, moral suasion, increasing credit supply through the rediscount window, and capital controls. For example, simply increasing the loan-to-deposit ratio can free up significant reserves for lending and lowering rates in the process. This is done regularly in China, where rural banks, rural cooperatives and village banks have higher loan-to-deposit ratios to meet demand. Also in China is a tax credit that banks can receive if they increase lending in poverty zones by a fixed target (e.g. 15 per cent, see Turvey, 2013).

Meyer (2011) recommends guidelines for smart or market-friendly subsidies in donor programmes that support microfinance institutions. His recommendations include subsidizing the institution and not the borrower in order to reduce distortions; avoid subsidies that undermine competition; subsidize the creation of public goods that benefit the entire financial sector; subsidize institutions where there is a natural spillover to non-subsidized institutions; identify quantitative performance measures for financial firms receiving subsidies; conduct comparative cost-benefit studies to identify subsidies that generate the greatest payoff; require grant recipients to demonstrate commitment through matching contributions; and design grants that clearly differentiate between grants and loans. As previously discussed, Adams and Vogel (1986) presented arguments against subsidies because it can distort input and output markets and repress credit to agriculture. And policies can

also have unintended consequences, with Ravallion (1988) cautioning that it is theoretically possible that a reduction in income variability through stabilization programmes can remove sources of variability favourable to farmers' periodic exit from poverty. In a study of stabilization programmes in India, Ravallion finds empirically that programmes are effective in reducing the depth of poverty but not so much the proportion of poverty. As history has shown, it is unlikely that paying interest rate subsidies directly to farmers will have welfare enhancing benefits (Adams and Vogel, 1986), nor would direct subsidies to lenders really encourage increased supply. But a smart subsidy based on measureable incentives that is pro-poor (see Meyer, 2011, Turvey, 2013) and economically efficient in terms of encouraging loan supply into poverty zones might be an effective direction for agriculture and rural policy.

### Government-sponsored enterprises

When agricultural growth is too slow, rural incomes too low, and market or environmental risks are high, markets will fail agricultural economies, with lenders seeking lower risk, lower cost and more profitable clients for funds. Under these circumstances, state sponsorship of farm credit through some form of a government-sponsored enterprise (GSE) may be required to provide adequate credit to farming and rural development. Two of the most developed agricultural economies have GSE for agriculture. In the United States of America, the Farm Credit System was developed on cooperative principles between 1913 and 1933 in response to market failures and disequilibrium in rural credit. Likewise, Canada established the Farm Credit Corporation as a crown corporation. Germany has a state bank dedicated to agriculture, and in terms of an emerging economy, the Government of Thailand established the Bank for Agriculture and Agricultural Cooperatives to lend directly to agriculture and rural communities on terms that are favourable and flexible to farmers. In all cases, the concept of a state-sponsored lender, operating alongside commercial lenders, arose from the unwillingness of the private sector to meet the needs of agricultural and rural development. Whether or not "public" and private lending has increased the general welfare is an empirical question that has yet to be answered with rigour, but the general assumption is that the imperfections in commercial lending to agriculture there is a role for government to play. But that role must be a smart role and built on principles of financial and sectoral soundness.

### Interlinked and risk-contingent credit

One of the most significant barriers to agricultural credit is risk. Risk increases the inelasticity of both demand and supply, restricting both access to and demand for credit even when investments would be profitable. Risk-contingent credit (or interlinked credit) is an agricultural loan product that reduces business risk through some form of agricultural insurance linked to an agricultural loan. The form of the insurance can be of any type, including weather, crop or prices.<sup>7</sup> Risk-contingent credit can reduce risk rationing behaviour and relax liquidity constraints in times of adversity and can lead to improvements in farmer utility, output, income and welfare. Because insurance payments come equal and opposite to those very states that give rise to financial risks, it is an ideal risk-balancing mechanism that can encourage

7. Studies that investigate or discuss risk-contingent or interlinked credit at the micro or farm level include Adams and Vogel (1986, describe crop insurance in the Philippines, Sri Lanka and India); Skees and Barnett (2006, El Nino); Carter (2011); Giné and Yang (2009, rainfall in Malawi); Karlan et al. (2011, prices in Ghana); Shee and Turvey (2012, prices in India); Shee et al. (2015, weather and prices in Kenya); Jin and Turvey (2002, weather in Canada); and Turvey, Bogan and Yu (2012, milk futures prices in New York). Studies on meso-insurance include Skees and Barnett (2006); Miranda and Gonzalez-Vega (2011); Miranda and Farrin (2012); Binswanger-Mkhize (2012); Collier, Katchova and Skees (2011); Collier and Skees (2012); and Weber et al. (2015).

greater, but safer utilization of credit.<sup>8</sup> Insurance can also substitute for collateral, providing an inclusive path for risk-rationed farmers, while savings held for precautionary purposes can, in the presence of agricultural insurance, be released as a source of liquidity to expand current investment. In RCTs, Giné and Yang (2009) investigated adoption of an operating loan in Malawi in which the payoff was determined by rainfall. About 33 per cent of farmers were offered conventional credit, and 20 per cent of farmers with risk-contingent credit accepted the loans. The Giné and Yang (2009) experiment illustrates how sensitive some farmers can be to the addition of a risk premium to the interest rate. Shee and Turvey (2012) compute risk premia on pulse crops in India, showing that the annual risk-adjusted interest rate ranged in the neighbourhood of 17 per cent to 32 per cent relative to a 12 per cent base.

Risk-contingent credit at the meso level has also been proposed as a solution to systemic risks that can affect the credit risk of lenders' portfolios and are designed to protect a loan portfolio against systemic default. Most applications are weather-indexed based applications, but concerns about weather-based products have been raised with respect to spatial basis risk (Woodard and Garcia, 2008; Norton et al., 2013; Binswanger-Mkhize, 2012), and how basis risk adversely affects the uptake of index-based insurance products (rainfall, heat, area yield).

At the macro level, risk-contingent credit usually takes the form of catastrophe bonds, but there are few applications of catastrophe bonds targeting the agricultural economy. Chantarat et al. (2007, 2008) investigate famine-linked bonds based on failure in long and short rains in Kenya. Also in Kenya, Sun, Turvey and Jarrow (2015) have proposed a multiple-tranche catastrophe bond issued in combination with treasury bonds to provide fiscal relief in the event short and/or long rains fail and treasury funds need to be diverted to famine relief and reconstruction.

### Flexible microfinance

Savings and credit products with inflexible and costly terms are not well suited to the planting and harvesting cycles in agriculture. Part of the inflexibility of loan terms is the belief that farmers are not creditworthy. Even Adams and Vogel (1986) who write critically of credit policies towards agriculture admit that delinquency rates are not that high, even with state run banks (Vogel, 1981), and this appears to be the case in many jurisdictions in the present, even when faced with considerable systemic risk.<sup>9</sup> Laureti and Hamp (2011) argue that the forced discipline in many micro savings, credit and insurance products may in fact hamper uptake because of liquidity mismatching. To Laureti and Hamp (2011), microfinance programmes cannot be both flexible and disciplinary at the same time as a matter of principle, yet through an extensive search they found nine disciplinary programmes that indeed had flexible terms that benefited clients. For example, in Thailand, the Bank for Agriculture and Agricultural Cooperatives not only provides loans of considerable duration for agricultural production and longer-term investments, but also takes into account the need to restructure when prices and/or yields fall from external factors, with some loans indemnified against large decreases in commodity prices (see also Townsend and Yaron, 2001).

8. The theory of risk balancing is developed in Barry, Baker and Sanint (1981); Gabriel and Baker (1980); Collins (1985); Featherstone et al. (1988); and Turvey and Baker (1989, 1990). Studies of risk balancing in developing countries are rare. Empirical studies directly evaluating risk balancing include Turvey and Kong (2009, China); Turvey et al. (2012, China); Ifft, Kuethe and Morehart (2015, United States of America); Uzea et al. (2014, Canada); de Mey et al. (2014, European farmers); and de Mey et al. (2015, Switzerland).
9. See, for example, Weber and Musshoff (2012, Tanzania); Pelka, Musshoff and Weber (2015, Madagascar); Castellani (2014, Ethiopia); and Turvey et al. (2011, China).

On the agricultural credit side, little work has been done on investigating flexible loans in agricultural development. Flexible loans are generally production loans tied to the planting and harvesting cycles of farmers (Weber et al., 2013), and because these loans are tied specifically to targeted production practices, Castellani (2014) adds further that flex loans should be monitored to control loan diversion (fungibility). Weber et al. (2013) evaluated flex loans in Madagascar and, importantly, found that by providing flex loans more farmers are willing to request loans, but the MFI was more likely to volume-ration flex loans. In an RCT study of non-agriculture, MFI borrowers in Calcutta, India, Field and Pande (2008) investigated the loan repayment terms of microloans. Having no flexibility in repayment, the control group were much more conservative in their investment strategy, whereas simply providing a few weeks to build up working capital reserves appeared to be sufficient to encourage larger and bolder investments.

## Summary and conclusions

This section summarizes and concludes this chapter and addresses the forward-looking third question on what key strategies, institutional changes, policies and investments can be employed to support financial inclusion and/or inclusive rural transformation. So far this chapter has investigated two intertwined and related questions. The first question discussed above was "How is the growth of demand for financial services related to the broader processes of structural and rural transformation?" The key lessons are that, by and large, the evidence shows that both marginal and inframarginal credit provides positive returns. Access and use of credit is correlated with higher incomes and asset values, and RCTs at the margin indicate that the link is causal. However, there is still a way to go. The evidence through regional studies at the macro level and household studies at the micro level show that there are still small farm and gender biases. In terms of creditworthiness, the evidence indicates that farms are creditworthy. Financial inclusion as a policy tool was also defined and discussed. One of the key points raised was that the liberalization of financial markets did not have the desired spillover effects into rural credit, and albeit imperfect from a market-oriented perspective, there is cause for public intervention. Already many countries are establishing offices or ministries for financial inclusion, but exactly what kind of interventions might best be employed will be discussed later in this section. However, an important aspect of the discussion is that microcredit may not unto itself be a panacea; effective microcredit programmes might also need to be coupled with outreach and technical assistance in order to achieve desired goals and objectives.

The next question addressed was how innovations in rural finance contribute to making access to financial services and the rural transformation more inclusive, and what are the adverse (exclusion) effects of such changes. The discussion focused on demand relationships, concentrating on three aspects of demand, including the demand for credit, credit demand elasticities, and risk rationing. The key results are that farmers who use credit have moderately inelastic to elastic demands. This implies that farmers are generally sensitive to interest rates, implying that policies that curb interest rates or otherwise lower the cost of credit may spur on credit demand. We raise the issues of risk-rationing to emphasize that there is also a behavioural aspect to credit that needs to be considered. Credit demand is constrained by collateral loss considerations, and is also constrained by risk. Policies that fail to consider collateral and risk may fail in the sense that a good number of farmers will either not borrow at all, or borrow lower amounts of credit.

Looking forward, this section recommends that policies targeting inclusive finance for inclusive transformation be targeted towards specific problems. If subsidies are required, they must be smart in the sense of minimizing distortions in the marketplace and, most likely, targeted towards lenders as incentives to increase loans in poverty or underserved communities, women

borrowers or indigenous peoples. When markets, for whatever reason, fail agriculture, it was also suggested that governments consider state run government-sponsored enterprises to meet farmers' credit demands.

Finally, lenders to farmers and rural communities, including MFIs, must reconsider their approach to disciplined savings and lending activities. Many farmers with credit demand will not borrow because the payment terms do not consider the risk or match the liquidity cycle of planting and harvesting. It is recommended that new approaches to credit product design be considered. These include risk-contingent credit, which introduces insurance into a credit product to risk-balance business and financial risks of both lender and borrower. To balance liquidity and reduce financial risks across seasons, lenders of any type making loans to farmers should be flexible and design loans according to the sequencing and timing of cash flow.



## References

- Abaru, B.M., Mugeru, A.W., Norman, D.W. and Featherstone, A.M., 2006. The Uganda rural farmers scheme: women's accessibility to agricultural credit. *Agricultural Finance Review*, 66(2): 215-234.
- Adams, D.W. and Vogel, R. C. 1986. Rural Financial Markets in Low-income Countries: Recent Controversies and Lessons. *World Development*, 14(4): 477-487.
- Akudugu, M.A., Egyir, I.S. and Mensah-Bonsu, A. 2009. Women Farmers' Access to Credit from Rural Banks in Ghana. *Agricultural Finance Review*, 69(3): 284-299.
- Awunyo-Vitor, D., Mahama Al-Hassan, R., Sarpong, D.B. and Egyir, I. 2014. Agricultural Credit Rationing in Ghana: What do Formal Lenders Look For? *Agricultural Finance Review*, 74(3): 364-378.
- Baiyegunhi, L.J.S., Fraser, G.C.G. and Darroch, M.A.G. 2010. Credit Constraints and Household Welfare in the Eastern Cape Province, South Africa. *African Journal of Agricultural Research*, 5(16): 2243-2252.
- Banerjee, A. and Duflo, E. 2008. *Do Firms Want to Borrow More: Testing Credit Constraints Using a Targeted Lending Program*. BREAD Working Paper No. 005, 2004, revised 2008.
- Banerjee, A., Karlan, D. and Zinman, J. 2015. Six Randomized Evaluations of Microcredit: Introduction and Further Steps. *American Economic Journal: Applied Economics*, 7(1): 1-21.
- Barham, B.L., Boucher, S. and Carter, M.R. 1996. Credit Constraints, Credit Unions, and Small-Scale Producers in Guatemala. *World development*, 24(5): 793-806.
- Barrett, C.B., Barnett, B.J., Carter, M.R., Chantarat, S., Hansen, J.W., Mude, A.G., Osgood, D., Skees, J.R., Turvey, C.G. and Ward, M.N. 2007. *Poverty Traps and Climate Risk: Limitations and Opportunities of Index-based Risk Financing*.
- Barry, P.J., Baker, C.B. and Sanint, L.R. 1981. Farmers' Credit Risks and Liquidity Management. *American Journal of Agricultural Economics*, 216-227.
- Beaman, L., Karlan, D. Thuysbaert, B. and Udry, C. 2014. *Self-Selection into Credit Markets: Evidence from Agriculture in Mali*. NBER Working Paper No. 20387, August 2014.
- Beck, T., Ross L. and Loayza, N. 2000. Finance and the Sources of Growth. *Journal of Financial Economics*, 58: 261-300.
- Beck, T., Demirgüç-Kunt, A. and Peria, M.S.M. 2007. Reaching Out: Access to And Use of Banking Services Across Countries. *Journal of Financial Economics*, 85 (1): 234-266.

- Beck, T., Demirgüç-Kunt, A. and Levine, R. 2007. Finance, Inequality and the Poor. *Journal of Economic Growth*, 12(1): 27-49.
- Beck, T. and Demirgüç-Kunt, A. 2008. Access to Finance: An Unfinished Agenda. *World Bank Economic Review*, 22: 383-396.
- Bell, C., Srinivansan, T. and Udry, C. 1997. Rationing, Spillover, and Interlinking in Credit Markets: The Case of Rural Punjab. *Oxford Economic Papers*, 49(4): 557-585.
- Bernhardt, D. and Backus, D. 1990. Borrowing Constraints, Occupational Choice, and Labor Supply. *Journal of Labor Economics*, 8(1, Part 1): 145-173.
- Bhattacharyya, S. 2005. Interest Rates, Collateral and (de-)Interlinkage: A Micro-study of Rural Credit in West Bengal. *Cambridge Journal of Economics*, 29(3): 439-462.
- Binswanger, H.P. 1980. Attitudes Toward Risk: Experimental Measurement in Rural India. *American Journal of Agricultural Economics*, 62(3): 395-407.
- Binswanger, H.P. and Sillers, D.A. 1983. Risk Aversion and Credit Constraints in Farmers' Decision-Making: A Reinterpretation. *The Journal of Development Studies*, 20(1): 5-21.
- Binswanger, H.P. and Khandker, S.R. 1995. The Impact of Formal Finance on the Rural Economy of India. *Journal of Development Studies*, 32(2): 234-262.
- Binswanger-Mkhize, H.P. 2012. Is There Too Much Hype about Index-based Agricultural Insurance? *Journal of Development Studies*, 48(2): 187-200.
- Bogan, V.L., Turvey, C.G. and Salazar, G. 2015. The Elasticity of Demand for Microcredit: Evidence from Latin America. *Development Policy Review*. Forthcoming.
- Boucher, S.R., Carter, M.R. and Guirkinger, C. 2008. Risk Rationing and Wealth Effects in Credit Markets: Theory and Implications for Agricultural Development. *American Journal of Agricultural Economics*, 90(2): 409-423.
- Boucher, S.R., Guirkinger, C. and Trivelli, C. 2009. Direct Elicitation of Credit Constraints: Conceptual and Practical Issues with an Application to Peruvian Agriculture. *Economic Development and Cultural Change*, 57(4): 609-640.
- Carter, M.R. 1988. Equilibrium Credit Rationing of Small Farm Agriculture. *Journal of Development Economics*, 28(1): 83-103.
- Carter, M.R., 2011. The Impact of Interlinked Index Insurance and Credit Contracts on Financial Market Deepening and Small Farm Productivity. Selected Paper. Annual Meeting of the American Applied Economics Association, Pittsburgh PA, July 24-26.
- Carter, M.R. and May, J. 2001. One Kind of Freedom: The Dynamics of Poverty in Post-Apartheid South Africa. *World Development*, 29: 1987-2006.
- Carter, M.R. and Olinto, P. 2003. Getting Institutions "Right" for Whom? Credit Constraints and the Impact of Property Rights on the Quantity and Composition of Investment. *American Journal of Agricultural Economics*, 85(1): 173-186.
- Carter, M.R. and Barrett, C.B. 2006. The Economics of Poverty Traps and Persistent Poverty: An Asset-Based Approach. *Journal of Development Studies*, 42(2): 178-199.

- Castellani, D. 2014. Shocks and Credit Choice in Southern Ethiopia *Agricultural Finance Review* 74(1): 87-114.
- CGAP and IFAD. 2006. *Emerging Lessons in Agricultural Finance: Selected Case Studies*.
- Chakravarty, S.R. and Pal, R. 2013. Financial Inclusion in India: An Axiomatic Approach. *Journal of Policy Modeling*. Available at <http://dx.doi.org/10.1016/j.jpolmod.2012.12.007>.
- Chantararat, S., Turvey, C.G., Mude, A.E. and Barrett, C.B. 2008. Improving Humanitarian Response to Slow-onset Disasters Using Famine-Indexed Weather Derivatives. *Agricultural Finance Review*, 68(1): 169-195.
- Chantararat, S., Barrett, C.B., Mude, A.G. and Turvey, C.G. 2007. Using Weather Index Insurance to Improve Drought Response for Famine Prevention. *American Journal of Agricultural Economics*, 89(5): 1262-1268.
- Ciaian, P., Falkowski, J. and d'Artis, K. 2012. Access to Credit, Factor Allocation and Farm Productivity: Evidence from the CEE Transition Economies. *Agricultural Finance Review*, 72(1): 22-47.
- Collier, B., Katchova, A.L. and Skees, J.R. 2011. Loan Portfolio Performance and El Niño, An Intervention Analysis. *Agricultural Finance Review*, 71(1): 98-119.
- Collier, B. and Skees, J. 2012. Increasing the Resilience of Financial Intermediaries Through Portfolio-Level Insurance Against Natural Disasters. *Natural Hazards*, 64(1): 55-72.
- Collins, R.A. 1985. Expected Utility, Debt-equity Structure, and Risk Balancing. *American Journal of Agricultural Economics*, 67: 627-629.
- Dabla-Norris, E., Yan J.I., Townsend, R. and Unsal, D.F. 2015. *Identifying Constraints to Financial Inclusion and Their Impact on GDP and Inequality: A Structural Framework for Policy*. International Monetary Fund Working Paper 15/22. January 2015.
- Dehejia, R., Montgomery, H. and Morduch, J. 2012. Do Interest Rates Matter? Credit Demand in the Dhaka Slums. *Journal of Development Economics*, 97(2): 437-449.
- Demirgüç-Kunt, A., Beck, T. and Honohan, P. 2008. *Finance for All? Policies and Pitfalls in Expanding Access*. World Bank Research Report. World Bank. Washington DC.
- Demirgüç-Kunt, A. and Klapper, L.F., 2012. Measuring Financial Inclusion: The Global Findex Database. World Bank Policy Research Working Paper #6025. The World Bank. Washington DC. April 2012.
- Dercon, S. 2004. Growth and Shocks: Evidence from Rural Ethiopia. *Journal of Development Economics*, 74: 309-329.
- de Mey, Y., van Winsen, F., Wauters, E., Vancauteran, M., Lauwers, L. and Van Passel, S. 2014. Farm-Level Evidence on Risk Balancing Behavior in the EU-15. *Agricultural Finance Review*, 74(1): 17-37.
- de Mey, Y., Wauters, E., Schimide, D., Lipse, M., Vancauteranf, M. and Van Passel, S. 2015. Farm Household Risk Balancing: Empirical Evidence from Switzerland. *European Review of Agricultural Economics*. Forthcoming.
- Dev, S.M. 2006. Financial Inclusion: Issues and Challenges. *Economic and Political Weekly*, 41(Oct 14-16): 4310-4313.

- Dong, F., Lu, J. and Featherstone, A.M. 2012. Effects of Credit Constraints on Household Productivity in Rural China. *Agricultural Finance Review*, 72(3): 402-415.
- Duflo, E., Kremer, M. and Robinson, J. 2008. How High Are Rates of Return to Fertilizer? Evidence from Field Experiments in Kenya. *American Economic Review*, 98(2): 482-88.
- Duflo, E., Kremer, M. and Robinson, J. 2011. Nudging Farmers to Use Fertilizer: Theory and Experimental Evidence from Kenya. *American Economic Review*, 101(6): 2350-90.
- Eswaran, M. and Kotwal, A. 1990. Implications of Credit Constraints for Risk Behaviour in Less Developed Economies. *Oxford Economic Papers*, 42(2): 473-482.
- Featherstone, A.M., Moss, C.B., Baker, T.G. and Preckel, P.V. 1988. The Theoretical Effects of Farm Policies on Optimal Leverage and the Probability of Equity Losses. *American Journal of Agricultural Economics*, 70(3): 572-579.
- Feder, G. 1985. The Relation between Farm Size and Farm Productivity: The Role of Family Labor, Supervision and Credit Constraints. *Journal of Development Economics*, 18: 297-313.
- Feder, G., Lau, L.J., Lin, J.Y. and Luo, X. 1990. The Relationship between Credit and Productivity in Chinese Agriculture: A Microeconomic Model of Disequilibrium. *American Journal of Agricultural Economics*, 72(5): 1151-1157.
- Field, E. and Pande, R. 2008. Repayment Frequency and Default In Microfinance: Evidence from India. *Journal of the European Economic Association*, 6(2-3): 501-509.
- Fletschner, D., Guirking, C. and Boucher, S. 2010. Risk, Credit Constraints and Financial Efficiency in Peruvian Agriculture. *The Journal of Development Studies*, 46(6): 981-1002.
- Foltz, J.D. 2004. Credit Market Access and Profitability in Tunisian Agriculture. *Agricultural Economics*, 30: 229-240.
- Gabriel, S.C. and Baker, C.B. 1980. Concepts of Business and Financial Risk. *American Journal of Agricultural Economics*, 62(3): 560-564.
- Giné, X. and Yang, D. 2009. Insurance, Credit, and Technology Adoption: Field Experimental Evidence from Malawi *Journal of Development Economics*, 89 :1-11.
- Gonzalez-Vega, C. 1994. Stages in the Evolution of Thought on Rural Finance. A Vision from The Ohio State University. *Economics and Sociology Occasional Paper*, 2134.
- Gross, D.B. and Souleles, N.S. 2002. Do Liquidity Constraint and Interest Rates Matter for Consumer Behavior? Evidence from Credit Card Data. *The Quarterly Journal of Economics*, 117 (1): 149-185.
- IFAD. 2001. Institutions and the Rural Poor: Building Coalitions for Rural Poverty Reduction. In *2001 Rural Poverty Report*, Chapter 6. Rome, Italy.
- IFAD. 2010. IFAD Decision Tools for Rural Finance. Rome, Italy
- Ifft, J., Kuethe, T. and Morehart, M. 2015. Does Federal Crop Insurance Lead to Higher Farm Debt Use? Evidence from the Agricultural Resource Management Survey. *Agricultural Finance Review*. In Press.
- Jin, Y. and Turvey C.G. 2002. Hedging Financial and Business Risks in Agriculture with Commodity-Linked Loans. *Agricultural Finance Review*, 62(1), 41-57.

- Hartarska, V.M. and Holtmann, M. 2006. An Overview of Recent Developments in the Microfinance Literature. *Agricultural Finance Review*, 66(2): 147-165.
- Karlan, D.S. and Zinman, J. 2008. Credit Elasticities in Less Developed Economies: Implications for Microfinance. *American Economic Review*, 98(3): 1040-1068.
- Karlan, D., Kutsoati, E., McMillan, M. and Udry C. 2011. Crop Price Indemnified Loans for Farmers: a Pilot Experiment in Rural Ghana. *The Journal of Risk and Insurance*, 78(1): 37-55.
- Kochar, A. 1997a. Does Lack of Access to Formal Credit Constrain Agricultural Production? Evidence from the Land Tenancy Market in Rural India. *American Journal of Agricultural Economics*, 79(3): 754-763.
- Kochar, A. 1997b. An Empirical Investigation of Rationing Constraints in Rural Credit Markets in India. *Journal of Development Economics*, 53: 339-371.
- Kumar, C.S., Turvey, C.G. and Kropp, J.D. 2013. The Impact of Credit Constraints on Farm Households: Survey Results from India and China. *Applied Economic Perspectives and Policy*, 35(3): 508-527.
- Laureti, C. and Hamp, M. 2011. Innovative Flexible Products in Microfinance. *Savings and Development*, 35(1): 97-129.
- Lin, J.Y. 2011. New Structural economics: A Framework for Rethinking Development. *The World Bank Research Observer*, 26(2): 193-221.
- McKenzie, D. and Woodruff, C. 2008. Experimental Evidence on Returns to Capital and Access to Finance in Mexico. *The World Bank Economic Review*, 22(3): 457-482.
- Meyer, R.L. 2011. *Subsidies as an Instrument in Agricultural Finance: A Review*. Joint Discussion Paper. The International Bank for Reconstruction and Development-World Bank. Washington DC. June 2011.
- Meyer, R.L. and Nagarajan, G. 2006. Microfinance in Developing Countries: Accomplishments, Debates, and Future Directions. *Agricultural Finance Review*, 66(2): 167-193.
- Miranda, M.J. and Gonzalez-Vega, C. 2011. Systemic Risk, Index Insurance, and Optimal Management of Agricultural Loan Portfolios in Developing Countries. *American Journal of Agricultural Economics*, 93(2): 399-406.
- Miranda, M.J. and Farrin, K. 2012. Index Insurance for Developing Countries. *Applied Economic Perspectives and Policy*, 34(3): 391-427.
- Morduch, J. 1994. Poverty and Vulnerability. *The American Economic Review*, 84(2): Papers and Proceedings: 221-225.
- Morduch, J. 1995. Income Smoothing and Consumption Smoothing. *The Journal of Economic Perspectives*, 9(3): 103-114.
- Norton, M.T, Turvey, C. G. and Osgood, D. 2013. Quantifying Spatial Basis Risk for Weather Index Insurance. *Journal of Risk Finance*, 14(1): 20-34.
- Pal, S., Pradhan, D. and Bais, H. 2015. *The Establishment of Samridhi, A Women's Soybean Producers' Company*. Case study report prepared by Srijan – Self-Reliant Initiatives Through Joint Action, India.

- Pelka, N. Musshoff, O. and Weber, R. 2015. Does Weather Matter? How Rainfall Affects Credit Risk in Agricultural Microfinance. *Agricultural Finance Review*, 75(2).
- Petrick, M. 2004. A Microeconometric Analysis of Credit Rationing in the Polish Farm Sector. *European Review of Agricultural Economics*, 31: 77-101.
- Ravallion, M. 1988. Expected Poverty Under Risk-Induced Welfare Variability. *The Economic Journal*, 98(393): 1171-1182.
- Sahn, D. and Alderman, H. 1988. The Effect of Human Capital on Wages and the Determinants of Labor Supply in a Developing Country. *Journal of Development Economics*, 29(2): 157-183.
- Sarma, M. and Pais, J. 2011. Financial Inclusion and Development. *Journal of International Development*, 23: 613-628.
- Schultz, T.P. 1993. Investments in the Schooling and Health of Women and Men: Quantities and Return. *Journal of Human Resources*, 28(4): 694-734.
- Shee, A. and Turvey, C.G. 2012. Collateral Free Lending with Risk-Contingent Credit for Agricultural Development: Indemnifying Loans against Pulse Crop Price Risk in India. *Agricultural Economics*, 43(5): 561-574.
- Simtowe, F., Diagne, A. and Zeller, M. 2008. Who is Credit Constrained? Evidence from Rural Malawi. *Agricultural Finance Review*, (2): 255-272.
- Skees, J.R. and Barnett, B.J. 2006. Enhancing Microfinance Using Index-Based Risk-Transfer Products. *Agricultural Finance Review*, 66(2): 235-250.
- Stiglitz, J.E. 2011. Rethinking Development Economics. *The World Bank Research Observer*, 26(2): 230-236.
- Sun, L., Turvey, C.G. and Jarrow, R.A. 2015. Designing Catastrophic Bonds for Catastrophic Risks in Agriculture: Macro Hedging Long and Short Rains in Kenya. *Agricultural Finance Review*, 75(1): 47-62.
- Swain, R.B. 2002. Credit Rationing in Rural India. *Journal of Economic Development*, 27(2): 1-20.
- Tadesse, M. 2014. Fertilizer Adoption, Credit Access, and Safety Nets in Rural Ethiopia. *Agricultural Finance Review*, 74(3): 290-310.
- Tarozzi, A., Desai, J. and Johnson, K. 2015. The Impacts of Microcredit: Evidence from Ethiopia. *American Economic Journal: Applied Economics*, 7(1): 54-89.
- Townsend, R.M. and Yaron, J. 2001. *The Credit Risk-Contingency System of an Asian Development Bank. Economic Perspectives*. Federal Reserve Bank of Chicago, 3rd quarter 2001, 31-48.
- Turvey, C.G. 2013. Policy Rationing in Rural Credit Markets. *Agricultural Finance Review*, 73(2): 209-232.
- Turvey, C.G. and Baker, T.G. 1989. Optimal Hedging Under Alternative Capital Structures and Risk Aversion. *Canadian Journal of Agricultural Economics*, 37(1): 135-143.
- Turvey, C.G. and Baker, T.G. 1990. A Farm-level Financial Analysis of Farmers' Use of Futures and Options Under Alternative Farm Programs. *American Journal of Agricultural Economics*, 72(4): 946-957.

- Turvey, C.G., Bogan, V.L., and Yu, C. 2012. Small Businesses and Risk Contingent Credit. *The Journal of Risk Finance*, 13(5): 491-506.
- Turvey, C.G. and Kong, R. 2009. Business and Financial Risks of Small Farm Households in China. *China Agricultural Economic Review*, 1(2): 155-172.
- Turvey, C.G., Kong, R. and Hu, X. 2010. Borrowing Amongst Friends: The Economics of Informal Credit in Rural China. *China Agricultural Economic Review*, 2(2): 133-147.
- Turvey, C.G. and Kong, R. 2010. Informal Lending Amongst Friends and Relatives: Can Microcredit Compete in Rural China? *China Economic Review*, 21(4): 544-556.
- Turvey, C.G., He, G., Kong, R., Ma, J. and Meagher, P. 2011. The 7 Cs of Rural Credit in China. *Journal of Agribusiness in Developing and Emerging Economies*, 1(2): 100-133.
- Turvey, C.G., He, G., Ma, J., Kong, R. and Meagher, P. 2012. Farm Credit and Credit Demand Elasticities in Shaanxi and Gansu. *China Economic Review*, 23: 1020-1035.
- Uzea, N., Poon., K., Sparling, D. and Weersink, A. 2014. Farm Support Payments and Risk Balancing: Implications for Financial Riskiness of Canadian Farms. *Canadian Journal of Agricultural Economics*, 62(4): 595-618.
- Verteramo-Chiu, L.J., Khantachavana, S.V. and Turvey, C.G. 2014. Risk Rationing and the Demand for Agricultural Credit: A Comparative Investigation of Mexico and China. *Agricultural Finance Review*, 74(2): 248-270.
- Vogel, R.C. 1981. Rural Financial Market Performance: Implications of Low Delinquency Loans. *American Journal of Agricultural Economics*, 61(1): 58-67.
- Weber, R., and Musshoff, O. 2012. Is Agricultural Microcredit Really More Risky? Evidence from Tanzania. *Agricultural Finance Review*. 72(3): 416-435.
- Weber, R. and Musshoff, O. 2013. Can Flexible Microfinance Loans Improve Credit Access for Farmers? *Agricultural Finance Review*, 73(2): 255-271.
- Weber, R., Fecke, W., Moeller, I. and Musshoff, O. 2015. Meso-level Weather Index Insurance. *Agricultural Finance Review*, 7(1): 31-46.
- Weersink, A., Vanden-Dungen, M.J. and Turvey, C.G. 1994. Estimating the Demand for Farm Operating and Term Credit. *Cahiers D'Economie et Sociologie Rurales*, 33 (4): 97-116.
- Woodard, J.D. and Garcia, P. 2008. Weather Derivatives, Spatial Aggregation, and Systemic Risk: Implications for Reinsurance Hedging. *Journal of Agricultural and Resource Economics*, 33(1): 34-51.
- World Bank. 2003. *Rural Financial Services: Implementing the Bank's Strategy to Reach the Rural Poor*. World Bank, Agriculture and Rural Development Department, Washington DC.
- Zeller, M. 2006. A Comparative Review of Major Types of Rural Microfinance Institutions in Developing Countries. *Agricultural Finance Review*, 66(2): 195-213.

## **The IFAD Research Series**

01. **Agricultural and rural development reconsidered**  
A guide to issues and debates  
By Steve Wiggins
02. **Migration and transformative pathways**  
A rural perspective  
By David Suttie, Rosemary Vargas-Lundius
03. **Fostering inclusive outcomes in African agriculture**  
Improving agricultural productivity and expanding agribusiness opportunities  
By David Suttie, Rui Benfica
04. **The effects of smallholder agricultural involvement on household food consumption and dietary diversity:  
Evidence from Malawi**  
By Rui Benfica, Talip Kilic
05. **Rural-urban linkages and food systems in sub-Saharan Africa**  
The rural dimension  
By Karim Hussein, David Suttie
06. **Why food and nutrition security matters for inclusive structural and rural transformation**  
By Steven Were Omamo
07. **Measuring IFAD Impact: Background Paper to the IFAD9 Impact Assessment Initiative**  
By Alessandra Garbero
08. **Fostering inclusive rural transformation in fragile states and situations**  
By Karim Hussein
09. **Social protection and inclusive rural transformation**  
By Carolina Trivelli, Silvana Vargas, Jhonatan Clausen
10. **Inclusive Finance and Inclusive Rural Transformation**  
By Calum G. Turvey





International Fund for Agricultural Development

Via Paolo di Dono, 44 - 00142 Rome, Italy

Tel: +39 06 54591 - Fax: +39 06 5043463

E-mail: [ifad@ifad.org](mailto:ifad@ifad.org)

[www.ifad.org](http://www.ifad.org)

[www.ruralpovertyportal.org](http://www.ruralpovertyportal.org)

 [ifad-un.blogspot.com](http://ifad-un.blogspot.com)

 [www.facebook.com/ifad](http://www.facebook.com/ifad)

 [instagram.com/ifadnews](http://instagram.com/ifadnews)

 [www.twitter.com/ifadnews](http://www.twitter.com/ifadnews)

 [www.youtube.com/user/ifadTV](http://www.youtube.com/user/ifadTV)

ISBN-978-92-9072-709-5



9 789290 727095

