

# Effective rural development



IFAD's **evidence-based  
approach** to managing  
for results



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.

© IFAD 2018  
All rights reserved

ISBN 978-92-9072-839-9  
Printed June 2018

# Effective rural development

IFAD's **evidence-based approach** to managing for results



Investing in rural people

# Table of contents

About the authors .....	4
Abbreviations and acronyms .....	9
Chapter 1	
IFAD's approach to promoting effective rural development .....	10
<b>PART I: Analysing corporate-level evidence</b>	
Chapter 2	
Approach to attributing IFAD's aggregate impact .....	30
Chapter 3	
IFAD's disbursement performance: trends and drivers .....	46
Chapter 4	
Assessment of IFAD's end-of-project documentation .....	59
<b>PART II: Assessing project-level impact</b>	
Chapter 5	
Ethiopia's Participatory Small-Scale Irrigation Development Programme (PASIDP) .....	64
Chapter 6	
Kenya's Smallholder Dairy Commercialization Programme .....	70
Chapter 7	
Madagascar's AD2M-I Project .....	78
Chapter 8	
The Philippines's Irrigated Rice Production Enhancement Project .....	88
<b>PART III: Analysing the evidence on thematic activities</b>	
Chapter 9	
Land administration interventions: a systematic review .....	100
Chapter 10	
Smallholder irrigation in a broader productivity and value chain framework: implications for IFAD investments ...	111
Chapter 11	
Assessment of IFAD's policy impact in four countries in Asia.....	122
Chapter 12	
The impact of adoption of CGIAR's improved varieties on poverty: a systematic review.....	131

# About the authors

---

## Aslihan Arslan

is a senior agricultural development economist (research) in the Research and Impact Assessment Division (RIA), Strategy and Knowledge Department, IFAD. Before joining IFAD in January 2017, she worked at FAO as a natural resource economist, primarily focusing on research and policy support on climate-smart agriculture. Prior to that, she was a post-doctoral research economist at the poverty reduction, equity and development research group of the Kiel Institute for the World Economy in Germany. She holds a PhD and an MSc in agricultural and resource economics from the University of California, Davis, and a BSc in economics from the Middle East Technical University, Ankara.

---

## Tim Balint

is a technical specialist in RIA at IFAD. His work focuses on analysing the development effectiveness of IFAD's investment projects through quantitative and qualitative techniques, including impact assessments and systematic reviews. He also has expertise in strategic planning, results-based management and organizational change. He holds a PhD and master's degree in politics and public administration from the University of Konstanz.

---

## Rui Benfica

is a lead economist in RIA at IFAD. His work focuses on developing regions. Before joining IFAD, he worked for the Department of Agricultural Food and Resource Economics at Michigan State University as an associate professor, and for the World Bank, where he held the positions of economist in the Gender and Development Group, and poverty economist in the Africa Region, where he worked on poverty assessments and poverty and social impact analyses of public sector reforms. Prior to obtaining his PhD from Michigan State University, he was a policy advisor at the USAID Office of Agriculture and Food Resources in Maputo.

---

## Juan Bonilla

is a senior economist at the International Development, Evaluation and Research Program at American Institutes for Research. He conducts impact evaluations of social programmes in developing countries, including agricultural extension, cash transfers and value chain interventions. Bonilla has served on the scientific committee both for the Latin American and the Caribbean Economic Association, and for the Brazilian Econometric Society. Before joining American Institutes for Research, he worked for the World Bank and was an assistant professor

at the University of São Paulo, where he taught graduate courses in development economics and applied microeconomics, including programme evaluation. He holds an MA in economics from New York University, and a PhD in economics from the University of Maryland.

---

## Peter Brueckmann

is a specialist in impact assessment and development effectiveness research in RIA at IFAD. His research interests are in the areas of poverty, agriculture, infrastructure and global health. He previously worked on a research project in Pakistan, jointly conducted by the Deutsche Gesellschaft für Internationale Zusammenarbeit and the University of Göttingen. He holds an MA in development economics from the University of Göttingen, and a BSc in economics from the Philipps-Universität Marburg.

---

## Romina Cavatassi

is a senior technical specialist in RIA at IFAD. Her areas of expertise are impact evaluation of projects and programmes, survey design and data collection. Before joining IFAD, she worked for the Food and Agriculture Organization of the United Nations (FAO) as project coordinator, natural resources economist, in its Agricultural Development Economics Division, and prior to that as a consultant and also as a junior economist on several aspects of natural resources, economic development and poverty reduction. She holds a PhD in natural resources and development economics from Wageningen University, an MS in environmental assessment and evaluation from the London School of Economics, and a bachelor's degree in economics from the University of Bologna.

---

## Constanza Di Nucci

is the senior technical advisor to the Associate Vice-President of IFAD's Strategy and Knowledge Department. She coordinated IFAD's Rural Development Report 2016, as well as other initiatives on rural transformation and policy issues. She was formerly programme officer at the IFAD Environment and Climate Division. Before joining IFAD, she was coordinator of governmental

agencies and international cooperation for WWF Argentina, and project coordinator of the Center for the Implementation of Public Policies Promoting Equity and Growth (CIPPEC). She holds a master's degree in public policy from the Harvard Kennedy School of Government, a postgraduate degree in management of social organizations from Universidad Torcuato Di Tella, and a BA in international relations from the University of San Andrés.

---

## Alessandra Garbero

is a senior econometrician in RIA at IFAD. Her work focuses on impact assessment methodologies and applied econometrics. Her prior work experience includes working at the United Nations Population Division on population projections; in FAO, on the impact of HIV/AIDS on food security and agriculture; and at the International Institute for Applied Systems Analysis, on population forecasting, demographic modelling and vulnerability to climate change. She holds a BA in economics and an MSc in statistics and social research methods from the University of Rome La Sapienza, and an MSc in demography from the London School of Economics. She obtained her PhD in epidemiology and population health from the London School of Hygiene & Tropical Medicine.

---

## Edward Heinemann

is a lead technical specialist in the Programme Management Department at IFAD, promoting IFAD's country-level policy engagement agenda. He is the principal author of the 2014 Consultation Report for the Tenth Replenishment of IFAD's resources, IFAD's 2011 Rural Poverty Report, and its Strategic Framework 2007-2010, policy on sector-wide approaches, partnership strategy and grants policy. Prior to 2007, he worked first as a country programme manager in East and Southern Africa, and later as the regional economist for that region. Before joining IFAD, he worked at the African Development Bank as a project officer. He holds a BSc in agricultural economics from the University of Reading, and an MA in rural development from the University of East Anglia.

---

## Daniel Higgins

is a specialist in impact assessment and development effectiveness research in RIA at IFAD. He previously conducted such work for UNESCO, the University of East Anglia, and a Ugandan education non-governmental organization. He has an MSc in impact assessment for international development, and a BA in development economics, both from the University of East Anglia.

---

## Harold Liversage

is the lead land tenure technical specialist for IFAD. Prior to joining IFAD in 2004, he worked in the early 1990s for the association for a land rights NGO in KwaZulu-Natal, South Africa, and then as a land reform programme coordinator for the South African Government from 1996 to 1998. Subsequently he worked as a land tenure adviser for the Zambézia Agricultural Development Programme, working with the Government of Mozambique's provincial land administration service and a national land rights NGO. From 2002 to 2004, he worked as a land policy adviser for the Government of Rwanda/United Kingdom Department for International Development. He holds a master's degree in town and regional planning from the University of KwaZulu-Natal.

---

## Chandra A. Madramootoo

is a James McGill Professor of Bioresource Engineering at McGill University, and Director of the McGill Water Innovation Lab. He holds BSc, MSc and PhD degrees from McGill. His areas of expertise are water management, irrigation and food security. He is also a visiting professor and visiting scholar at the Massachusetts Institute of Technology. He served as dean of the Faculty of Agricultural and Environmental Sciences at McGill from 2005 to 2015. During his tenure as dean, he created programmes in integrated water management, food safety, food security, and innovation and entrepreneurship. He was founding director of McGill's Brace Centre for Water Resources Management. He holds several awards, including a DSc (honoris causa) from the University of Guelph.

---

## Paola Mallia

is a specialist in impact assessment and development effectiveness research in RIA at IFAD. Her research interests are in the areas of poverty, food security, agriculture, rural development and migration. She previously worked in FAO's Agricultural Development Economics Division. She holds an MSc in economics from Bocconi University.

---

## Pierre Marion

is a quantitative research assistant in the Young Lives team in the Oxford Department of International Development at the University of Oxford. He previously worked as a research analyst, specialized in impact assessments and agriculture research in RIA at IFAD as well as in the FAO Statistics Division. His research interests are in the areas of poverty, vulnerability, food security, agriculture and rural development. He holds an MSc in development economics from the University of Sussex.

---

## Lisandro Martin

is Director of the West and Central Africa Division and Acting Director of the Operational Policy and Results Division at IFAD. Prior to joining IFAD, he worked for the World Bank in Washington, D.C., where he served as senior operations officer in charge of its results agenda. At the World Bank, he also held other positions, both in headquarters and in the field, including as a senior results specialist for Bangladesh and Nepal, based in Dhaka, and as a social development specialist in the Southern Cone of Latin America. Between 2008 and 2011, he worked for the African Development Bank in Tunisia, where his last position was as principal results specialist. He holds an MA in public affairs from Princeton University, where he was a Fulbright Scholar. He also holds an honours BA degree in international relations from Universidad del Salvador.

## Nancy McCarthy

---

earned a PhD in agriculture and resource economics from the University of California, Berkeley in 1996, and a JD from the George Mason University School of Law in 2009. In 2010, she founded LEAD Analytics, a consulting firm that specializes in agricultural economics and legal analyses to support economic development. The firm's clients have included the World Bank, FAO, Inter-American Development Bank, and 3ie. Prior to founding LEAD Analytics, she worked at the International Food Policy Research Institute (IFPRI) in Washington, D.C., and held a joint position with IFPRI and the International Livestock Research Institute based in Nairobi for four years.

## Anna McCord

---

is a research economist and sociologist, specializing in the design and evaluation of social protection programmes, with a particular interest in programme impact at household level, public works and labour markets, and political economy. She has over 25 years' experience working in international development, with experience throughout sub-Saharan Africa, as well as in South and South-East Asia; and she has worked with a range of governments, major donors, United Nations agencies and non-governmental agencies. She has an MA in social and political science from the University of Cambridge, a diploma in economics from the Open University, and a master's and PhD in economics from the University of Cape Town.

## Mitchell Morey

---

is an economic researcher at American Institutes for Research. He is responsible for evaluations of development programmes, with a special focus on sub-Saharan Africa. He received his PhD in economics, with a minor in African studies, from the University of Wisconsin–Madison. Prior to that, he received a master's in industrial and labour relations from Cornell University. He also lived and worked in Madagascar as a peace volunteer, teaching English as a foreign language.

## Lauren Phillips

---

is a senior technical specialist in the Programme Management Department at IFAD, promoting IFAD's country-level policy engagement agenda. From 2008 to 2014, she was an assistant professor of international political economy in the Department of International Relations at the London School of Economics, and also taught at Johns Hopkins School of Advanced International Studies Europe. She has published on a wide range of topics related to the political economy of development and finance. She previously worked for the Overseas Development Institute, and has additional experience in private finance and international NGOs. She holds a PhD in international political economy from the London School of Economics, an MA in international policy studies from Stanford University, and a BA in international relations and Latin American studies from Stanford University.

## Silvana Scalzo

---

is an administrative associate in RIA at IFAD responsible for coordinating impact assessment activities. She has worked as both a research associate and a statistical associate for various IFAD divisions since 1990, focusing on corporate data and databases, and combining these data into corporate statistical outputs. She has worked closely with the Organisation for Economic Co-operation and Development, reporting on IFAD's official development assistance statistics, to ensure IFAD's historical data are properly represented in the online Common Reporting Standard.

## Tisorn Songsermsawas

---

is a research analyst in RIA at IFAD. His research interest focuses on investigating how social interactions and agricultural interventions relate to household welfare outcomes. He holds a PhD in agricultural and applied economics from the University of Illinois at Urbana-Champaign, and a BS in economics and statistics from Bucknell University. His prior experience includes periods



at the University of Illinois, teaching development economics and environmental economics at undergraduate level; FAO's Investment Centre, conducting research on rice production in Southeast Asia; and the International Crops Research Institute for the Semi-Arid Tropics, conducting research on marketing barriers of small-scale farmers in rural India.

## Paul Winters

---

is the Associate Vice-President of the Strategy and Knowledge Department, and Director of the Research and Impact Assessment Division at IFAD. From 2004 to 2015, he was a professor in the Department of Economics at the American University in Washington, D.C., where he taught courses on impact evaluation, development economics and environmental economics. He also worked at the International Potato Center in Lima, the University of New England, and the Inter-American Development Bank in Washington, D.C. He holds a PhD in agricultural and resource economics from the University of California, Berkeley, an MA in economics from the University of California, San Diego, and a BA in non-Western studies from the University of San Diego.

# Abbreviations and acronyms

<b>AD2M-I</b>	Appui au Développement du Menabe et du Melaky
<b>CGIAR</b>	Consultative Group on International Research
<b>CIS</b>	communal irrigation system
<b>CLPE</b>	country-level policy engagement
<b>COSOP</b>	Country Strategic Opportunities Programme
<b>CPM</b>	country programme manager
<b>DP</b>	development partner
<b>FFS</b>	farmer field school
<b>IA</b>	irrigators association
<b>IAI</b>	Impact Assessment Initiative
<b>ICO</b>	IFAD country office
<b>IFAD9</b>	Ninth Replenishment of IFAD's Resources
<b>IFAD10</b>	Tenth Replenishment of IFAD's Resources
<b>IFI</b>	international financial institution
<b>IRPEP</b>	Irrigated Rice Production Enhancement Project
<b>MOP-SEDP</b>	market-oriented participatory socio-economic development planning
<b>M&amp;E</b>	monitoring and evaluation
<b>NERCORMP</b>	North Eastern Region Community Resource Management Project for Upland Areas
<b>NGO</b>	non-governmental organization
<b>NRD</b>	New Rural Development
<b>NTP-NRD</b>	National Target Program on New Rural Development
<b>ORMS</b>	Operational Results Management System
<b>PASIDP</b>	Participatory Small-Scale Irrigation Development Programme
<b>PBAS</b>	performance-based allocation system
<b>PCR</b>	project completion report
<b>PNPM</b>	National Programme for Community Empowerment
<b>PRiME</b>	Program in Rural Monitoring and Evaluation
<b>RIMS</b>	Results and Impact Management System
<b>RMF</b>	Results Measurement/Management Framework
<b>SDCP</b>	Smallholder Dairy Commercialization Programme
<b>SDG</b>	Sustainable Development Goal
<b>SO</b>	strategic objective
<b>VfM</b>	value for money
<b>WUA</b>	water user association
<b>4Es</b>	economy, efficiency, effectiveness and equity
<b>4Ps</b>	public-private-producer partnerships

## Chapter 1

---

# IFAD's approach to promoting effective rural development

by  
**Paul Winters**  
**Lisandro Martin**  
**Constanza Di Nucci**

In September 2015, the United Nations General Assembly adopted the Sustainable Development Goals (SDGs) with the aim of ending poverty and hunger, protecting the planet, and ensuring prosperity for all, leaving no one behind. Building on the experience of the Millennium Development Goals, which accentuated the importance of thinking through indicators of success as early as possible, this agenda sought to develop measurement frameworks that would allow countries not only to report progress, but also to manage their implementation strategies, allocate resources accordingly, and ensure the accountability of all actors (SDSN, 2015).

The need to focus on and measure development results has been recognized at each of the four high-level forums on aid effectiveness (in Rome, Paris, Accra and Busan in 2003, 2005, 2008 and 2011, respectively). Efforts to modernize, deepen and broaden development effectiveness have led to the formulation of frameworks, strategies and plans in most international financial institutions (IFIs), including at IFAD. Development effectiveness – understood as “the extent to which the development intervention’s objectives were achieved, or are expected to be achieved, taking into account their relative importance” (OECD, 2002, 20) – has become a core operational principle of international development organizations (OECD, 2012).

Furthermore, a consensus has emerged that generating evidence by monitoring and measuring results can play a strategic role in informing programme, policy and investment decisions, and in making them more likely to achieve development objectives (Segone, 2008). Sound, relevant and frequent information about the progress of a given intervention allows decision makers to assess whether progress is being made, whether results are being achieved, and whether changes need to be introduced in order to reach expected impacts. Indeed, managing for results leads to better decisions, which in turn contribute to the achievement of development results.

However, effectively supporting development is not just about generating evidence on individual interventions, it is also about effectively managing development institutions. The scarce resources used for development must be employed as efficiently and effectively as possible to ensure value for money. Effective development thus requires examining the policies, procedures and use of resources of institutions working in development.

Hence, at both the corporate and project level, the generation of evidence is central for learning and accountability. The rapid changes and increasing complexity and uncertainty of the

development landscape create new and evolving challenges to reaching sustainable development results. Thus, it is essential for IFIs to monitor and generate evidence from their own projects, learn from internally and externally generated knowledge, and build a culture of continuous learning and progress towards results.

Working towards achieving development effectiveness in IFIs does not happen automatically; it must be made to happen. It requires a corporate agenda that involves, among other things: leadership and guidance to drive change; corporate frameworks to set up a structure that facilitates the use of evidence in decisions about the design and implementation of projects; institutionalized systems that allow effective monitoring, evaluation and assessment of interventions; concrete instruments and tools to harmonize and aggregate results in order to assess corporate impact; and continuous learning processes that enhance existing capacities and knowledge, and ensure that future operations incorporate learning. For international development organizations to advance their agendas on development effectiveness, all of these elements are necessary. However, they are not sufficient unless they also build a corporate-wide culture of results-based management.

With this background in mind, IFAD has systematically increased its efforts to create a culture of results-based management and to bring innovative thinking on development effectiveness to the organization. Building on previous efforts to focus on results, IFAD's Development Effectiveness Framework was presented to the Fund's Executive Board in December 2016 with the objective of creating the structure needed to facilitate the use of evidence in decisions on designing and implementing projects (IFAD, 2016). It proposes a series of actions to overcome constraints on the generation and use of evidence in decision-making and seeks to push forward a results-based agenda. In 2017, during the Eleventh Replenishment of IFAD's Resources,

additional commitments were made to enhance IFAD's development effectiveness and its value for money.<sup>1</sup>

This report reflects IFAD's ongoing efforts to generate evidence to inform decision-making at the corporate and project level. The chapters in this volume include examples of: corporate-level evidence analysis (Part I); project-level impact assessment (Part II); and evidence analysis for thematic activities (Part III). They are based on detailed quantitative and qualitative technical papers that are being or will be published in appropriate technical products, including in IFAD's Research Paper Series and in academic journals. Overall, the report shows how creating a culture of results-based management operates in practice – namely, through a series of different types of analyses that can inform decisions.

To put these individual chapters into a broader context, this introductory chapter provides an overview of IFAD's results architecture. This report is the first publication of this type at IFAD, and it is important to articulate how these activities fit together. Building on the Development Effectiveness Framework, it presents an overview of the ongoing corporate efforts to develop a culture of results that aims to go beyond the standard approaches of most IFIs. Key components of such a system include: (1) a strong and coherent self-evaluation and impact assessment system that links project reporting to corporate reporting; (2) a systematic understanding of the portfolio that helps identify corporate indicators and targets as well as analytics for assessing progress; (3) internal systems that monitor the use of resources and link them to corporate outputs, outcomes and impact to enhance value for money; and (4) trained staff and partners who understand and are actively engaged in generating and using results.

The rest of this chapter covers each of these four areas in turn. It then provides an overview of the conclusions of the individual chapters as well as general conclusions and the challenges ahead.

1. These commitments can be found in the Commitment Matrix in Annex 1 of the *Report of the Consultation on the Eleventh Replenishment of IFAD's Resources* (IFAD, 2017).

## From project to corporate measurement: IFAD's corporate reporting system

An organization's corporate-level indicators of success should reflect its strategic goals and objectives as well as the anticipated pathways through which it will reach these goals and objectives. Identifying these indicators should be relatively straightforward provided that: (1) it is easy to quantify the stated goals and objectives; and (2) it is possible to identify indicators that can be easily aggregated across projects for corporate results reporting.

For IFIs such as IFAD, which provides investments primarily through loans to borrowing countries, projects are the primary means of achieving corporate strategic goals and objectives. They are thus the starting point for a corporate results-based management system.

To be effective in obtaining results, projects need to be designed to address a development problem linked to a corporate strategic objective or goal. Projects not linked to corporate strategic objectives or goals are not fulfilling the corporate mandate. Projects that fail to address a development problem are not targeting a fundamental reason for underdevelopment. Figure 1.1 demonstrates the link between a project and a development problem.

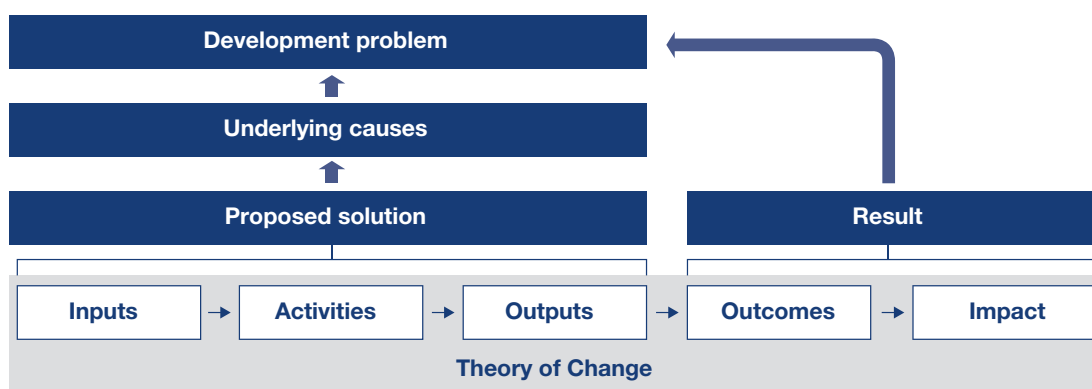
Adequately addressing a development problem requires analysing the underlying causes of that

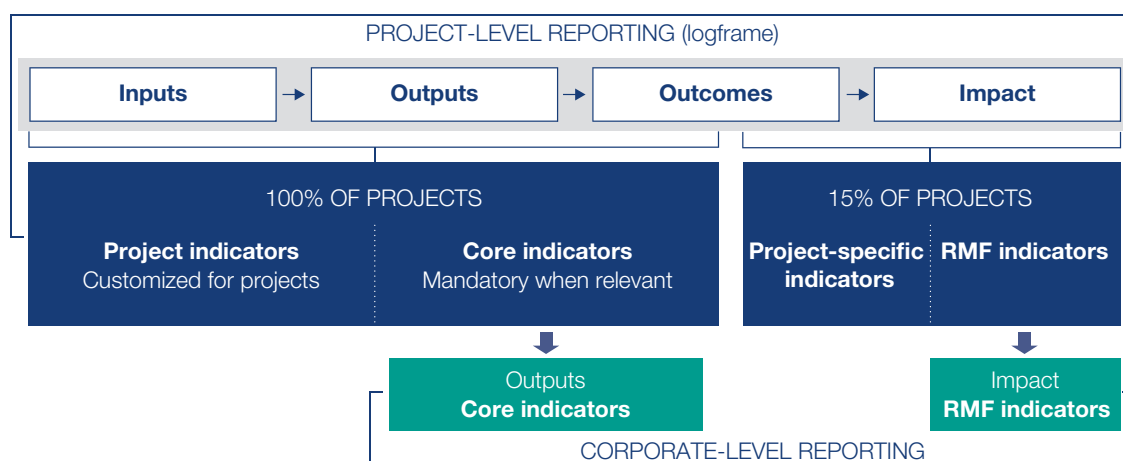
problem to allow for careful reflection on its sources and to determine potential solutions. The proposed solution should not only be directly linked to the underlying causes of underdevelopment, but also have a clear logic and be based on the available evidence of what has proved successful in overcoming the identified constraints.

A development project is a series of inputs anticipated to lead to an output that should address the underlying causes limiting development under certain assumptions. These inputs and outputs embody the proposed solution. Assuming they adequately address the underlying causes constraining beneficiaries, the expectation is that beneficiaries will respond in a manner that leads to anticipated outcomes and the hypothesized impact. In the pathway from inputs and outputs to outcomes and impacts, a project should have an underlying logic, or theory of change, that articulates how the proposed solution will bring about the desired result and what the assumptions are behind that logic. If the proposed solution is successful and brings about the desired results (outputs, outcomes and impact), the development problem should be addressed (as indicated by the arrow in figure 1.1 showing that the result is linked to the identified problem).

Thus, projects are hypotheses about how to address a development problem. The success of the proposed solution should be verified through careful collection of data on key results

**Figure 1.1** Effective projects



**Figure 1.2** Corporate- and project-level reporting

Note: RMF = Results Management Framework (previously, Results Measurement Framework).

indicators and analysis of those data. Each project provides an opportunity to learn whether and why a solution is effective. This work builds an evidence base on what approaches are, and are not, effective and the reasons for success or limitations.

A sound project theory of change that addresses a development problem, combined with effective implementation and strong data collection, constitutes the first step in assessing development impacts at the project level. Assessing this performance at the corporate level requires aggregating these individual project results to the corporate level. This, in turn, requires that projects include indicators that can be aggregated across interventions.

This is precisely the system IFAD has set up for corporate reporting, which is summarized in figure 1.2. The figure shows how IFAD has organized data collection in individual projects to build a corporate results reporting system. To understand this figure, some critical factors must be considered.

First, every project should have its own data collection system linked to the project's theory of change. At IFAD, this is done through the logical framework (logframe), which includes indicators on results to be achieved. Data on these indicators are collected throughout the project cycle based on a monitoring and evaluation

(M&E) plan developed at the initiation of the project. As projects necessarily differ because they address distinct development problems in differing contexts, these indicators vary by project. This presents a challenge for aggregation to the corporate level because it is not possible to aggregate different indicators. However, there are sufficient similarities among IFAD projects to allow for some similar indicators – what IFAD refers to as core indicators. These are discussed further below.

Second, a key part of measuring results involves attributing them to IFAD interventions. As discussed more fully in Chapter 2, this is not challenging at the input and output level, but it is a significant issue at the impact level, and in many cases at the outcome level. Because attribution at the impact level is more complicated, it is also more costly. Therefore, it is difficult to justify impact assessments for all projects. For this reason, IFAD performs impact-level measurement in only 15 per cent of projects but requires measurement of outputs and certain outcomes of all projects. Chapter 2 describes IFAD's approach to measuring impact through attributable impact assessments.

IFAD's approach is to ensure that all projects have strong, high-quality logframes with indicators linked directly to its strategic objectives, which are in turn drawn from the SDGs. Project-level

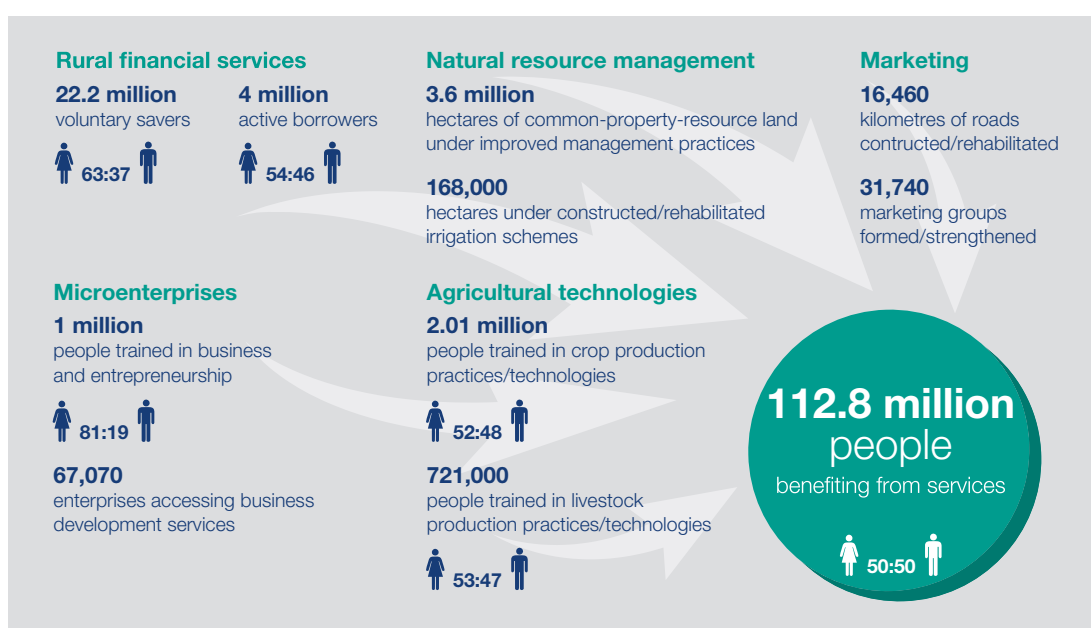
## Box 1.1 Operational Results Management System (ORMS)

To help facilitate a results culture and increase the probability of achieving development objectives, IFAD has put in place the Operational Results Management System (ORMS), a single interconnected system that provides real-time data on projects for evidence-based decision-making.

ORMS is a fully fledged online platform that allows IFAD to aggregate outputs to the corporate level. By collecting all the data from each project, the system links expected results (as per the logframes in project design reports) with progress towards results (as documented in supervision reports) and results actually achieved (as reported in project completion reports).

ORMS brings IFAD more in line with the standards of other international financial institutions while promoting efficiencies. Efficiency gains include streamlined and harmonized reporting processes, improved data generation and accessibility, and more-useful complete statistics and reports. These improvements allow for timelier evidence-based decision-making, informed by better-quality, accessible and real-time reporting and analysis of results.

Figure 1.3 Core indicators reported in 2016



indicators are tracked over time using an online system called the Operational Results Management System (ORMS).<sup>2</sup> As explained in box 1.1, ORMS includes project data from all projects in the portfolio at the output level, and in some cases at the outcome level.

Included in the indicators identified in the logframes are core indicators – that is, a set of indicators that are mandatory for projects

depending on a project's sectoral focus.

For example, a project that includes a finance component would include an indicator on the numbers of voluntary savers and active borrowers. A project that promotes agricultural technologies would include the number of people trained in crop production or livestock production practices. And a project that improves an irrigation system would include hectares

2. ORMS replaces the previous system, known as the Results and Impact Management System (RIMS-online).



covered by constructed or rehabilitated irrigation schemes. ORMS facilitates the aggregation of these project-level core indicators to report outputs at the corporate level as needed. Figure 1.3 provides some examples of the use of core indicators to report on IFAD's 2016 corporate output.

As described in Chapter 2, a similar process occurs at the impact level. In this case, 15 per cent of IFAD projects completed within the three-year replenishment period undergo an impact assessment in which a counterfactual is identified to determine impact. This attributable impact estimate is combined with a strong understanding of IFAD's portfolio of projects and used to estimate total corporate impact at the end of each replenishment period. This process makes it possible to report on key indicators of corporate success at the impact level.

Overall, IFAD's approach involves careful planning and measurement to cascade results from individual projects to corporate measurement. It allows for corporate reporting that can be attributed to IFAD investment. Equally importantly, it creates an opportunity to generate lessons from individual projects, and from IFAD's overall approach, that can provide insights for future programming and for the development community.

As noted, Chapter 2 provides an overview of the approach used for the impact assessments. Chapters 5, 6, 7 and 8 give examples of specific impact assessments for projects in Ethiopia, Kenya, Madagascar and the Philippines. These chapters not only show IFAD's impact resulting from those projects but also present lessons from those projects. These individual impact assessments will also be used as the basis for corporate-level impact estimates, in this case for the Tenth Replenishment of IFAD's Resources (IFAD10) period. By allowing IFAD to draw significant lessons from individual projects as well as aggregate lessons at the corporate level, this approach helps ensure that IFAD is "doing things right". Of course, as discussed below, it is also important that IFAD is "doing the right things".

## Indicators, targets and analysis: generating and using results

While the previous section described IFAD's overall corporate approach to measuring results, this section discusses how these results can be generated and used for decision-making. It describes how to identify the indicators and targets to measure in order to reflect corporate performance, and how to analyse information about the portfolio to determine whether IFAD is doing the right things.

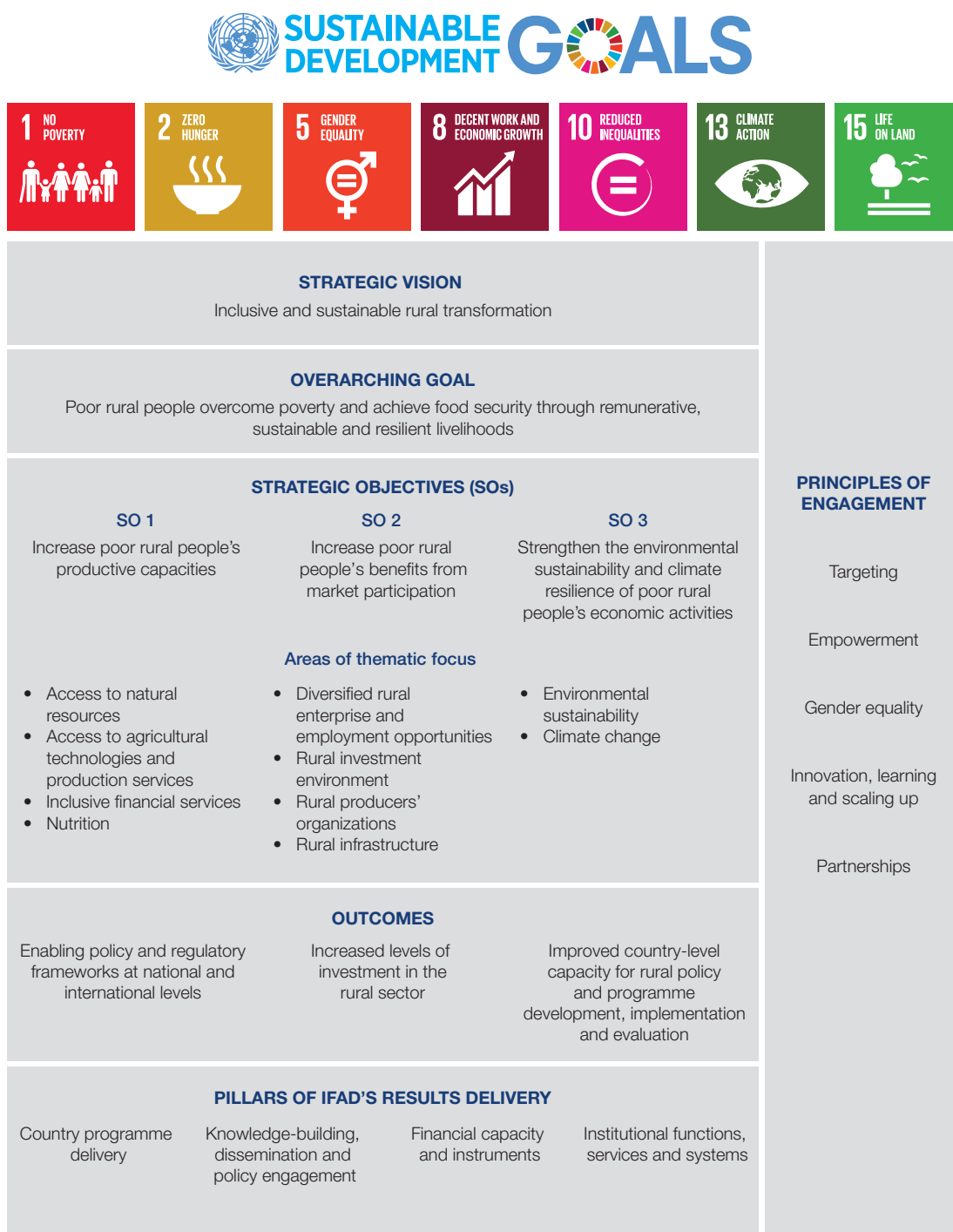
IFAD's Strategic Framework 2016–2025 establishes its overarching goal – that is, to invest in rural people to enable them to overcome poverty and achieve food security through remunerative, sustainable and resilient livelihoods. To support this goal, the framework identifies strategic objectives, outcomes, and pillars of results delivery that guide IFAD's operations over the 2016–2025 period (figure 1.4). Because one key purpose of measuring results is to determine whether corporate goals and objectives are achieved, identified indicators of success and targets for those indicators should be linked to stated corporate objectives. Following this logic, IFAD's Results Measurement Framework (RMF) for IFAD10 has been revised to ensure alignment with the corporate strategy. A key principle of corporate measurement should be alignment of RMFs and indicators used to collect data.

With this in mind, the impact indicators and the core indicators (reflecting outputs and outcomes) have been mapped, respectively, to each of the strategic objectives and areas of thematic focus of IFAD's Strategic Framework in such a way that each project's impact and outputs can be linked directly to the corporate strategy. Project-level data collected through ORMS and the impact assessment initiative can be used to determine whether IFAD is reaching its corporate objectives. Examples of core indicators are shown in figure 1.3, and the impact indicators are discussed in Chapter 2.

Once indicators have been identified, it is necessary to determine targets for those indicators in order to express the scale of an organization's ambition in a given period. Assuming (1) that corporate goals and



**Figure 1.4** Overview of IFAD's Strategic Framework 2016–2025



project-specific output and impact goals align, and (2) that clear implementation plans identify the investments and the number of beneficiaries affected by different types of investments, it should be possible to determine the anticipated output and impact of the project, and the number of people obtaining benefits associated with each corporate indicator.

If this process can be carried out for every project for the period in question, determining the corporate-level impact target for each indicator involves simply adding the anticipated impacts on that indicator for each project.

This requires understanding the portfolio of investments being undertaken. There needs to be a sense of the types of activities to be carried

out across the institution, and the anticipated outputs, outcomes and impacts that will occur as a result of those activities. Targets for IFAD corporate indicators should reflect how IFAD is investing – not just in what activities but how much in each activity – because this information will determine the anticipated outputs. Any shift in overall strategy should generate a change in a target level going forward. For example, if IFAD decides to invest in more irrigation as a pathway to improve production and market access (two strategic objectives noted in figure 1.4), the target for beneficiaries receiving irrigation investment should also increase. Chapter 2 illustrates how this can be done by discussing how impact-level targets were established for IFAD10.

In short, measuring IFAD's corporate performance requires three steps:

1. identifying indicators that reflect IFAD's corporate strategic objectives;
2. determining targets for those indicators that reflect IFAD's approach to development as represented in its project portfolio;
3. creating a system of measuring whether targets are reached.

This process creates significant quantities of data, both on individual projects and for aggregation across projects. Given the other data that are also collected to manage projects and the institution, this means there is a wealth of data available on corporate activities. Managing for results requires identifying and understanding the conditions and factors that determine project performance, as well as the binding constraints behind those factors. Results should be not just considered but analysed. These data provide that opportunity.

For example, the Strategic Framework shows the potential pathways towards achieving IFAD's goals, but the collected data identify the relative emphasis of these pathways across the investment portfolio. This, in turn, allows questions to be asked about whether IFAD's focus is correct: Is IFAD doing the right things? Are there areas that are over- or under-emphasized? Are there gaps in the approach? In other words,

understanding and analysing the portfolio and complementary activities allow for broader introspection. IFAD's approach to results-based management is then to reflect on activities being undertaken and consider whether they represent the best way forward.

While understanding IFAD's own work is central, it is also necessary to look beyond the Fund and incorporate existing evidence on issues related to IFAD's portfolio. One way of doing this is through systematic reviews – literature reviews that use a transparent process to find, evaluate and synthesize evidence on a given topic.<sup>3</sup> This information, along with ongoing impact assessments, consolidates what IFAD knows and does not know about what works in a particular sector or subsector. By conducting regular systematic reviews that synthesize all existing high-quality evidence on a given intervention, an organization such as IFAD can ensure that “what works” is considered when it is time to design new operations, action plans, policies or strategies on specific topics.

Examples of this type of analysis can be seen in Part III of this report. Chapter 9 reflects on the approaches IFAD uses to support land administration and provides a systematic review of the evidence on what works and what does not in this area. Along similar lines, Chapter 10 considers how to improve on IFAD's approach to irrigation investment. Chapter 11 looks beyond individual projects to consider IFAD's policy engagement in Asia to draw lessons for improving how IFAD works with governments. It provides critical insights on how to improve policy engagement just as IFAD is in the process of stepping up these efforts. Finally, Chapter 12 provides a meta-analysis of the poverty-reducing effects of particular types of agricultural research that IFAD has supported in the past. In general, the motivation for these analyses is to improve on IFAD's overall approaches by regularly considering the set of activities that IFAD is supporting. They help ensure that IFAD is doing the right things.

3. See the Campbell Collaboration definition for details: [www.campbellcollaboration.org/library.html](http://www.campbellcollaboration.org/library.html)

## Monitoring and analysing the use of resources to ensure value for money

While the focus of activities should be on achieving key development results, particularly the SDGs, this work should be accomplished using resources as efficiently and effectively as possible. This section highlights IFAD's efforts to improve internal processes to enhance value for money (VfM).

In the IFAD context, VfM means that IFAD maximizes the impact of each dollar invested to improve the lives of poor and food-insecure rural men and women.<sup>4</sup> It requires balancing the "4Es": economy, efficiency, effectiveness and equity. Economy means reducing the cost of individual resources used for an activity while maintaining high-quality output. Efficiency means increasing output at the same quality but at a lower cost or, equivalently, minimizing costs for a given quality of output, generally by reallocating resources. Economy and efficiency are closely linked – they focus on obtaining more at the same cost. Effectiveness means achieving an activity's intended impact. Equity means ensuring that the impacts are felt by poor or marginalized beneficiaries. The 4Es are not new, but VfM seeks to integrate a number of concepts that are already part of the results agenda so that development practitioners focus on resource use as well as impact (Schiere, 2016).

VfM can be considered at the project level or the corporate level (Jackson, 2016). At the project level, it entails ensuring that investments in project activities are the best use of resources to achieve the goals of the project – that is, that project resources could not be used in a better way to achieve the same project impact, nor could the project have a greater impact with an alternative approach. At the corporate level, VfM focuses on whether the business model used by IFAD is the best approach to transforming core resources into impact.

The previous sections of this chapter have focused on building from the project level to identify corporate indicators, including impact. Similarly, corporate VfM requires that both projects and the overall institution use resources wisely. At IFAD, economic and financial analysis is completed for projects as part of their preparation. This analysis considers the returns to the project, and the economy and efficiency of resource use. As described above, measures of outputs and impact determine project effectiveness.

At the corporate level, the RMF includes indicators linked to operational and institutional efficiency, and it seeks to monitor and improve corporate-level resource use. Overall, corporate-level VfM is a product of project-level VfM as well as of corporate operational and institutional efficiency. As it is IFAD's business model that largely determines the approach to resource use, improving VfM depends on conceptualizing and implementing a business model that is created with the 4Es in mind.

The VfM literature emphasizes the need to systematically and simultaneously consider the use of resources, at both project and corporate level, to be sure that the best option is used to obtain the highest output and impact. This consideration requires regular analysis of resource use and its links to the project and corporate results chain. As one analysis states, "Evaluative reasoning needs to preside over measurement" (King and Guimaraes, 2016, 67).

VfM is not simply about reducing operational costs or cutting budgets, but rather about using evaluative reasoning to think carefully about maximizing impact for the lowest cost possible. In that sense, IFAD recognizes that moving towards a culture of VfM goes beyond operations. It requires ensuring that policies and procedures be designed to achieve intended outcomes cost-effectively and implemented following the same principles. If the corporate mechanisms behind IFAD's operations do not incorporate the

4. This definition follows standard definitions used elsewhere, including, for example, DFID (2011), ICAI (2011), Jackson (2016), and the articles in IDEV (2016).

## Box 1.2 Value-for-money scorecard

IFAD has developed a value-for-money (VfM) scorecard to drive the VfM agenda and to help management use evaluative reasoning to identify and balance the trade-offs inherent in pursuing that agenda. These trade-offs include: (1) maximizing the short-term versus long-term benefits of any course of action; (2) maximizing the number of poor and food-insecure men and women who benefit versus supporting the poorest countries or those in the most fragile situations; and (3) reducing overheads versus strengthening the quality of operations. By helping clarify such trade-offs, the scorecard will support IFAD's efforts to increase its effectiveness, efficiency and sustainability.

The scorecard is composed of a subset of indicators from the Results Management Framework of the Eleventh Replenishment of IFAD's Resources that measure progress in improving economy, efficiency, effectiveness and equity in IFAD's operational and organizational performance. The indicators are chosen based on their potential to enhance IFAD's VfM, to achieve greater economy and equity, and to overcome long-standing barriers to greater operational efficiency and effectiveness.

Selected RMF indicators for the VfM scorecard are also linked to the different dimensions of the business model (that is, resource mobilization, resource allocation, resource utilization, and resource transformation).

Source: IFAD (2017).

principles of efficiency, effectiveness, economy and equity, then the consequences could significantly compromise the VfM of IFAD's operations (National Audit Office, 2001). For this reason, IFAD has developed a VfM scorecard as described in box 1.2, and related to selected RMF indicators shown in table 1.1.

Improving the VfM of a development organization such as IFAD is not easy. Among other elements, it requires being able to establish the pathway from budget allocations to results achieved, at both the project and the corporate level. Towards this end, IFAD has recently moved from a budgeting approach based on clusters of activities to a pillars approach based on outputs. IFAD has aligned all instruments in its strategic planning and budgeting architecture around four main results pillars (box 1.3). The overall objective is to improve the effectiveness and efficiency of corporate planning and budgeting processes, as well as to ensure better consistency between

the allocation of resources and the Fund's latest strategic objectives and outcomes as expressed in the Strategic Framework. Thus, IFAD aims to ensure that programming of outputs drives the budget process, rather than having budget allocations drive the programme.

Chapters 3 and 4 reflect efforts to improve the use of resources by analysing internal systems. Chapter 3 presents trends in IFAD's disbursement performance and the drivers of that performance. Disbursements at IFAD, as at other IFIs, were falling below targets, and the analysis provides input into internal IFAD plans to improve disbursement. Chapter 4 considers the use of evidence to make claims in project completion reports (PCRs) – the final reports on project performance, which include lessons for future projects. The chapter reveals a strong need for IFAD to improve the use of evidence in drawing conclusions from projects.

**Table 1.1** IFAD's value-for-money (VfM) scorecard

Dimensions of business model	Key problems	Actions taken to enhance VfM
<b>Resource mobilization</b>	Core resources not being leveraged to the greatest possible degree	<p>Leverage resources through borrowing</p> <hr/> <p>Cofinancing with domestic and international partners</p> <hr/> <p>Mobilization of supplementary funds linked to climate, youth, fragility (refugees) and private sector</p>
<b>Resource allocation</b>	Targeting of countries and within countries needs strengthening	<p>Country selection and resource allocation through performance-based allocation system (PBAS)</p> <hr/> <p>Tailoring country-level approaches</p> <hr/> <p>Enhanced targeting of youth</p>
<b>Resource utilization</b>	Resource use within countries not reaching full potential	<p>Decentralization and enhanced country-based model</p> <hr/> <p>Enhanced synergies between lending and non-lending activities</p> <hr/> <p>Increased loan size</p> <hr/> <p>Mainstreaming climate, gender, nutrition and youth</p>
<b>Resource transformation</b>	Insufficient focus on measuring and managing for results	<p>Development Effectiveness Framework and framework to manage for results</p> <hr/> <p>Impact assessment initiative</p> <hr/> <p>Enhanced transparency through systematic action plan</p> <hr/> <p>Service delivery platform improvements</p>

Link to VfM “4E” dimensions	Measurement of success through Results Management Framework indicators
<p><b>Economy and efficiency.</b> Allows each dollar of official development assistance to have a multiplier effect on the total amount of loans, thereby increasing the efficiency and economy of these resources.</p> <p><b>Effectiveness.</b> Enhances effectiveness by improving impact with funds and knowledge that complement IFAD's approaches and reinforce domestic ownership.</p> <p><b>Effectiveness and equity.</b> Enhances equity by facilitating targeting of funds, and enhances effectiveness by addressing particular concerns of disadvantaged groups.</p>	<ul style="list-style-type: none"> <li>• Debt-to-equity ratio (3.1.2)</li> <li>• Cofinancing ratio (3.1.3 and 3.1.4)</li> <li>• Number of persons receiving services (millions) (2.3.1)</li> </ul>
<p><b>Efficiency and equity.</b> Enhances equity through a focus on countries with strong needs and effectiveness through an emphasis on performance. It also improves efficiency by sequencing services to borrowers.</p> <p><b>Effectiveness and equity.</b> Enhances equity by ensuring that targeting is appropriate for the context and leads to effective projects.</p> <p><b>Equity.</b> Enhances equity by ensuring reach to key populations.</p>	<ul style="list-style-type: none"> <li>• Share of core resources allocated to low-income, lower-middle-income and upper-middle-income countries (3.2.1)</li> <li>• Percentage of PBAS resources reallocated in the Eleventh Replenishment of IFAD's Resources (3.2.2)</li> <li>• Number of countries included in the PBAS at the beginning of the cycle (3.2.3)</li> <li>• Number of persons receiving services (millions) (2.3.1)</li> </ul>
<p><b>4Es.</b> Enhances the 4Es through expanded country presence, which allows for better information flow and engagement, and more effective use of resources.</p> <p><b>Economy and effectiveness.</b> Enhances economy and efficiency through better solutions and enhances effectiveness through improved impact.</p> <p><b>Economy and efficiency.</b> Enhances economy and efficiency through economies of scale in project design and implementation.</p> <p><b>Equity.</b> Enhances equity through improved targeting and effectiveness by focusing on key issues (e.g. climate and nutrition).</p>	<ul style="list-style-type: none"> <li>• Time from concept note to approval (3.5.1)</li> <li>• Time from project approval to first disbursement (3.5.2)</li> <li>• Disbursement ratio (3.5.3)</li> <li>• Ratio of budgeted staff positions in IFAD country offices / regional hubs (3.6.1)</li> <li>• Average size of IFAD's investments projects (IFAD financing) (3.2.4)</li> <li>• Percentage of operations rated 5 and above at completion for overall project achievement (IFAD's Independent Office of Evaluation) (2.2.3)</li> </ul>
<p><b>4Es.</b> Ensures adequate information to drive increases in the 4Es through evidence-based decisions.</p> <p><b>Effectiveness.</b> Ensures attributable impact to determine effectiveness.</p> <p><b>Effectiveness.</b> Creates an openness to data in order to provide incentives for improving the 4Es, and reinforces domestic accountability mechanisms to increase aid effectiveness.</p> <p><b>Economy and efficiency.</b> Enhances corporate-level economy and efficiency by shortening processing times and facilitating nimbler business processes.</p>	<ul style="list-style-type: none"> <li>• Number of persons receiving services (millions) (2.3.1)</li> <li>• Number of people with: greater economic mobility, greater production, greater market access and increased resilience (2.1.1, 2.1.2, 2.1.3, 2.1.4)</li> <li>• Percentage of countries with disbursable projects using the IFAD Client Portal (3.7.5)</li> <li>• Percentage of IFAD operations using Operational Results Management System (3.7.6)</li> <li>• Percentage of IFAD-supported projects trained through Centers for Learning on Evaluation and Results initiative (3.7.7)</li> </ul>

- **Pillar 1** – Country programme delivery: Strengthened effectiveness of IFAD-supported programmes and their capacity to systematically scale up successful interventions.
- **Pillar 2** – Knowledge-building, dissemination and policy engagement: Strengthened capacity to learn, generate and disseminate evidence-based lessons on rural development so that innovations and proven solutions are scaled up.
- **Pillar 3** – Financial capacity and instruments: Diversified IFAD financing instruments relevant to different country contexts, with funds mobilized from a broader range of partners to expand public and private investments for inclusive and sustainable rural transformation.
- **Pillar 4** – Institutional functions, services and systems: Strengthened effectiveness and efficiency of IFAD's institutional management, administration and service delivery platform, including part of the decentralization process.

### Staff and counterparts' readiness for results management

Taking the actions noted in the previous sections will not move IFAD to a results-based organization unless a corporate-wide culture of results is constructed. This requires ensuring that staff, development partners and country counterparts are equipped to manage for results and embrace the ideas underlying results-based management. As part of IFAD's efforts in this area, special training programmes have been developed to ensure readiness to manage for results.

To provide a foundation for results-based management, and more generally to become a more competitive and relevant IFI, IFAD is updating the knowledge, skills and competencies of its staff. The IFAD Operations Academy has been designed to equip staff to deliver. It provides a learning environment that allows staff to develop their core operational competencies, while offering them opportunities to improve their technical capacities and providing a peer-to-peer platform where staff can learn from one another or from external experts who can provide cutting-edge knowledge.

Operating at a high pedagogic level, the Academy offers a mix of training, most of which is face-to-face. These face-to-face sessions are complemented by follow-up activities, e-learning, video tutorials and other distance

knowledge-sharing tools. Its learning methods are based on three key principles: participation, experiential learning and brain-based learning.

The Academy is structured around three main complementary and mutually reinforcing pillars (figure 1.5). The first pillar, the Core Learning Curriculum, is at the heart of the Academy. It includes a set of basic training modules aimed at ensuring that staff have the skills necessary to effectively design and implement IFAD programmes while at the same time taking into account the Fund's priorities, commitments and evolving delivery model. In this pillar, special emphasis is given to data collection, analysis and reporting at the different stages of projects. The second pillar offers a set of technical training modules that complement the core curriculum, delving deeper into many of the technical and fiduciary areas covered in the basic training. Finally, the third pillar offers a space for peer-to-peer learning in order to capitalize on the wealth of experience accumulated by the Fund and by external experts and partner institutions.

IFAD-financed projects, as those financed by most IFIs, are implemented by national staff in the borrowing countries, and occasionally by other development partners or non-governmental organizations (NGOs). Thus, to effectively track and achieve development outcomes, IFAD must enhance not only its own culture of results but also those of its partners at the country level. Specifically, countries should invest in developing



**Figure 1.5** Structure of the IFAD Operations Academy

1 core learning curriculum	2 technical training	3 peer-to-peer learning
<p><b>Module 1</b> Operationalizing IFAD's decentralization plan</p> <p><b>Module 2</b> Developing country strategies</p> <p><b>Module 3</b> Strengthening project design</p> <p><b>Module 4</b> Strengthening project supervision</p> <p><b>Module 5</b> Commitments and safeguards</p>	<p>Technical training on disciplines relevant to IFAD's rural transformation agenda</p> <p><b>Examples of topics that will be covered in technical training sessions</b></p> <ul style="list-style-type: none"> <li>• Agricultural risk management</li> <li>• Anti-corruption</li> <li>• Climate and development</li> <li>• Climate finance</li> <li>• Conservation agriculture</li> <li>• Economic and financial analysis – advanced</li> <li>• Engaging with indigenous peoples</li> <li>• Environmental sustainability</li> <li>• Financial management</li> <li>• Fisheries</li> <li>• Gender</li> <li>• Institutional analysis</li> <li>• Knowledge management in country programmes</li> <li>• Land tenure</li> <li>• Livestock development</li> <li>• Nutrition</li> <li>• Partnership-building skills</li> <li>• Private-sector engagement</li> <li>• Procurement (for reviewers) – advanced</li> <li>• Reduction of food losses</li> <li>• Remittances and migrant investment</li> <li>• Rural finance</li> <li>• Rural infrastructure</li> <li>• Seed management</li> <li>• Small-scale irrigation</li> <li>• Support of farmers' organizations</li> <li>• Value chains</li> <li>• Youth</li> </ul>	<ul style="list-style-type: none"> <li>• Learning events</li> <li>• Exchanges</li> <li>• Mentoring/coaching</li> <li>• Participating in missions of other divisions</li> </ul>
<b>Mandatory (within 2 years)</b>	<b>On demand</b>	<b>Initiative-based</b>

adequate in-country M&E capacities and in putting in place systems that facilitate data collection, analysis, and reporting of results.

These types of efforts are not new. In fact, most efforts to date, both by IFAD and by other development partners, have focused on increasing capacities in their own institutions and the M&E activities of their projects.

However, there have been no systematic

efforts (or standardized tools) to measure governmental capacities at the institutional level for results-based management in the rural and agricultural development sector. There is usually little emphasis on the capacities and systems required to collect, understand and use data; to systematically link evidence to decision-making; and even less to effectively incorporate evidence in public decisions.



AVANTI adapts a tried and tested self-assessment methodology of governments' capacities in managing for development results (CAP-Scan) to the rural sector. This results into a new product (Ag-Scan) following three steps:

1. Identify key stakeholders, engage senior government officials, motivate champions to engage, and coordinate with CAP-Scan facilitators.
2. Conduct preparatory working sessions and a two-day workshop to discuss and prioritize needs.
3. Implement action plan, and collect lessons learned.

AVANTI will also generate knowledge products and case studies that include developing methods for measuring SDG indicators. In addition, information on the progress of these indicators in concrete cases will feed into ongoing debates and foster the exchange of knowledge within the interested community.

For further information, see: [www.avantiagriculture.org](http://www.avantiagriculture.org)

To identify and understand the capacities that are in place, where the gaps are, how to measure progress, and how to build on and strengthen what exists in order to achieve sustainable development, IFAD has put forward the AVANTI grant to adapt an existing tool (CAP-Scan) to the rural sector (AG-Scan). This tool can be used to assess in-country M&E systems and capacities and identify shortfalls. The application of this programme is in itself a capacity development exercise. Through facilitated self-assessment tools, governmental units and institutions will deepen their understanding of the challenges, success factors and open questions existing around M&E. This assessment results in the development of an action plan for strengthening rural-sector M&E capacities and systems. To ensure synergies between these efforts, IFAD's upcoming country strategies will include the results of these action plans to guide M&E efforts and resources through future IFAD projects. Box 1.4 describes AVANTI.

To support countries in improving overall M&E systems in the rural and agricultural development sector, IFAD has brought together The Evaluators' Institute with Centers for Learning on Evaluation and Results to develop a comprehensive rural development-focused M&E and impact assessment training and certification framework, called the Program in Rural Monitoring and Evaluation (PRiME). This training, described in box 1.5, aims to significantly expand and add value to efforts to close data gaps by strengthening country and regional capacities to collect and manage data on rural development.

Taken together, these efforts at the individual and institutional level seek to build a culture of results in order to facilitate an overall strategy to improve development effectiveness. The expectation is that the more widely results management is understood and its value recognized, the more likely it is that high-quality data will be collected and used in decision-making. Ultimately, success in this area will be reflected in the active engagement by IFAD staff and counterparts in management for results.

The Program in Rural Monitoring and Evaluation (PRiME) seeks to establish a high-quality, global and sustainable training programme to certify IFAD-affiliated and other rural development professionals. The programme aims to achieve the following outcomes:

1. an improved skill base in M&E and impact assessment in the rural sector of IFAD-financed client countries;
2. development of a knowledge management repository, where all curriculum materials and learning from the global course delivery, the “train the trainer” component, and the certification process will be codified, stored, and made available as public goods;
3. development of a new M&E and impact assessment certification framework that will be quality assured, implemented and widely recognized by M&E and rural development professionals globally.

PRiME works with government officials and ministries currently engaged with IFAD, improving their knowledge of M&E as a tool for greater impact in the rural sector. Participants are nominated by their respective governments, based on pre-established criteria. In addition, the training and certification programme is open to other government officials, IFAD staff, consultants, partner institutions, staff of other IFIs and multilateral development banks, and others.

The PRiME curriculum has two levels: a fundamentals course in M&E; and advanced training in either M&E or impact assessment. The curriculum uses a modular approach, with exercises, case studies, and other innovative tools for learning and sharing. PRiME is headquartered at the Centers for Learning on Evaluation and Results (CLEAR)–Latin America, based at Centro de Investigación y Docencia Económicas (CIDE), Mexico City. For further information, see: [www.primetraining.global](http://www.primetraining.global)



## Conclusions

The purpose of this report is to highlight IFAD's ongoing efforts to generate evidence to inform decision-making at the corporate and project levels, and to create a culture of results. The chapters provide examples of corporate-level analysis (Part I: Chapters 2–4), project-level impact assessments (Part II: Chapters 5–8), and analysis on thematic areas (Part III: Chapters 9–12). These chapters are based on quantitative and qualitative analysis, which have been used to answer key questions. While the individual chapters provide specific lessons, the report overall highlights that creating a culture of results-based management requires a combination of data collection and analyses that can be used to inform decisions.

In addition to providing an overview of IFAD's results architecture, this chapter has drawn attention to how the different pieces of IFAD's ongoing efforts fit together, and shown the actions being undertaken more broadly to ensure management for results. These efforts are critical to ensuring that IFAD maintains its focus on contributing to SDG 1 (no poverty) and SDG 2 (zero hunger) in rural areas. This chapter recognizes the importance of corporate buy-in and the role of leadership, and it highlights that building a culture of results requires working throughout an organization and embedding this culture in all processes and products, not just in operations.

While IFAD has had a history of measuring results, these efforts represent a surge in activity to expand management for results. This is neither a small nor an easy enterprise. New challenges will emerge, mistakes will be made, and new analysis will uncover areas where IFAD is not doing as well as it should. This is expected as part of the process of improving development effectiveness in rural areas. The insights should be used to draw lessons and continue to improve so that IFAD can be more effective in promoting rural development.

## References

- DFID (UK Department for International Development). 2011. *DFID's approach to value for money (VfM)*. Manuscript, Quest reference: 3116186. London.
- ICAI (Independent Commission for Aid Impact). 2011. *ICAI's approach to effectiveness and value for money*. Report 1 November. London.
- IDEV (Independent Development Evaluation). 2016. Value for money in development work. *eVALUation Matters: A Quarterly Knowledge Publication on Development Evaluation* (third quarter). Abidjan: IDEV, African Development Bank.
- IFAD (International Fund for Agricultural Development). 2016. *IFAD development effectiveness framework*. EB 2016/119/R.12. Rome, <https://webapps.ifad.org/members/eb/119/docs/EB-2016-119-R-12.pdf>
- IFAD. 2017. *Report of the Consultation on the Eleventh Replenishment of IFAD's Resources: Leaving no one behind: IFAD's role in the 2030 agenda*. IFAD11/4/R.2/Rev.1. December 8. Rome, <https://webapps.ifad.org/members/repl/11/04/docs/IFAD11-4-R-2-Rev-1.pdf>
- Jackson, P. 2016. Value for money and international development: Deconstructing myths to promote a more constructive discussion. *eVALUation Matters: A Quarterly Knowledge Publication on Development Evaluation* (third quarter 2016). Abidjan: IDEV, African Development Bank.
- King, J. and Guimaraes L. 2016. Evaluating value for money in international development: The Ligada female economic empowerment programme in Mozambique. *eVALUation Matters: A Quarterly Knowledge Publication on Development Evaluation* (third quarter 2016). Abidjan: IDEV, African Development Bank.
- National Audit Office. 2001. *Modern policy-making: Ensuring policies deliver value for money*. HC 289 Session 2001–2002: 1 November 2001. London.
- OECD (Organisation for Economic Co-operation and Development). 2002. *Glossary of key terms in evaluation and results-based management*. Paris: Development Assistance Committee (DAC).
- OECD. 2012. *The Busan Partnership for Effective Development Cooperation*. Paris: Development Assistance Committee (DAC).
- Schiere, R. 2016. What is new in value for money? *eVALUation Matters: A Quarterly Knowledge Publication on Development Evaluation* (third quarter 2016). Abidjan: IDEV, African Development Bank.
- SDSN (Sustainable Development Solutions Network). 2015. *Indicators and monitoring framework for the Sustainable Development Goals: Launching a data revolution for the SDGs*. A report to the Secretary-General of the United Nations by the Leadership Council of the Sustainable Development Solutions Network. New York.
- Segone, M., ed. 2008. *Bridging the gap: The role of monitoring and evaluation in evidence-based policy making*. Geneva: UNICEF Evaluation Office.





## PART I

---

# Analysing corporate-level evidence

## Chapter 2

---

# Approach to attributing IFAD's aggregate impact

by  
**Paul Winters**  
**Alessandra Garbero**

### Attributing corporate impact

The Sustainable Development Goals (SDGs) have generated a renewed focus on results-based management, inducing the development community to place more emphasis on creating corporate monitoring and evaluation (M&E) systems that generate evidence. This new emphasis has been driven partly by the desire of donor countries to ensure accountability for funds provided to development institutions, and partly by the recognition that managing for results can improve the impact of interventions and generate lessons for subsequent activities in the same country or elsewhere.<sup>5</sup>

Significant progress has been made in methods to rigorously assess impact<sup>6</sup> – the highest-level results that are linked to activities' ultimate objectives, such as increasing income, food security, nutrition or resilience. However, this progress has been made vis-à-vis specific targeted interventions. With these approaches, it is possible to identify the impact of individual projects and programmes supported by a given organization, but not corporate-level impact. Showing that a number of individual interventions have impacts does not necessarily mean that

there is an overall corporate impact. It depends on whether the evaluated interventions can be seen as representing overall corporate efforts.

Some might question the need to measure impact at a corporate level at all; surely, what matters is understanding whether individual interventions have an impact and drawing lessons on successes and failures to improve future projects and programmes. Worrying about corporate-level impact potentially distracts from an intervention-level focus and may come at the expense of learning from innovative individual activities. Projects are often selected for impact assessments<sup>7</sup> specifically for their potential to produce key lessons.

In fact, however, there are several reasons to assess corporate-level impact. A corporate-level estimate of impact can be crucial for justifying funding to an institution as well as, more broadly, funding for development. It can address taxpayers' questions about whether development assistance is effective. For donors, the lack of corporate-level impact assessments represents a missed opportunity, given their interest in assessing the impact of providing an institution with funding as well as the value for money of their donations.

5. See, for example, the call by the Evaluation Gap Working Group (2006) to systematically build evidence about what works in social development.

6. See Gertler et al. (2011) and Khandker, Koolwal and Samad (2010).

7. In general, an attempt to empirically attribute the causal impact of a project on an indicator is referred to as "impact evaluation", but IFAD and others use the term "impact assessment". In this publication, the terms are used synonymously.



In addition, corporate-level impact measurement induces systematic thinking about an institution's overall portfolio. While the selection of individual projects for impact assessments is often theoretically justified based on learning, practically speaking it often reflects what is feasible and in the interest of researchers. This leads to a collection of impact assessments that are skewed towards certain sectors, particularly social sectors, or towards narrow research questions. For example, the impact evaluation database of the International Initiative for Impact Evaluation includes more than 5,000 studies. Of those, about 70 per cent are in the social sector and 20 per cent are in economic and productive sectors (Sabet and Brown, 2017). This is in spite of the fact that the Organisation for Economic Co-operation and Development reports that about 40 per cent of funding goes to the social sector and 35 per cent goes to economic and productive activities.<sup>8</sup> A corporate-level approach requires reflecting on the range of activities in a portfolio. It facilitates a consideration of whether a corporation is “doing the right things” rather than just “doing things right”.

This chapter seeks to clarify the general challenges of measuring impact at a corporate level and to describe IFAD's overall approach. A primary challenge to measuring impact is assessing attribution. Attribution refers to the ability to claim that impact on a key high-order indicator is the result of a particular investment – that is, that an intervention caused an observed effect. This is distinct from measuring contribution, which involves monitoring a key indicator to determine whether it is heading in a direction consistent with an investment to support the claim that an intervention helped to create the observed effect. Attribution involves a claim of causality that contribution does not include. As described more carefully later in this chapter and discussed in box 2.1, attribution requires the creation of a reasonable counterfactual that allows for comparison of what would have happened in the absence of

an intervention. At the corporate level, as seen in table 2.1, contribution to impact is what is commonly measured.

Besides attribution, there is another issue in assessing corporate impact: aggregation. Corporate impact requires having indicators that can be aggregated across a range of interventions as well as a means to add up the overall impacts across those interventions. If every intervention had the same objective, such as higher income, and every intervention had an impact assessment, aggregation would be straightforward – a matter of adding up the individual estimates of impact in a systematic way. However, in reality, this is not the case. Projects vary in their objectives based on local development needs and country priorities. Impact assessments are costly and therefore are rarely undertaken for every project as each additional impact assessment provides less information. However, the absence of an impact assessment means no ability to identify impact and learn from projects. Determining the optimal number of impact assessments and how to aggregate these into a corporate measure is not a trivial task.

With these challenges in mind, IFAD has been seeking to attribute its corporate-level impact on key indicators linked to its Strategic Framework. These efforts are a by-product of the Consultation on the Ninth Replenishment of IFAD's Resources (IFAD9) (2013-2015), where its Results Measurement Framework (RMF) included the aspirational goal of raising 80 million people out of poverty. The indicator “people out of poverty” can create perverse policy incentives.<sup>9</sup> It was found to be a narrow measure of IFAD's corporate impact because it did not reflect all of IFAD's corporate strategic objectives, which include goals other than moving people over a poverty line. Moreover, the target itself was not based on a careful analysis of IFAD's portfolio – it is not clear how much of IFAD's investment was designed to move people over a poverty line.

8. See Table 1.3.3 in OECD (2017).

9. The issue of discrete indicators creating perverse incentives for policymakers is widely known and was recently articulated in a blog by Lant Pritchett (2014) for the Center for Global Development.



**Table 2.1** Corporate measurement of impact

Institution	Impact indicators	Target	Year	Type of assessment
Asian Development Bank (ADB)	Population living on less than US\$1.25 per day (%)	27.4	2015	Contribution
	GDP per capita growth rate (%)	N/A		
	Underweight children under 5 years old (%)	17.7		
	Under-5 child mortality (number per 1,000 live births)	17.7		
	Ratio of girls and boys in education	1.0		
	Gross lower secondary education graduation rate (%)	N/A		
	Maternal mortality ratio (number per 100,000 births)	100.7		
African Development Bank (AfDB)	GDP growth (%)	N/A	N/A	Contribution
	GDP per capita (US\$)			
	Proportion of population living below the poverty line			
	Income inequality (Gini coefficient)			
	Life expectancy			
	Enrolment in education (%)			
	Unemployment rate (%)			
	Economic Diversification Index			
	Global Competitiveness Index			
	Food insecurity (% of population)			
	Resilience to water shocks (index)			
	Institutional capacity for environmental sustainability			
Caribbean Development Bank	Population below the poverty line (%)	34	2019	Contribution
	Population below the indigence line (%)	17		
	Multidimensional Poverty Index (headcount %)	N/A		
	GDP per capita growth rate	0.9		
	Unemployment rate	Decrease		
Consultative Group on International Research (CGIAR)	People assisted to exit poverty (of whom 50% are women)	100 m	2030	Attribution
	People meeting minimum dietary energy requirements (of whom 50% are women)	150 m		
	Women of reproductive age who consume less than the adequate number of food groups	Reduce by 33%		
Global Agriculture and Food Security Program (GAFSP)	Increased household income of direct beneficiaries	N/A	N/A	Attribution
	Proportion of target population below the minimum level of dietary energy consumption			

Institution	Impact indicators	Target	Year	Type of assessment
Global Environment Fund (GEF)	Landscapes and seascapes under improved biodiversity management	300 million ha	N/A	Attribution
	Tons of CO <sub>2</sub> equivalent avoided, both direct and indirect, over the investment or impact period	750 million tons		
	Globally overfished fisheries (volume) moved to more sustainable levels	20%		
Inter-American Development Bank (IDB)	Poverty headcount ratio (US\$4 per day PPP) (%)	N/A	N/A	Contribution
	Gini coefficient			
	Growth rate of GDP per person (%)			
International Fund for Agricultural Development (IFAD)	Number of people experiencing economic mobility	40 million	2018	Attribution
	Number of people with improved production	43 million		
	Number of people with improved market access	42 million		
	Number of people with greater resilience	22 million		
International Finance Corporation (IFC)	End extreme poverty and boost shared prosperity	N/A	2030	Contribution
Islamic Development Bank	Proportion of population living on < US\$1.25 a day	Reduce by ¾	2020	Contribution
	Poverty rate of member countries whose poverty rate is above 40%	Halve		
	Poverty rate of member countries whose rate is below 40%	Reduce by ¾		
	Under-5 mortality rate	Reduce by ¾		
	Maternal mortality rate	Reduce by ¾		
	GDP of member countries	Double		
	Income inequality	Halve		
Work Bank Group and International Development Association (IDA)	Proportion of population living on < US\$1.90 a day	3%	2030	Contribution
	Median income growth rate of bottom 40% of population	N/A	N/A	
	Agriculture value added per worker	N/A	N/A	
	GDP per capita	N/A	N/A	
	Under-5 mortality rate	N/A	N/A	
	Malnutrition	N/A	N/A	
	Population living in areas under water stress	N/A	N/A	
	Population exposed to harmful air pollution (PM2.5)	N/A	N/A	
	CO <sub>2</sub> emissions (kg per 2011 PPP\$ of GDP)	N/A	N/A	

Note: N/A = not applicable; PPP = purchasing power parity.

The contribution-attribution tension can clearly be seen in results measurement and management frameworks (RMFs) or similar corporate measurement systems. RMFs are performance measurement and management frameworks mechanisms that contain a suite of indicators and targets to monitor corporate performance. Progress against an RMF is tracked and reported for the purpose of accountability and learning, although in practice the use of RMFs is often limited to communication and reporting tools for corporate executive boards.

RMFs are reasonably homogeneous across international financial institutions (IFIs) in terms of terminology and structure but vary for other institutes. In general, most organizations adopt a multilevel structure composed of three tiers:

- Tier 1 focuses on the overall global picture and monitors progress towards the Sustainable Development Goals (SDGs).
- Tier 2 determines the development results that are attributable to an institution – the causal effect of activities.
- Tier 3 assesses operational and organizational performance, although some IFIs have separate tiers for these two areas.

Whereas tier 1 monitors progress, and thus contribution, tier 2 measures results that can be attributed to the institution's efforts. Impact indicators that seek to measure the ultimate goals of activities, such as those linked to the SDGs, tend to be in tier 1. In most cases, tier 2 results tend to be outputs, such as the number of people reached or receiving some type of support.

Using the most recent information available at the time of writing, table 2.1 presents impact-level indicators from either tier 1 or tier 2 for the RMFs or equivalent corporate documents of IFAD, selected regional development banks, the World Bank Group (including the International Development Association and International Finance Corporation separately), and major agricultural institutes (the CGIAR, the Global Agriculture and Food Security Program [GAFSP], and the Global Environment Facility [GEF]). The impact-level indicators are noted, as well as whether they measure contribution or attribution.

Generally, across all the major institutions included in the table, there is a lack of impact indicators attributable to that institution. Only IFAD, CGIAR, GAFSP and GEF have set at least one impact target generated by their own operations, whereas the others report only lower-level outputs and outcomes.

Moreover, only in the case of IFAD, and to some extent CGIAR, can one see an attributed impact target and an explanation of how it is to be produced and measured. In light of this, IFAD's approach of attempting to attribute an impact to the institution, rather than merely monitoring its contribution, remains unusual among IFIs.

Even with these limitations, the IFAD9 Impact Assessment Initiative (IAI) recognized IFAD management's responsibility to generate evidence on project success in order to report on past projects and learn lessons for future projects. The approach to the IFAD9 IAI attempted to be scientific, systematic and comprehensive, and it provided IFAD with significant lessons that helped it advance a results-based agenda.<sup>10</sup>

Results of the IFAD9 IAI are reported in table 2.2 to illustrate the types of corporate-level impact measures that can be calculated. The results demonstrate that IFAD beneficiaries analysed as part of the initiative are, on average, better off in percentage terms when compared with a comparison, or control, group (discussed in more detail later in this chapter). IFAD's investments in rural people have generated returns in a number of critical areas, including assets, resilience, livestock ownership, agricultural revenues, nutrition and women's empowerment. Aggregate impact projections show that 43 million beneficiaries will see substantial increases in agricultural revenues,

and 29 million and 23 million beneficiaries will obtain significant gains in poultry and livestock asset ownership, respectively. More than 10 million beneficiaries will experience an increase in each of the following domains: overall assets, productive assets, gender empowerment, dietary diversity, and reduction in shock exposure. Finally, using an asset-based poverty measure, an estimated 24 million beneficiaries are expected to move out of poverty as a result of projects that were either closing or ongoing between 2010 and 2015. Overall, the analysis paints a portrait of IFAD improving the well-being of rural people in terms of asset accumulation and higher revenue and income.

While the IFAD9 IAI was able to provide an assessment of impact, the process had some limitations. This is particularly true given that other IFIs have not yet sought to attribute impact at a corporate level and lessons could not be drawn from the experience of others. Reflecting on this process has led to lessons that have helped move forward IFAD's agenda for measuring

**Table 2.2** IFAD9 estimated impacts (for projects open during 2010–2015)

Impact domain	Indicator	Global impact estimate (average treatment effect) (%)	Projected number of people impacted (million)
<b>Economic mobility</b>	Overall asset index	6.6	15.8
	Durables asset index	2.7	6.4
	Productive asset index	5.6	13.4
	Income	4.0	9.5
	Asset poverty reduction	9.9	24.0
<b>Resilience</b>	Ability to recover from shocks	1.5	3.5
	Reduced shock severity	1.8	4.3
	Reduced shock exposure	4.5	10.9
<b>Nutrition</b>	Dietary diversity	4.6	11.0
<b>Agriculture</b>	Agricultural revenue	18.0	43.2
	Yields	3.8	9.2
<b>Livestock</b>	Livestock asset index	9.5	22.8
	Poultry count index	12.0	28.9
<b>Gender</b>	Gender empowerment	4.8	11.6

10. For details of the IFAD9 IAI, see IFAD (2016).

corporate-level impact. Although the IFAD9 IAI had a number of fundamental flaws, starting from the identification of key indicators and targets, it provided a reasonable basis on which to build.

The remainder of this chapter discusses and justifies the approach IFAD is currently taking. The following section discusses how corporate indicators and targets can be and are identified. The chapter then examines how impact assessments are conducted on individual projects, and looks at how they are aggregated to the corporate level. The final section discusses some of the limitations of the approach and how to move forward to continue to improve measurement.

## From projects to aggregate impact: identifying indicators and targets

As described in Chapter 1, corporate-level indicators of success should reflect an organization's strategic goals and objectives, and should be relatively straightforward to identify provided that: (1) it is easy to quantify the stated goals and objectives; and (2) it is possible to identify indicators that can be easily aggregated across projects. As an example, one can consider the difference between the goal of "improved livelihoods" and that of "greater income". The former is a more encompassing goal but is not easily quantified as there is no agreed-upon livelihood measure. The latter is a narrower goal but is easy to quantify in monetary terms and easy to aggregate across projects because it is expressed in the same unit. Measuring project or corporate impact requires measurable and aggregable indicators; hence, even if corporate goals have not been written with measurability in mind, a solution must be found.

Even if an adequate indicator is found to represent corporate priorities, one cannot assume that an institution's individual projects are designed and implemented to reflect corporate strategic objectives and goals – that is, that there is a one-to-one correspondence between

corporate and project objectives. If there is not, a problem arises. Without a link to the indicators, the projects would not be counted in an institution's aggregate success. While a mismatch between project and corporate objectives may seem inappropriate, in work with governments and communities it may be difficult to avoid. For example, IFAD has had projects that improve drinking-water quality, which should provide clear health benefits. However, its strategic objectives, which focus on productive investment, do not include health outcomes.

Calculating the associated targets of success for each indicator and for a given period is more complicated than identifying the indicator. For example, if the indicator of success is the number of rural people with increased agricultural production (linked to SDG 2.3 on doubling agricultural productivity), how many people constitute success over what period? Answering this question requires a thorough understanding of the institution's portfolio of activities – what is the magnitude of activities undertaken to achieve an objective? The target for a given indicator and period of corporate reporting then depends on the objectives in the individual projects (e.g. recipients expected to benefit from the project for a given objective) and whether the project is successful (the anticipated effectiveness rate of projects). The key building blocks of measuring aggregate performance are: the design and implementation of effective projects; and understanding the distribution and the potential of such projects across the institution's portfolio.

As the starting point for corporate-level measurement of impact is individual projects, a sound project theory of change that addresses a development problem, combined with effective implementation plans, constitutes the first step towards achieving aggregate performance. Assuming that corporate goals and project-specific impact goals align, and that clear implementation plans identify the investments and the number of beneficiaries affected by different types of investments, it should be possible to determine the anticipated impact of the project and the number of people obtaining

benefits associated with each corporate indicator. If this can be done for every project for the period in question, determining the corporate-level impact target for each indicator involves simply adding the anticipated impacts on that indicator for each project.

The corporate-level impact targets for the period relating to the Tenth Replenishment of IFAD's Resources (IFAD10) (2016-2018) can be used to illustrate how this is done. Figure 2.1 summarizes the steps taken by IFAD to develop targets. IFAD's Strategic Framework 2016-2025 states that IFAD's strategic goal is: poor rural people overcome poverty and achieve food security through remunerative, sustainable and resilient livelihoods. To achieve this goal, IFAD identifies three strategic objectives (SOs): SO1 – increase rural people's productive capacities; SO2 – increase rural people's benefits from market participation; and SO3 – strengthen the environmental sustainability and climate resilience of rural people's economic activities. In accordance with this strategy, the following impact indicators were proposed:

- Number of people experiencing economic mobility (goal).
- Number of people with improved production (SO1).
- Number of people with improved market access (SO2).
- Number of people with greater resilience (SO3).

The selection of these particular indicators follows a set of basic rules:

- They need to be clearly defined, measurable indicators that are aligned with IFAD's Strategic Framework. For the three SOs, this was straightforward because the objectives are relatively precise – although even in this case clear rules across diverse projects are required. For the goal, which is broad and includes multiple dimensions, choosing an indicator was more complicated, and in order to reflect the broad nature of the goal, economic mobility was used.

- They need to be aggregable – that is, one must be able to add up corporate indicators across distinct projects with aligned but diverse objectives. For example, one project may increase rice production through irrigation, and another may increase livestock production through finance and technical assistance. To add these together, a broad category, such as increased value of production, is necessary.
- A clear rule of impact needs to be established. If on average project beneficiaries improved resilience by 1 per cent, do they have greater resilience? Although any rule is arbitrary, rules should reflect what project success would look like – that is, what percentage increase would be considered successful.

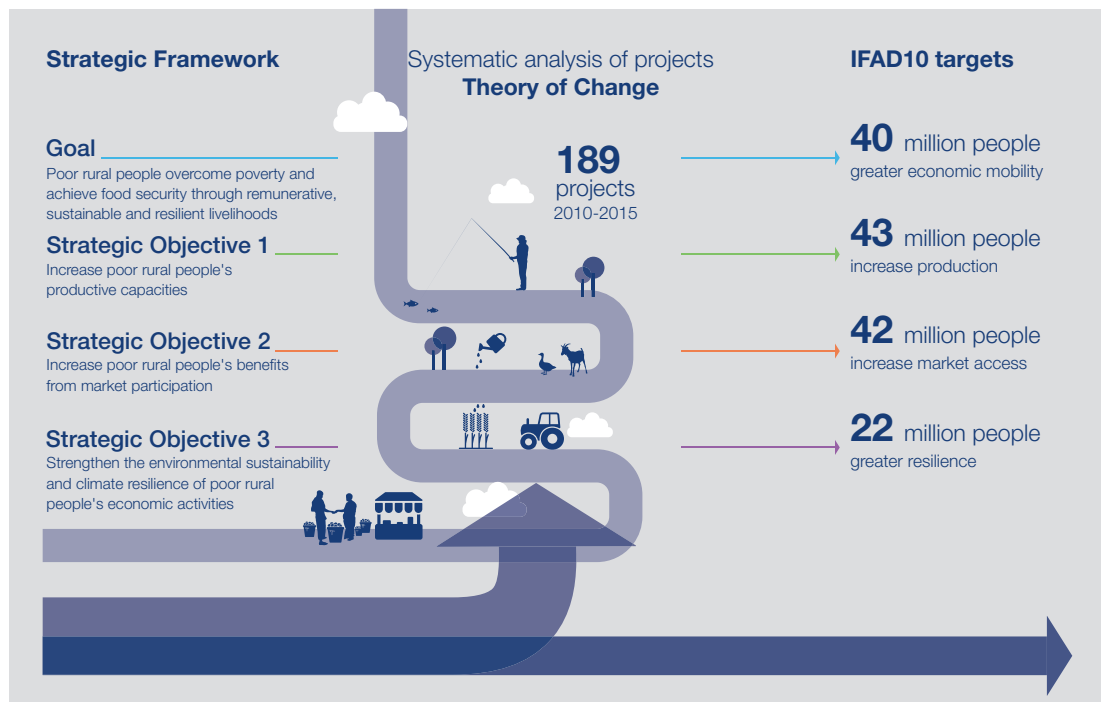
To determine the targets for each of these impact indicators, IFAD performed a broad portfolio analysis based on the distribution of IFAD interventions across the portfolio. Through a lengthy process, IFAD analysed project design documents and available data from all projects approved between 2010 and 2015, for a total of 189 projects. A systematic analysis was carried out to identify each project's theory of change and record these into a database, along with financial data and outreach estimates. The link between each project and the key indicator categories was determined in order to identify the potential impact of that project.<sup>11</sup>

Using the anticipated outreach target of 110-130 million beneficiaries for IFAD10 and assuming a 50 per cent success rate, the estimated RMF targets for IFAD10 were calculated for the four indicators. According to these targets, as a result of IFAD-financed investment projects, 40 million individuals are expected to experience significant economic mobility, 43 million people to significantly increase production (SO1), 42 million people to significantly increase market access (SO2), and 22 million people to experience greater resilience (SO3).

The indicators reflect IFAD's corporate strategic goal and objectives, and the targets reflect what

11. This review of IFAD's portfolio did find that one in five projects included an objective that was not aligned with current corporate SOs.

**Figure 2.1** Identifying corporate impact targets



IFAD actually does in the field. Because this was a new undertaking for IFAD, it was necessary to review the portfolio to understand where IFAD has historically invested. In moving forward, ideally, IFAD will keep track of its anticipated impacts per project beginning at the design stage and have a consistent flow of information on the expected impact for a given indicator. Given these indicators and targets, the key challenge is then to estimate whether these targets are met.

## Impact assessment of individual projects

At the core of the proposed strategy to measure corporate-level impact for IFAD10 is the aggregation of the results of rigorous project-level impact assessments. The key to project-level impact assessments is being able to attribute the impact observed on the ground to the intervention being evaluated.

Defining impact means estimating the difference between how project beneficiaries fared with

the project and how they would have fared in the absence of the project. It implies identifying something that is inherently unobservable: the beneficiaries' status had they not received the project; in other words, a parallel status referred to as the counterfactual. One can observe individuals in only one of the two states – with the project or without it – and not the other. To substitute for this lack of information, attribution requires using one set of individuals or households as a counterfactual for another set. The task then is to identify a comparison, or control, group that is as similar as possible to the beneficiary, or treatment, group had it not received the project.

The fundamental problem of attribution is preventing selection bias in estimates of impact – that is, the tendency for those who receive a project (treatment group) to be different from those who do not (control group). Selection bias can occur when individuals self-select into the project (self-selection bias) or when implementers allocate the intervention to particular types of individuals (project placement bias). Those



who self-select into a project may be more entrepreneurial, more willing to work with others, or have more time available. Those selected into a project by project leaders may be poorer or from marginalized populations. If evaluators fail to account for the fundamental characteristics of beneficiaries in conducting an impact assessment, selection bias can be introduced in the impact estimate. The differences between a treatment and control group could be due to pre-existing differences in those who self-selected into or are selected for the project rather than due to the activities of a project.

There are several methods for constructing a comparison group to attempt to ensure unbiased estimates of impact. These different evaluation designs all share the ultimate goal of trying to validly construct a counterfactual, but they differ in their data requirements, methodological strategy and assumptions. Methods that require fewer assumptions and are therefore valid in more settings are preferred.

Impact assessment can be designed *ex ante* or *ex post*. Those designed *ex ante* are developed during the project design phase and implemented in conjunction with the project. Those designed *ex post* are initiated after implementation has begun, and require constructing treatment and comparison groups after the fact. *Ex ante* impact assessments are preferred because they embed data collection into the project, generating high-quality baseline data before the project is implemented and high-quality follow-up data after it is implemented. They tend to be challenging to implement because they require that projects be well planned in advance so that beneficiaries for the entire project cycle are known. *Ex post* impact assessments face their own challenges, including the difficulty of identifying a reasonable control group after implementation has begun and the lack of baseline data from which to build an evidence base.

There are two broad classes of impact assessment designs: experimental and non-experimental. They differ in the way they identify the counterfactual population.

Experimental designs, such as randomized controlled trials, randomly assign the eligible population into treatment and control groups. This random assignment of those eligible for the project ensures that there are no systematic differences between project recipients and those who serve as a comparison group. The only difference between treatment and control groups should be that the treatment group receives the project.<sup>12</sup> Random assignment can only be done before project implementation and in the case of *ex ante* impact assessments. Randomized controlled trials are generally considered the gold standard for assessing impact, because they clearly provide attribution that avoids selection bias.

Non-experimental approaches seek to mirror experimental designs by using the best data possible, and then applying statistical techniques to create a counterfactual and address selection bias. Non-experimental designs often require assumptions that cannot always be tested. When they are designed *ex ante*, their underlying assumptions are easier to defend where baseline data are available on both treatment and control groups. When they are designed *ex post*, their underlying assumptions are harder to defend. Yet, under the right conditions, these approaches can plausibly replicate experimental treatment effect estimates. These approaches include matching methods, difference-in-difference estimators, instrumental variable models, and regression discontinuity designs.

Careful data collection and appropriate statistical methods lie at the core of rigorous impact assessments at the project level. All impact assessments seek to estimate average treatment effects – a measure that estimates the difference in mean (or average) outcomes between households or individuals in the treatment group and households or individuals in the control group. For example, if one objective of an agricultural project is to increase yields, the average treatment effect would be the increase in the value of production per hectare due to the project, which is the difference in the value of production per hectare between the treatment

12. This assumes that randomization and sampling are done following appropriate statistical procedures.



group and the control group. From this, the attributable impact of the project is determined. It identifies whether, on average, the treatment group is better off as a result of the project.

Although the impact indicators selected in a given project should be relevant to the project's theory of change, they need to be aggregable in order to measure corporate-level impact. Thus, data collection across individual projects must include a reasonably comparable set of indicators linked to corporate objectives, and the average treatment effect must be identified for each of these indicators at the project level. If a project is not linked to a given corporate indicator, this may be acceptable from a project-specific standpoint, but its impact will then be zero at the corporate level, suggesting that the project made no contribution to that objective. Therefore, each project that is assessed should be linked to at least one corporate objective.

Furthermore, in some cases, including in the case of IFAD, there may be a desire to determine the number of people who receive the benefits of a project. For example, as figure 2.1 shows, one of IFAD's impact indicators is the number of people with increased market access. Because impact assessments calculate the average treatment effect, it can be challenging to determine the number of people who benefited. If, for example, a project increases yields by 10 per cent on average, some people will receive gains lower than 10 per cent, and others, greater. An average treatment effect does not reveal the distribution of impacts, and in fact this is not straightforward to determine. However, with assumptions about what level of change constitutes a substantial impact (e.g. a 10 per cent increase in yield) and about the distribution of benefits across the target population, it is possible to estimate the number of people benefiting. This is discussed further in the next section.

In its current strategy for IFAD10 and beyond, IFAD has tried to conduct impact assessments designed both ex ante and ex post. Given the benefits of planning ahead to ensure high-quality data and a sound counterfactual, the long-term objective is to focus on ex ante studies.

However, it will take time to identify projects and to implement ex ante impact assessments in the field. Such impact assessments require a baseline before investment in the field, and then follow-up of from two to four years after investment has actually occurred. Impact estimates and the lessons learned from the analysis will then be produced within three to five years after the initial investment. Given the need to assess impact during IFAD10 (2016–2018), IFAD is focusing more heavily on ex post impact assessments in the short run because they are essential to ensuring sufficient reporting of results for this replenishment period, and therefore to computing corporate impact estimates.

Using these project-level impact assessments for corporate reporting in the manner described below also requires a certain level of comparability of impact assessments across projects and countries. To this end, IFAD has developed a management system to ensure that a solid and consistent approach is put forward and used across the various impact assessments. This allows consistency in methodology, approach and tools for any given study, taking into account project and country specificities.

## Aggregating to the corporate level

The key objective of measuring corporate-level impact is to determine whether investments allowed the institution to reach its targets. For IFAD, these targets have been described above. In practice, estimating impact at a corporate level requires a number of ingredients. First, it requires a critical mass of impact assessments that meet the attribution principle through carefully designed impact identification strategies, and that provide measurable, aggregable indicators. Second, it requires a methodology that allows one to go from a set of individual estimates of impact to an aggregate estimate of corporate impact. Inferring the potential impact of the entire portfolio requires conducting a projection or extrapolation.

This can be termed “intelligent aggregation” – a result synthesis that is informed by a carefully thought-out methodology.

The first step is to select a critical mass of projects to be evaluated through an impact assessment. Ideally, all projects would include a rigorous impact assessment, but as already noted this is generally not possible owing to cost considerations. Data collection requires administering questionnaires, and data analysis requires technical expertise; each has its own costs. Knowledge generation is also subject to diminishing returns as each additional impact assessment on a given development approach provides less new information.

Projects selected for impact assessment should reflect the corporate portfolio both geographically and in terms of the focus. In selecting projects for impact assessments, there are normally two options: (1) purposively select projects based on criteria that would reflect a preference towards strategic, innovative projects, or simply a potential for learning; and (2) randomly select projects to be evaluated, ensuring some form of statistical representativeness. There is a trade-off between purposive selection and random selection.

Choosing projects purposively to maximize learning from each individual impact assessment is justified by the reality that not all projects have the same potential to generate knowledge. Some may implement business-as-usual or small-scale interventions, whereas others may have large-scale or innovative interventions that warrant an impact assessment. However, an approach based on a purposive selection designed to maximize learning does not necessarily lead to a set of impact assessments that reflect the corporate portfolio. This approach can thus bias corporate reporting.

The alternative is to randomly select projects for an impact assessment from the list of projects. If the randomization is done properly,<sup>13</sup> it should lead to a representative sample of projects that can be used to make inferences about the overall portfolio. This approach maximizes corporate

accountability as the selected projects should be representative – to the degree possible – of the portfolio. However, it may come at the expense of learning, because the selected projects may not be those that can generate insightful recommendations and lessons learned. Random project selection is also difficult to implement in practice, particularly when the critical mass of impact assessments includes studies designed *ex ante*. Most of the time, it is not possible to know the entire corporate project portfolio distribution in advance with certainty, so randomly selecting projects is not feasible. Moreover, it is not always possible to assess the impact of a project. For example, partner governments need to agree, monitoring data must be sufficiently strong to create the basis for an impact assessment, and it must be possible to create a counterfactual. These last three elements make random selection of projects for impact assessments almost impossible to implement. In practice, some compromise between rigour and feasibility is needed to ensure a realistic approach that contains a critical mass of impact assessments able to reflect the corporate portfolio.

Once impact estimates for key measurable indicators from individual impact assessments have been obtained, the next step is to aggregate this measure to the corporate level through projection or extrapolation of some sort. Making such an extrapolation requires understanding the portfolio and the relationship between the projects selected for the impact assessment and those that are not selected. In other words, it requires an understanding of to what extent the selected impact assessments relate to the overall portfolio.

The extrapolation can be conducted in a variety of ways. The focus here is on the basic approach used by IFAD. This approach begins by developing a global, or aggregate, estimate of impact for the indicator of interest and then projecting it onto the population of interest. This means using the estimated average treatment effects for an indicator from each project to calculate one global estimate of impact showing the average treatment effect for an indicator based on IFAD's full portfolio

13. Random selection would necessarily require some form of stratification to ensure that all regions and types of projects are covered.

of work. For example, if the indicator is an increase in the value of production per hectare, the average treatment effects for each project can be used to make a global estimate of increase in the value of production per hectare based on an intelligent aggregation of the average treatment effect of the projects evaluated. This intelligent aggregation can potentially be done through meta-analysis, which is a systematic approach designed to provide a quantitative summary of statistical indicators reported in similar empirical studies.<sup>14</sup>

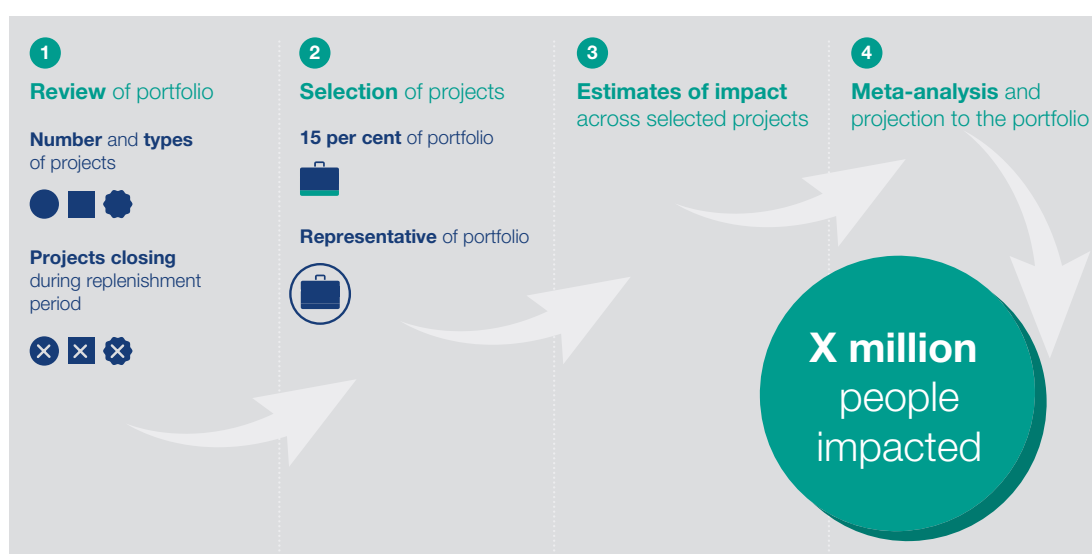
Once this global estimate has been calculated, the measure of corporate impact must be computed. As noted in figure 2.1, this is the number of people achieving certain benefits, such as increased value of production. This is calculated by applying the global estimate to the population of interest, which consists of the beneficiaries of the projects in the portfolio (within a given time frame). As the global estimate is a global average treatment effect, assumptions must be made about the distribution of benefits – that is, the different percentage gains achieved by different beneficiaries. Actual impacts on individual beneficiaries will vary, with some receiving greater benefits than the average and others receiving less

than average. Precisely calculating who benefits is challenging. One conservative approach is to assume a doubling of benefits for some and zero benefits for the remaining population, and then to extrapolate this to the projected population of beneficiaries. In effect, this is multiplying the global estimated effect by the total number of projected beneficiaries. Alternative, more reasonable assumptions could be made.

Figure 2.2 summarizes how this was done under IFAD9 and how the results shown in table 2.2 were obtained. Under IFAD9, there was an attempt to randomly select projects that could be evaluated to compile a critical mass of projects representative of IFAD projects across IFAD's five regions. Initially, about 200 projects were identified as being near completion during the 2010–2015 period and thus could be assessed for impact. Of those, only 122 had sufficient data. Of the projects with data, 41 were randomly selected for potential inclusion – 26 projects was the target number of impact assessments, so 15 were selected as reserves. For a number of reasons (such as data availability, strategic relevance, and timing), only 14 of the 26 were retained and 8 additional projects purposively selected, for a total

14. For an example of how this is done, see Garbero (2016).

**Figure 2.2** Steps of the IFAD9 Impact Assessment Initiative



of 22 impact assessments. To augment those, an additional 14 projects were chosen for analysis using secondary data. A total of 36 projects underwent some form of impact assessment (with primary or secondary data). The process highlighted the challenges of random selection of projects for impact assessments, and provided a strong argument that purposive selection from the beginning was more likely to be successful.

Next, the average treatment effects on key variables were calculated for these projects based on available data – not all indicators were available in every study. A meta-analysis was conducted to obtain one global estimate per indicator. This procedure provided the global estimates of impact reported in table 2.2, column heading “Global impact estimate (average treatment effect)”. Such global estimates of impact were then projected to a universe of beneficiaries (both direct and indirect) reached by projects that were active or due to be completed in the 2010-2015 period. Outreach estimates on the number of beneficiaries reached were about 240 million. It was therefore possible to project impact with a simple multiplicative function, given that the global average treatment effects were representative of the portfolio at the regional level. For example, the poverty reduction global estimate of 9.9 per cent translates into 24 million people projected to move out of asset poverty from the investments of projects open and closed during the 2010-2015 period.

As part of IFAD10, a similar logic will be applied to estimate corporate impact. The first step has entailed identifying projects suitable for an impact assessment in the existing portfolio of projects ongoing and closing between 2016 and 2018 according to a number of key features, including region and project type. The projects have been selected purposively according to project type and geographical distribution in order to reflect the overall portfolio. The second step entails conducting impact assessments of the selected projects by 2018. As generating evidence through ex ante impact assessment takes time, this approach relies only on ex

post impact assessments and will include the estimation of average treatment effects for the impact indicators of interest noted in figure 2.1 (among other indicators). The third step will be to carry out a meta-analysis across all the ex post impact assessments to derive global estimates of corporate impact. The latter can be stratified by the key portfolio features. The last step would be to extrapolate to the portfolio universe.

The end result of this approach would be the generation of corporate-level impact estimates across the main impact indicators – namely, agricultural production, market access, resilience and economic mobility. These can then be compared with the targets noted in figure 2.1. The main strength of this approach lies in its simplicity, transparency and, ultimately, coherence. Projects evaluated not only support learning, they also respond to the need for accountability because they are able to systematically reflect IFAD’s project portfolio distribution.

However, these approaches rely on a host of assumptions, starting from those linked to the individual impact assessments and including the assumptions underlying the meta-analysis and extrapolation. In interpreting results coming out of this exercise, these caveats must be kept in mind. The primary benefit of conducting such an analysis is to increase and maintain the focus on achieving the results articulated in a corporate strategic framework.

## Moving forward: opportunities and challenges

Discussions of impact assessment often focus on reporting for the purpose of accountability, which is important for stakeholders. However, this focus significantly underestimates the value of impact assessment as a means of learning and as a way to focus development efforts. Attempts to attribute impact put a spotlight on a project by raising questions about how investments should ultimately lead to impact. Such scrutiny

can lead to a reassessment of the project's theory of change and reconsideration of the adequacy of a project's monitoring and evaluation (M&E) systems.

Highlighting the role of impact assessments, a paper by Legovini, Di Maro and Piza (2015) analysed the differences between projects with and without an impact assessment. The analysis showed that the delivery of projects with an impact assessment was significantly timelier and avoided common delays. These effects were attributed to a clearer implementation road map, evidence-based midcourse corrections, and strengthened capacity on the ground. Thus, the benefits of impact assessments include not just improving learning and accountability but also focusing project managers on results and thereby enhancing project design and general M&E.

The scrutiny that accompanies an individual impact assessment also accompanies corporate-level impact measurement. IFAD's attempt to assess impact both in IFAD9 and in IFAD10 has been a key factor in the elaboration of its Development Effectiveness Framework. As described in Chapter 1, this framework is an institutional set-up that seeks to create a structure to facilitate the use of evidence in decisions on the design and implementation of projects. A focus on development effectiveness requires the adequate measuring of results – from outputs to outcomes and impact – and the design and implementation of effective projects. As with individual projects, the benefit of corporate-level impact assessment is to enhance the focus on results.

While a corporate impact assessment agenda presents an opportunity for IFAD in the long run, there are significant challenges to implementing the plans noted in this chapter and deriving the benefits of corporate measurement. One set of challenges revolves around the project-level impact assessments that are the basis of the corporate approach.

First, buy-in from both IFAD and government stakeholders is crucial to ensure that policy-relevant questions are asked in the impact assessment and to allow impact assessments to be properly designed and implemented. An impact assessment provides the greatest benefits when there is a strong partnership between the project team and the technical team conducting the assessment.

Second, project design can create challenges. A project that lacks a clear focus on delivering a key result and that has multiple components that are not clearly connected is difficult to assess because there is no critical mass of interventions linked to a clear and measurable result. In contrast, a project whose components all drive to a single consistent set of results is easier to assess.

Third, weak M&E systems within a project hinder the overall impact assessment because it is difficult to identify impact without adequate information. This is particularly challenging for impact assessments designed *ex post* because the lack of adequate monitoring data, including baselines and lists of beneficiaries, means researchers have to try to create information from past activities.

Fourth, the best timing for the selection of projects that will undergo an impact assessment is also an issue. Data collection often needs to fit not only the agricultural cycle but also the project timeline. *Ex post* impact assessment ideally occur prior to the closure of the project so project completion reports can benefit from the impact assessment findings. The timing of *ex ante* impact assessments depends on project start-up.

Another set of challenges relates to determining corporate-level impact. IFAD has been striving for evaluable projects that are suitable for impact assessments, that can maximize learning, and that reflect IFAD's overall portfolio distribution. However, there is often a mismatch between a project's initial concept and its implementation.

This design-implementation mismatch means that projects do not reflect the expected project type and therefore the portfolio distribution. Corrections or adaptations in implementation are not always carefully documented, and this is particularly problematic because projects with impact assessments form the empirical basis of the extrapolation methodology.

The resources needed to conduct an impact assessment also present a challenge for two reasons. First, if a primary objective of impact assessment is corporate reporting, it is difficult to embed data collection costs within a project. This is potentially resolved by ensuring that the impact assessment is relevant for governments. Second, knowledge generation is a public good, and its value goes beyond the individual project or country – impact assessments provide knowledge with potentially broad implications. Consequently, it tends to suffer from underinvestment. This means that new resources are likely to be required for impact assessment, putting pressure on already tight development assistance budgets.

Last, there are challenges linked to the overall aggregation methodology. The methods necessary for individual impact assessments and corporate aggregation are technically sophisticated and require specialist knowledge. This creates challenges in conveying the arguments for appropriate methods and in providing the caveats in any reporting. It also creates challenges in communicating results.

Nevertheless, these challenges represent tremendous opportunities for improvement. Ultimately, the lessons learned, both positive and negative, will improve M&E systems overall. They will simplify and therefore focus IFAD-supported projects, increasing IFAD's capacity to deliver evidence-based, policy-relevant results; and they will allow IFAD to achieve higher (and measurable) standards in aggregate terms.

## References

- Evaluation Gap Working Group. 2006. *When will we ever learn? Improving lives through impact evaluation*. Washington, D.C.: Center for Global Development.
- Garbero, A. 2016. *Measuring IFAD's impact: Background paper to the IFAD9 Impact Assessment Initiative*. IFAD Research Series 07. Rome: IFAD.
- Gertler, P., Martinez, S., Premand, P., Rawlings, L. B. and Vermeersch, C. M. J. 2011. *Impact evaluation in practice*. Washington, D.C.: World Bank.
- IFAD (International Fund for Agricultural Development). 2016. *Synthesis of lessons learned from the IFAD9 Impact Assessment Initiative*. Rome, <https://webapps.ifad.org/members/eb/117/docs/EB-2016-117-R-8-Rev-1.pdf>
- Khandker, S. R., Koolwal, G. B. and Samad, H. A. 2010. *Handbook on impact evaluation: Quantitative methods and practices*. Washington, D.C.: World Bank.
- Legovini, A., Di Maro, V. and Piza, C. 2015. *Impact evaluation helps deliver development projects*. Policy Research Working Paper No. WPS 7157. Washington, D.C.: World Bank, <http://documents.worldbank.org/curated/en/676351468320935363/Impact-evaluation-helps-deliver-development-projects>
- OECD (Organisation for Economic Co-operation and Development). 2017. *Development aid at a glance: Statistics by region, 2017 edition*. Paris.
- Pritchett, L. 2014. Saturday Night Live satirizes kinky development. Blog post, October 21. Washington, D.C.: Center for Global Development, [www.cgdev.org/blog/saturday-night-live-satirizes-kinky-development](http://www.cgdev.org/blog/saturday-night-live-satirizes-kinky-development)
- Sabet, S. M. and Brown, A. N. 2017. *Is impact evaluation still on the rise? Recent trends in the evidence base for development*. 3ie Draft paper.



## Chapter 3

---

# IFAD's disbursement performance: trends and drivers

by

**Tim Balint**

**Daniel Higgins**

**Paola Mallia**

**Silvana Scalzo**

**Paul Winters**

In the wake of the Addis Ababa Action Agenda's call for unprecedented investments in achieving the Sustainable Development Goals, international financial institutions (IFIs) – such as the World Bank and the regional development banks – have been playing an increasingly important role in providing financial assistance to developing countries. Unlike budget support, which is non-earmarked and provided as a one-off payment, operations financed by IFIs are typically tied to the implementation of a particular programme or project for which funding is granted in tranches of disbursements. Accordingly, the success of IFI-financed operations, and their ability to have the intended development impact, depends on a rapid project start-up, and regular and timely disbursements of funding to recipient countries (Gohou and Soumaré, 2009; Sunjka and Jacob, 2013; Mishra, 2016). Although the observed disbursement performance is to a large extent a reflection of the recipient's ability to implement the project, IFIs have a shared responsibility by supervising project implementation and releasing funds to the recipient when necessary and deemed appropriate.

In an effort to promote more timely and accelerated disbursements to IFAD's projects, the study presented in this chapter rigorously analyses trends in the Fund's disbursement performance and the drivers of those trends.

This reflects broader efforts by IFAD to move towards results-based management and to inform decisions through the analysis of data.

As a specialized United Nations agency and IFI that provides grants and concessional and non-concessional loans to governments of developing countries, IFAD currently manages a portfolio of about US\$6.8 billion of its own financing to 230 rural and smallholder agricultural development projects in more than 90 countries. Projects are collaboratively designed by IFAD and the recipient government, and implemented by a project management unit composed of recipient government staff, with IFAD adopting a supervisory role throughout implementation. Thus, when testing the factors that influence disbursement performance, this study considers factors related both to the country and to IFAD.

The number of published studies of IFI disbursement performance is relatively small – table 3.1 provides an overview. By adding to that body of work, the study presented in this chapter can provide important lessons not only for IFAD but also for other IFIs. Internally, it represents the first systematic investigation of the drivers of IFAD's disbursement performance and seeks to offer evidence-based insights for future improvement. Externally, the study represents the most comprehensive, and possibly the most methodologically robust, analysis of



disbursement performance of an IFI to date. It can serve as a potential best-practice approach for other IFIs wanting to assess and improve their disbursement performance.

Formally, the investigation aims to answer the following research questions:

- What are the trends in IFAD's disbursement performance over the past 20 years?
- What are the most significant factors that influence IFAD's disbursement performance?
- How can IFAD (and other IFIs, if relevant) improve disbursement performance in the future?

**Table 3.1** Existing quantitative studies of the drivers of IFI disbursement performance

Organization and study	Focus and sample	Results
<b>African Development Bank (AfDB)</b> Gohou and Soumaré (2009)	<ul style="list-style-type: none"> <li>• <b>Focus:</b> Factors that influence time between approval and first disbursement.</li> <li>• <b>Sample:</b> 2,195 AfDB-financed projects approved between 1967 and 2008.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Positive effect:</b> Higher GDP per capita; higher project budget; project being financed by a grant rather than a loan; project being related to communication sector.</li> <li>• <b>Negative effect:</b> Project in the south of the continent.</li> <li>• <b>No effect:</b> Project sector; project in north, west or east of the continent.</li> </ul>
<b>African Development Bank (AfDB)</b> Nkamleu, Tourino and Edwin (2011)	<ul style="list-style-type: none"> <li>• <b>Focus:</b> Causes of delay between approval and first disbursement.</li> <li>• <b>Sample:</b> 525 AfDB-financed projects approved between 1990 and 2007 in the agriculture and agro-industry sector.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Positive effect:</b> Higher approved project budget; more recent approval date; higher number of components.</li> <li>• <b>Negative effect:</b> Longer planned duration.</li> <li>• <b>No significant effect:</b> Goal linked to agricultural and productivity growth; share of budget covered by AfDB; located in an AfDB-only eligible country.</li> </ul>
<b>Inter-American Development Bank (IDB)</b> Álvarez, Bueso-Merriam and Stucchi (2012)	<ul style="list-style-type: none"> <li>• <b>Focus:</b> Factors that drive disbursement performance from approval until end of project.</li> <li>• <b>Sample:</b> 1,049 IDB projects approved between 1996 and 2011.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Positive effect:</b> Higher approved budget; team leader located in country (after policy change in 2009).</li> <li>• <b>Negative effect:</b> Team leader located in country (before policy change in 2009); longer preparation time; change in team leader during project life; number of projects managed by team leader.</li> <li>• <b>No effect:</b> Age and experience of team leader.</li> </ul>
<b>World Bank</b> Kersting and Kilby (2015)	<ul style="list-style-type: none"> <li>• <b>Focus:</b> Effects of country having an upcoming election and being aligned with the United States of America on the United Nations Security Council, against the number of months taken to disburse 25 per cent of project budget.</li> <li>• <b>Sample:</b> 5,115 projects implemented between 1984 and 2012.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Positive effect</b> on accelerating disbursements): When a country that is aligned with the United States of America on the United Nations Security Council has an upcoming election.</li> <li>• <b>Limitation:</b> Effect does not hold for non-competitive elections where there is little risk to the incumbent.</li> </ul>

## Data and methodology

### Data

This study analyses the disbursement performance of the 577 IFAD-supported projects approved between 1995 and 2014. It excludes investment projects approved before 1995 because data on potential explanatory factors for IFAD's disbursement performance are not available for the 1980s and early 1990s owing to the lack of corporate databases at that time. To ensure that the most up-to-date data were included, disbursements until 31 December 2015 were considered for the selected project sample. Data on the disbursements were drawn from an internal data source and carefully adjusted, taking into account the specifics of start-up advances and consistent retroactive financing in Botswana, Mexico and Morocco, as well as returns and refunds. Country-level data from a variety of sources were merged with these internal data.

### Defining disbursement performance indicators

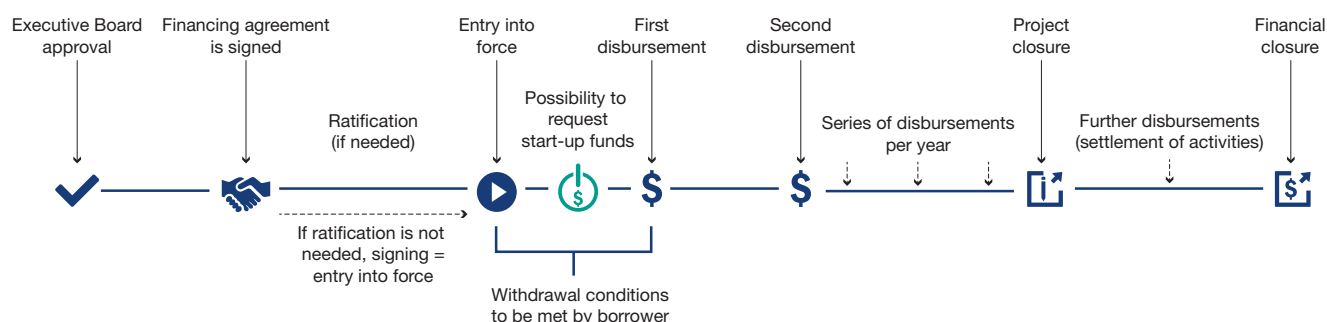
Disbursement-delaying issues can occur at many points along a project's life cycle. Figure 3.1 gives an overview of the life of an IFAD-financed project from approval to closure, highlighting these points. Based on internal documents and consultations with in-house disbursement experts, it was determined that the most meaningful way of categorizing these points for the purpose of analysis was to group them into: (1) those that come before the first two project disbursements;

and (2) those that come thereafter. Through this consultation process, indicators were formulated for these two areas of disbursement performance.

Accordingly, IFAD's disbursement performance is considered from two perspectives: disbursement readiness, and disbursement effectiveness. Disbursement readiness covers the period leading up to the first two disbursements. This period represents the ability to actually begin implementation of a project after formal approval. Disbursement effectiveness covers the remaining period, looking at the pace and amount of disbursements throughout the project lifetime until closure. These two dimensions are of the utmost importance for development effectiveness. They also reflect the most common indicators used in the results measurement frameworks of other IFIs, including the African Development Bank, Asian Development Bank, Inter-American Development Bank and World Bank, as well as those used in previous studies conducted on their disbursement performance (see table 3.1).

To assess disbursement readiness, the analysis uses five indicators covering the three key stages of this period, which are: being declared effective/entering into force; receiving the first disbursement; and receiving the second disbursement. The second disbursement was identified as an important readiness milestone. This was because, while the first disbursement is sometimes an advance to cover planned project expenditures, the second disbursement occurs only once proof has been provided that expenditures are under way and therefore that

**Figure 3.1** The life of an IFAD project



project activities have actually begun. The five indicators of disbursement readiness are:

- number of days between approval and effectiveness/entry into force;
- number of days between effectiveness/entry into force and first disbursement;
- number of days between approval and first disbursement;
- number of days between first and second disbursement;
- number of days between approval and second disbursement.

To assess disbursement effectiveness, the analysis uses two indicators:

- disbursement rate at any point in time across project stages;
- disbursement rate at financial closure.

These disbursement rates are calculated as the cumulative amount disbursed as a proportion of the approved budget. For disbursements across project life, rates were calculated for given points along the project's length, measured by the time elapsed since approval as a proportion of the planned length. Proportions, rather than absolute amounts of time, were used so that disbursement rates could be compared at similar project stages across projects of different planned lengths.

### Identifying potential disbursement-influencing factors

Input from in-house experts and insights from the previous IFI studies were also sought in order to identify the factors whose influence on disbursement performance would be tested. This process highlighted the importance of both country- and IFAD-side factors. On the country side, important political and socio-economic characteristics were identified, as well as the frequency of important incidents such as elections and natural disasters. On the IFAD side, important subcategories of factors were related to: the financing of the project; the management of the project, specifically various characteristics of the country programme manager (CPM) in charge; and the conditions included in the project's financing agreement. Accordingly, sets of variables

for each of these categories and subcategories were obtained from internal and external sources for inclusion in the analysis.

One key part of this process was separating out variables in these sets that were highly correlated with one another. Two highly correlated variables cannot be included in the same analytical model because it is impossible to measure the individual effects of each. Consequently, for each of the correlated pairs, the variable of the highest interest to IFAD was selected for inclusion and the other variable excluded.

### Generating a benchmark disbursement schedule

As part of the trend analysis for this study, it was important to obtain an idea of how a typical IFAD project disburses funds across its life. This was done using a method similar to that of Álvarez, Bueso-Merriam and Stucchi (2012). Using data on disbursement rates from all of the projects in the sample, an econometric regression technique was used to identify a line of best fit to serve as the benchmark disbursement curve for disbursements across project life. However, whereas Álvarez Bueso-Merriam and Stucchi (2012) assessed rates according to the amount of absolute time passed since project approval, this study used disbursement rates at different project stages, measured by the amount of time since project approval as a percentage of the project's planned length. In this way, disbursement rates for projects of different lengths could be compared at similar stages of implementation. This was deemed a more meaningful comparison. Trends in IFAD disbursement performance could be observed by looking at deviations from the benchmark curve of project disbursement rates at a given stage.

### Analytical models

Three different analytical models were employed to assess the effects of the various influencing factors on the disbursement performance indicators. All three models use econometric techniques that provide an average effect size of each influencing factor on the performance indicators, and a measure of the "statistical significance" of the effect.

For the disbursement readiness analysis, a survival model analysis was employed. This structures the data into time periods and assesses the influence of a given factor on the likelihood of a project's first disbursement occurring in that period (see Cameron and Trivedi, 2005). The benefit of this approach over other econometric models is that it allows for the inclusion of projects that have not yet disbursed, as these are classed as “right censored” in the survival model, and the periods that have already occurred before the end of the dataset can still be analysed.

The analytical model used for the disbursement effectiveness indicator of disbursements across project life was a dynamic random-effects generalized least squares model (see Wooldridge, 2002). This was deemed the most appropriate owing to its usefulness for analysing data taken across multiple points over time. For the assessment of factors influencing the amount disbursed by project closure, which would have only one data point for each project, a standard ordinary least squares regression analysis was deemed the most appropriate.

## Trends in IFAD's disbursement performance

### Disbursement readiness

IFAD's overall disbursement readiness has improved slightly over its past five three-year replenishment periods (table 3.2). The average time from approval to first disbursement fell from 21.0 months to 17.6 months, and the average time from approval to second disbursement dropped from 28.3 months to 24.5 months. Strikingly, the time it takes to complete different phases has changed dramatically over the years. Projects that disbursed for the first time in the IFAD9 replenishment period (2013-2015) needed only 7.4 months to be declared effective – half the time needed during IFAD5 (2001-2003). At the same time, projects in IFAD9 needed twice as much time to obtain a first disbursement after effectiveness as those in IFAD6. This change is probably an effect of the 2009 revision of the General Conditions for Agricultural Development Financing, which abolished effectiveness conditions but resulted in the addition of many more first disbursement conditions to project financing agreements.

**Table 3.2** Disbursement readiness in IFAD's past five replenishment periods

	IFAD5 (2001-2003)	IFAD6 (2004-2006)	IFAD7 (2007-2009)	IFAD8 (2010-2012)	IFAD9 (2013-2015)
<b>Board approval to effectiveness</b>	15.8	15.3	13.7	9.9	7.4
<b>Effectiveness to first disbursement</b>	5.3	5.1	5.3	8.2	10.2
<b>Subtotal (Board approval to first disbursement)</b>	21.0	20.4	19.0	18.1	17.6
<b>First to second disbursement</b>	7.3	9.4	7.4	8.3	6.9
<b>Total (Board approval to second disbursement)</b>	28.3	29.8	26.4	26.4	24.5

**Table 3.3** Average time from approval to first disbursement by IFAD region and replenishment period

Region	IFAD5 (2001-2003)	IFAD6 (2004-2006)	IFAD7 (2007-2009)	IFAD8 (2010-2012)	IFAD9 (2013-2015)
Asia and the Pacific	19.6	16.1	17.7	15.6	14.8
East and Southern Africa	19.3	17.6	15.5	16.6	14.2
Latin America and the Caribbean	26.0	31.3	28.3	26.5	23.3
Near East, North Africa and Europe	17.1	20.1	19.7	15.4	21.1
West and Central Africa	22.7	24.2	17.4	18.3	15.9

Regionally, the average time from approval to first disbursement improved across the board over time, with the recent exception of the Near East, North Africa and Europe region (table 3.3). The West and Central Africa region's performance greatly improved from a peak of more than 24 months in IFAD6 to 16 months in IFAD9. Projects in the Asia and the Pacific and in the East and Southern Africa regions also managed to reduce the time lag by more than 30 per cent, from about 19 months in IFAD5 to 14-15 months in IFAD9. The Latin America and the Caribbean region still has the highest lag between approval and first disbursement, but here as well disbursement readiness has steadily improved since IFAD6.

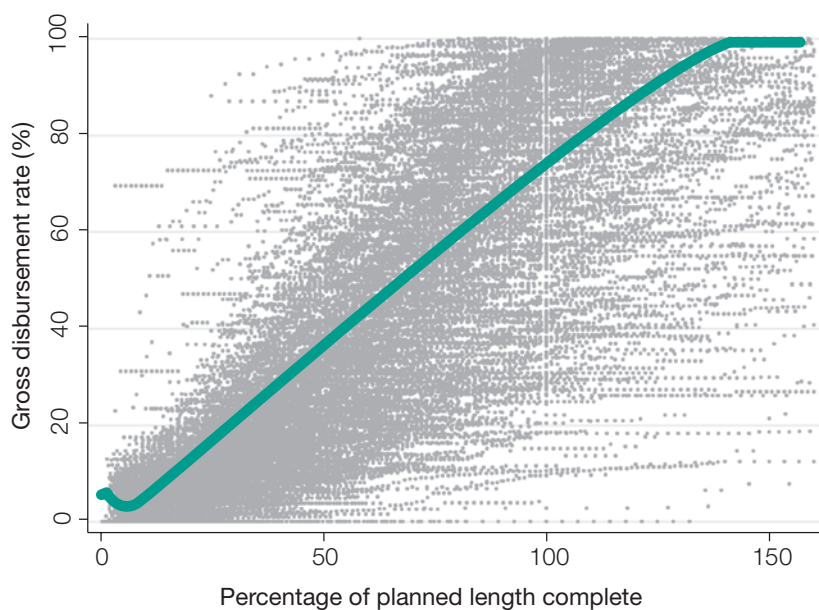
#### Disbursement effectiveness

IFAD projects often run beyond their planned length. The data on disbursement effectiveness show that by the 100 per cent planned completion point, the benchmark curve rate of disbursement of funds reaches only 71.4 per cent (figure 3.2 and table 3.4). In addition, figure 3.2 highlights the high amount of variation in the disbursement performance of IFAD projects. While values for the disbursement curve are not a reflection of average values but a smoothed-out stylized depiction, the figure shows that many projects fall both well above and well below the benchmark curve. Moreover, it is clear that IFAD

**Table 3.4** Disbursement rates along the line of best fit

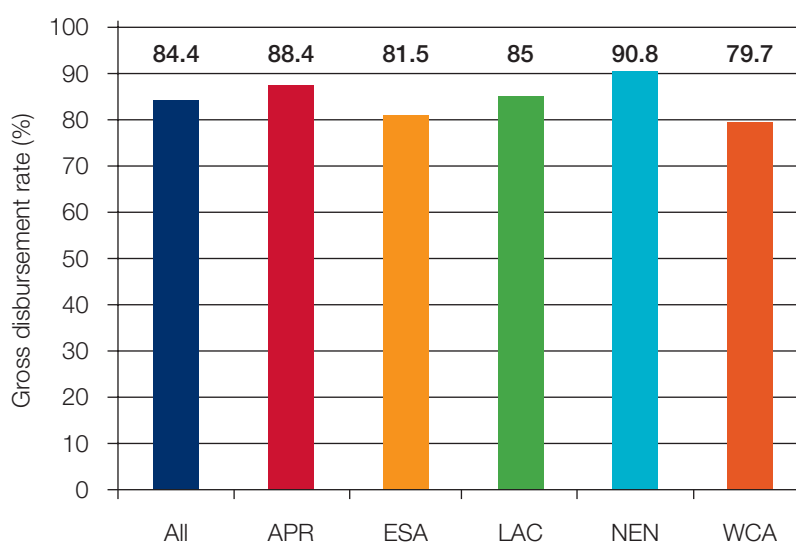
% planned time	Disbursement rate (%)
10	2.8
20	8.6
30	16.7
40	25.1
50	33.4
60	41.6
70	49.4
80	57.0
90	64.4
100	71.4
110	78.2
120	83.5
130	91.3
140	97.5
150	100.0

**Figure 3.2** Disbursement rates of all projects with line of best fit



Note: These data show the benchmark disbursement curve plotted across all of the disbursement rates of the 577 IFAD projects included in the sample, taken at intervals of 2.5 per cent of planned project length.

**Figure 3.3** Disbursement rates at project closure by region



Note: APR = Asia and the Pacific; ESA = East and Southern Africa; LAC = Latin America and the Caribbean; NEN = Near East, North Africa and Europe; WCA = West and Central Africa.

**Table 3.5** Results for country-level factors on disbursement readiness and effectiveness

Variables	Disbursement readiness		Disbursement effectiveness	
	Time to first disbursement	Time to second disbursement	Disbursement rate across project life	Disbursement rate at project closure
<b>Country classification</b>				
State fragility index (The higher, the ...)	ns	Slower*** (+14 days per point)	Lower* (-0.5%)	ns
Gross national income (GNI) per capita (The higher, the ...)	Slower**	Slower***	-	-
Financing terms (The more grant versus non-grant financing, the ...)	-	-	Higher*** (+15%)	Higher*** (+12%)
Small state (If yes, then ...)	-	-	ns	Higher** (+13%)
<b>Socio-economic and political variables</b>				
Official development assistance (ODA) to agriculture (The higher, the ...)	Quicker** (#)	Quicker*** (#)	ns	ns
Elections in current year (If yes, then ...)	Slower*** (+84 days)	Slower*** (#) (+141 days)	ns	Higher* (+0.9% per election)
General government revenue (The higher as % of GDP, the ...)	Quicker**	Quicker**	-	-
Current account balance (The higher as % of GDP, the ...)	Slower***	ns	ns	ns
SDR/local currency exchange rate (The stronger SDR versus local currency, the ...)	-	-	-	Lower** (-3.2%)
<b>Events in country during implementation</b>				
Number of extreme weather events (The more events, the ...)	Slower*** (+8 days per event)	Slower*** (+11 days per event)	ns	Higher* (+0.2% per event)
Number of epidemics (The more epidemics, the ...)	Slower*** (+7 days per event)	Slower* (+3 days per event)	-	-
Number of incidents of drought (The more events, the ...)	-	-	ns	Higher** (+0.7% per event)
Number of incidents of agricultural disasters (The more events, the ...)	-	-	ns	ns

Notes: ns = not significant; # = level only significant in one of the two statistical models. – = variable not tested for this indicator. SDR = special drawing rights. Coefficients in brackets are shown only if easy to interpret. Estimated p-values of statistics: \*\*\* =  $p < 0.01$  (meaning a 99% probability that the result is different from 0), \*\* =  $p < 0.05$  (95%), \* =  $p < 0.1$  (90%).



**Table 3.6** Results for project-level factors on disbursement readiness and effectiveness

Variables	Disbursement readiness		Disbursement effectiveness	
	Time to first disbursement	Time to second disbursement	Disbursement rate across project life	Disbursement rate at project closure
<b>Financing</b>				
Approved IFAD financing (The higher the amount, the ...)	<b>Quicker***</b> (optimal: US\$32 million)	<b>Quicker*</b>	-	-
First disbursement (as % of approved) (The higher the first disbursement, the ...)	-	<b>Quicker***</b>	-	-
Use of start-up funds (If used, then ...)	<b>Slower*** (#)</b>	ns	-	-
Start-up advance (as % of approved) (The higher the start-up, the ...)	-	ns	-	-
Cofinancing ratio (The higher, the ...)	-	-	<b>Lower**</b> (-0.4%)	ns
Infrastructure financing (The higher as % planned, the ...)	-	-	ns	ns
Credit financing (The higher as % planned, the ...)	-	-	ns	ns
Soft activities financing (The higher as % planned, the ...)	-	-	ns	ns
<b>Management</b>				
Operational IFAD country office (ICO) (If yes, then ...)	<b>Slower*</b>	<b>Slower*** (#)</b>	<b>Higher**</b> (+4.6%)	<b>Lower*</b> (-9%)
ICO is headed by country programme manager (CPM) (If yes, then ...)	<b>Quicker** (#)</b> (-62 days)	<b>Quicker*** (#)</b> (-9 days)	ns	<b>Higher***</b> (+24%)
Project was directly supervised (If yes, then ...)	-	-	ns	<b>Higher***</b> (+16%)
<b>Country Programme Manager</b>				
CPM turnover (If CPM who designed the project is still in charge during start-up, then ...)	<b>Quicker***</b> (-160 days)	<b>Quicker* (#)</b> (-146 days)	ns	ns
CPM experience (The more years of IFAD experience the CPM has, the ...)	<b>Quicker*** (#)</b>	<b>Quicker***</b>	ns	ns
CPM workload (The larger the portfolio managed by the CPM, the ...)	<b>Slower** (#)</b>	<b>Slower* (#)</b>	ns	ns
CPM gender (If the CPM is a woman, then ...)	ns (Quicker for time to entry into force**)	ns (Quicker from first to second disbursement**)	ns	ns

Variables	Disbursement readiness		Disbursement effectiveness	
	Time to first disbursement	Time to second disbursement	Disbursement rate across project life	Disbursement rate at project closure
<b>Financing agreement conditions</b>				
Ratification of financing agreement (If required, then ...)	ns (Slower for time to entry into force <sup>***</sup> ) (Quicker for entry into force to first disbursement <sup>***</sup> )	ns	-	-
Financing agreement was signed by correspondence (If yes, then ...)	ns (Slower for approval to entry into force <sup>***</sup> )	ns	-	-
Project implementation manual required (If yes, then ...)	ns	ns (Quicker for first to second disbursement*)	-	-
Number of accounts required (The higher the number of accounts, the ...)	ns	ns	-	-
Project management unit required (If yes, then ...)	Quicker <sup>***</sup> (-61 days)	ns	-	-
Project director required (If yes, then ...)	ns	ns	-	-
Number of conditions (The higher the number of conditions, the ...)	ns	ns	-	-

Note: ns = not significant; # = level only significant in one of the two statistical models. – = variable not tested for this indicator. Coefficients in brackets are shown only if easy to interpret. Estimated p-values of statistics: \*\*\* =  $p < 0.01$  (meaning a 99% probability that the result is different from 0), \*\* =  $p < 0.05$  (95%), \* =  $p < 0.1$  (90%).

projects are typically slow starters, with the curve reaching around just 33 per cent by the halfway mark of planned project length.

For various reasons, IFAD projects do not have to have disbursed their total approved budget by the time of financial closure, and undisbursed balances are returned to IFAD. In fact, the average amount actually disbursed across all projects is 84.4 per cent (figure 3.3). Across regions, the Near East, North Africa and Europe stands out with the highest rate, at 90.8 per cent, followed by projects in Asia and the Pacific with 88.4 per cent, and Latin America and the Caribbean with 85.0 per cent. The closed portfolio for projects in sub-Saharan Africa lags behind, with West and Central Africa reaching a disbursement rate below 80 per cent.

## Explaining IFAD's disbursement performance

Tables 3.5 and 3.6 present the findings of the econometric analysis for the country- and the IFAD-side factors affecting disbursement readiness and effectiveness indicators. *R*-squared statistics are a measure of the strength of an analytical model. In this case, they show that the included variables explain more than 60 per cent of the variation for the disbursement readiness models and 45 per cent of the variation for the effectiveness models.

On the country side, the analysis finds that the likelihood of disbursements being delayed during start-up significantly increases if a country is a fragile middle-income country, has constrained fiscal space (measured by government revenue and current account balance), or is in an election year. In addition, non-fragile low-income countries, countries with a stable local currency, and those that have had a higher frequency of elections and natural disasters (e.g. droughts) during the project life tend to have higher disbursement rates. Thus, the study confirms the hypothesis by Ahsan and Gunawan (2010) that a devalued national currency decreases the

likelihood of fully disbursing the approved project budget, and the need to do so. Elections and natural disasters have a negative effect during early project stages but a positive effect in the long term. This result may occur because a high incidence of such events generates more demand for spending the available resources, but such demand is offset by the disruption caused if they occur during project start-up.

On the IFAD side, the results show that the size, type and sequencing of project financing all play a role. Projects with larger budgets disburse faster. However, during implementation, IFAD's disbursement rates suffer from excessive dependence on cofinancing. Although the study also finds that start-up advances do not accelerate first disbursements, it shows that a relatively high first disbursement is a good predictor of a more rapid second disbursement. This finding suggests that IFAD's efforts to support the submission of larger and better-quality withdrawal applications are bearing fruit.

Furthermore, the variables over which IFAD has the most control clearly make a difference. The results assert that having offices in the field (IFAD country offices [ICOs]) with nationally recruited IFAD staff (country programme officers) benefits IFAD's disbursement performance during implementation. ICOs headed by outposted country programme managers (CPMs) are also shown to have a positive impact on both disbursement readiness and effectiveness. Moreover, signing financing agreements face-to-face (rather than by correspondence) is shown to accelerate the process and almost offsets the delays resulting from ratification requirements. Finally, the study shows that the turnover, experience and workload of CPMs are important elements of IFAD's disbursement readiness. If the CPM remains the same at approval and during start-up of a project, the first and second disbursements are roughly five months quicker than in cases of turnover. Performance is further enhanced if the CPM is experienced, is not overloaded with work and/or is a woman.

## Concluding remarks

The study presented in this chapter is the first in-depth investigation of the trends and drivers of IFAD's disbursement performance. It is also the most extensive study of this area conducted for any IFI. It reveals areas where IFAD, and perhaps other IFIs, can improve their performance in disbursing funds for development projects, and thereby achieve better end results.

Indeed, the analysis of disbursement trends highlights the need to do better. From 2003 to 2015, the time between approval and first disbursement improved only slightly, from 21.0 months to 17.6 months. IFAD-supported projects disbursed, on average, only 84.4 per cent of their approved budget, albeit with significant differences across countries and regions. On a year-by-year basis, projects were generally slow in disbursing funds, reaching a rate of only 33 per cent at the halfway point of their originally planned implementation schedule, and not more than 71 per cent at the originally planned completion date.

These trends, according to the study, result from several factors under the control of recipient countries and IFAD itself. These factors – especially the internal factors over which a funding organization such as IFAD has control – have implications for measuring and improving the disbursement performance of IFAD and other IFIs. Perhaps the strongest message is that larger projects perform better, especially in terms of disbursement readiness. This message is supported by previous studies on disbursement performance in the African Development Bank and the Inter-American Development Bank (see Gohou and Soumaré, 2009; Nkamleu, Tourino and Edwin, 2011; Álvarez, Bueso-Merriam and Stucchi, 2012). In addition, relationships in which one cofinancier shoulders a much higher burden than others can lead to disbursement problems for all parties involved if the most important cofinancier performs poorly. Hence, careful consideration should be given to how financiers share costs.

Other controllable factors include the role of project managers, as also shown by Álvarez, Bueso-Merriam and Stucchi (2012). The analysis

showed that the gender, experience, workload, location and amount of turnover of IFAD's CPMs affected disbursement performance. Investments capitalizing on this knowledge are thus likely to bear fruit. In addition, the results for disbursement readiness show that financing agreement conditions constitute a powerful tool for shaping disbursement performance; these conditions should be carefully considered to ensure more streamlined project preparation.

Although country-level factors are less under the control of funding agencies, findings in this area also have implications for future decisions and policy. Factors such as state fragility, constrained fiscal space and a devalued currency were shown to hinder disbursement performance. IFIs should adjust their disbursement performance expectations accordingly, so that when these hindrances occur they are not a surprise and thus have a less debilitating effect on a project's implementation and impact.

IFAD has already taken on board several of the lessons of this study. IFAD management has approved a corporate action plan aimed at better projecting, measuring, monitoring and managing the Fund's disbursements. All actions have a specific timeline, as well as clear responsibilities and measures of success. A corporate workshop held in early 2017 further raised awareness among all responsible staff about the importance of disbursement performance to demonstrate efficient use of Member States' contributions and to ensure that IFAD clients – and especially target beneficiaries – receive adequate support.

Looking ahead, measures to enhance IFAD's disbursement performance will include revisiting policies (e.g. cancellation policy and restructuring policy) and reviewing current products, processes and procedures. IFAD will need to give critical attention to ex ante disbursement forecasts and the disbursement dimension of projects, aiming for a balance of project types within each country portfolio. Finally, to help strengthen borrowers' readiness to implement projects, IFAD will make more targeted use of start-up advances and focus more on procurement issues in project design. The results of the analysis are facilitating the management of disbursement performance.

## References

- Ahsan, K. and Gunawan, I. 2010. Analysis of cost and schedule performance of international development projects. *International Journal of Project Management*, 28: 68-78.
- Álvarez, C., Bueso-Merriam, J. and Stucchi, R. 2012. *So you think you know what drives disbursements at the IDB? Think, think again...* Technical Note No. IDB-TN-479. Washington, D.C.: Inter-American Development Bank.
- Cameron, A. C. and Trivedi, P. K. 2005. *Microeconomics: Methods and applications*. Cambridge: Cambridge University Press.
- Gohou, G. and Soumaré, I. 2009. *The impact of project cost on aid disbursement delay: The case of the African Development Bank*, [www.afdb.org/fileadmin/uploads/afdb/Documents/Knowledge/2009%20AEC-%20The%20Impact%20of%20Project%20Cost%20on%20Aid%20Disbursement%20Delay%20The%20Case%20of%20the%20African%20Development%20Bank.pdf](http://www.afdb.org/fileadmin/uploads/afdb/Documents/Knowledge/2009%20AEC-%20The%20Impact%20of%20Project%20Cost%20on%20Aid%20Disbursement%20Delay%20The%20Case%20of%20the%20African%20Development%20Bank.pdf)
- Kersting, E. K. and Kilby, C. 2015. With a little help from my friends: Global electioneering and World Bank lending. *Journal of Development Economics*, 121: 153-165.
- Mishra, P. K. 2016. Managing international development projects: Case studies of implementation of large-scale projects in India. *International Journal of Rural Management*, 12(1): 4-26.
- Nkamleu, G. B., Tourino, I. and Edwin, J. 2011. *Always late: Measures and determinants of disbursement delays at the African Development Bank*. Working Paper No. 141. Tunis: African Development Bank.
- Sunjka, B. P. and Jacob, U. 2013. Significant causes and effects of project delays in the Niger Delta region, Nigeria. Paper prepared for the 25th annual conference of the Southern African Institute of Industrial Engineering, July 9-11, Stellenbosch, South Africa.
- Wooldridge, J. 2002. *Econometric analysis of cross section and panel data*. Cambridge, USA: MIT Press.

# Assessment of IFAD's end-of-project documentation

by  
Alessandra Garbero

In the past couple of decades, as international development discourse and practice have focused more heavily on improving development effectiveness, the role of evidence-based reporting on results has also gained prominence. The development community has recognized the need to focus on results rather than inputs and to ensure that a project's processes contribute to the achievement of its objectives (Flint, 2003). Multiagency commitments such as the Paris Declaration on Aid Effectiveness (OECD, 2016) have underlined issues around the quality, impact and accountability of development interventions.

At a practical level, several international development agencies have established development effectiveness frameworks that seek to integrate project data into a learning process (ACFID, 2015). Within these frameworks, project completion reports (PCRs) are the main instrument many development institutions use to report on results. They tell the story of a project, make sense of data generated during the project cycle, and discuss the project's success at achieving its development objectives, the challenges or failures it encountered, and the sustainability of interventions. They are crucial tools for internal and external accountability as well as for learning from experience to inform the design of future operations (Crespo et al., 2013). As such, these documents should provide solid evidence of a project's effectiveness in bringing about development.

This study sought to examine how well claims about project results were supported by evidence in a sample of PCRs from IFAD. Using an IFAD-specific conceptual framework to capture the diversity of activities and potential impacts of IFAD investments, it classified claims about project results according to their themes, the results level, and the presence and types of evidence sources.

## Study design

Under the Results Management Framework (RMF) covering the period between 2013 and 2015, IFAD committed to providing a broader and more in-depth assessment of the Fund's impact on poverty reduction. This study was originally part of a larger impact evaluation initiative that employed a mixed-methods approach to assess IFAD's contribution to movements out of poverty across the project portfolio. Among other things, it aimed to verify the hypothesis that because PCRs – as standardized documents that take stock of project performance – play an important role within the project cycle and in broader institutional planning, they are based on robust evidence.

To accomplish this goal, categories of analysis were divided into two distinct types: case coding, and thematic coding. Case coding was used to characterize the claims, and thematic coding described the subject of the claims; the two were combined for a comprehensive analysis. In order

to ensure consistency and reliability during the coding process, a detailed codebook that defined the parameters that coders should consider for each of the indicators within the categories of analysis was developed for both case coding and thematic coding.

The characteristics of claims were categorized into four types: claim direction, claim support, claim quantification, and evidence source. Thematic coding described the subject or the content of a claim, representing the most important category of analysis by organizing the various results associated with IFAD's projects by themes. The ten themes were: (1) agricultural production, (2) capacity to innovate, (3) commerce and value chain, (4) economic mobility, (5) environmental sustainability, (6) food security and health, (7) human capital, (8) policies and institutions, (9) resilience capacity, and (10) women's empowerment. This categorization system allowed for the analysis of results according to the recurring themes found in the theories of change of IFAD-funded projects, as well as aligned with the Fund's broader rural development mission. When combined with the case coding, findings across themes could be further contextualized and described across all case coding categories.

IFAD PCRs were the principal source for analysis. After defining and applying eligibility criteria, the research team coded 72 project documents.

## Results

The research team coded almost 4,000 unique claims across the sample of 72 projects. They found considerable variation in the rates at which claims were made for different themes, as well as in the degree of evidence used to support the claims.

The "commerce and value chain" theme tallied more claims than any other category – a result that reflects IFAD's market-oriented strategy. "Economic mobility" was a close second; although this theme is aligned with IFAD's goal of reducing poverty, reporting in this area included few mentions of longer-term impacts such as moving people out of poverty. The third-most frequent theme was "human

capital", which captures outputs related to training, demonstrations and model farming. Yet the medium-term outcomes of such capacity-building initiatives, which were grouped under the theme "capacity to innovate", received significantly fewer claims, revealing a lack of reporting on how well people applied the skills they learned through the extensive training.

At the bottom of the list, representing just 1.5 per cent of claims, was "resilience capacity", which encompassed several impact-level indicators related to the ability of individuals, households and communities to cope with shocks. "Women's empowerment", another theme that pertained to longer-term results, was mentioned in just 6 per cent of all claims.

Across all themes, 71 per cent of claims in the sample were not explicitly supported by a source of evidence. The "commerce and value chain" theme had the fewest explicitly supported claims: 77 per cent were either partially supported or not supported at all. Indeed, in both of the predominant themes – "commerce and value chain" and "economic mobility" – most claims were either not supported or only partially supported by evidence. Conversely, "food security and health" had the largest share of supported claims, 41 per cent.

The analysis also looked at the level of results reported. The vast majority of claims – 96 per cent – report on relatively immediate outputs and outcomes rather than long-term impacts. Still, although impact claims have such a negligible presence across PCRs, 49 per cent of such claims are supported by a source of evidence, compared with just 36 per cent of outcomes and 22 per cent of outputs. Medium-term changes account for the largest level of claims – more than 930 outcome-level claims are backed by direct evidence, and a similar number are backed by "partially supported" results. Across the sample, outputs were rarely supported by direct evidence; more than 1,400 claims, or 66 per cent, at this result level were coded as "partially supported".

The research team also categorized the sources of evidence. Many of the data came from external sources rather than IFAD's own efforts to collect



impact data. The share of claims supported by IFAD's Results and Impact Management System (RIMS) rose from 2 per cent in 2010 to 32 per cent in 2014. However, this rate is still low, especially considering that external, non-RIMS surveys served as sources of evidence almost as often as RIMS data until 2013. Reliance on PCR missions for data collection decreased 10 percentage points, from 29 per cent in 2010 to 19 per cent in 2014. This shift could point to improved attempts to collect data throughout the life of the projects rather than relying on end-of-programme support. Nevertheless, PCRs overwhelmingly rely on project monitoring and evaluation (M&E) data for reporting. This is problematic given that many of IFAD's project M&E systems were not designed to support reporting on longer-term results. Sixty-six per cent of project M&E data were related to outputs, 24 per cent to outcomes, and only 9 per cent to impacts.

Finally, claims made were overwhelmingly – 84 per cent – positive. The lack of neutral claims (at just 5 per cent of the total) shows insufficient reporting on indicators that have not been affected by IFAD initiatives. About 11 per cent of claims were negative. This overall pattern indicates a reporting bias that reduces the transparency of project results and hinders the effective learning that could arise out of PCRs.

## Conclusion

This study highlights a significant need for IFAD to incorporate evidence-based results into its end-of-project reporting processes. Current reporting suffers from a lack of clear evidence and from an unbalanced focus on immediate results. The sources of evidence used to support project claims rely too heavily on project M&E systems that are ill-equipped to provide data on outcomes and impacts. Despite the availability of RIMS – the precursor to the Operational Results Management System (ORMS) – as a tool for impact reporting, compliance with its procedures remains low, which in turn affects the quality of reporting.

This inefficient use of evidence in PCRs makes it difficult to gauge the successes and achievements of projects. Although these documents often compile the full extent of project reporting, their findings can be opaque, and the large amounts of unclear information sometimes obscure significant results or learning. Moreover, the positive reporting bias confounds the transparency of project results. This bias is structural to internal project reporting processes, as PCR authors are more likely to exaggerate positive results while overlooking neutral and negative ones for fear of losing subsequent funding. The result is that learning from project success is not balanced with learning from project failures. Such a bias could be minimized through the use of objective indicators.

Because the quality of reporting largely depends on the quality of data available – which in turn depends on the capacity of the project management team – agencies would benefit from encouraging the incorporation of robust impact evaluation strategies into project design.

## References

- ACFID (Australian Council for International Development). 2015. *Developing an effectiveness framework: A toolkit for small and medium sized NGOs*. Canberra.
- Crespo, A., Hallberg, K., Ruiz, N., Martin, L., Alonso, D., Zambrano, P., Dal-Toe, T., et al. 2013. *IDB-9: The development effectiveness framework and overview*. Washington, D.C.: Inter-American Development Bank.
- Flint, M. 2003. *Easier said than done: A review of RBM in multilateral development institutions*. Herefordshire, UK: UK Department for International Development (DFID).
- OECD (Organisation for Economic Co-Operation and Development). 2016. *Paris Declaration and Accra Agenda for Action*. Paris, [www.oecd.org/development/effectiveness/parisdeclarationandaccraagendaforaction.htm](http://www.oecd.org/development/effectiveness/parisdeclarationandaccraagendaforaction.htm)





## PART II

---

# Assessing project-level impact



## Chapter 5

---

# Ethiopia's Participatory Small-Scale Irrigation Development Programme (PASIDP)

by  
**Alessandra Garbero**  
**Tisorn Songsermsawas**

Ethiopian agriculture faces a number of challenges that prevent smallholder farmers from attaining higher levels of productivity. Although average rainfall in Ethiopia is higher than in the rest of sub-Saharan Africa, farmers' production is often affected by frequent drought, severe soil degradation, unpredictable weather patterns, and a lack of irrigation, transportation and market infrastructure (Escobal, 2005; Kassahun, 2007; Matouš, Todo and Mojo, 2013). Because these smallholder farmers' main source of income is their agricultural production, these challenges have direct implications for their welfare and poverty outcomes.

The Government of Ethiopia has addressed some of these challenges by promoting investments in small-scale irrigation systems, as put forward in the country's Poverty Reduction Strategy Paper 2005/06. One such investment was the Participatory Small-Scale Irrigation Development Programme (PASIDP), a project funded by IFAD, which took place between 2008 and 2015. PASIDP was designed to develop small-scale irrigation infrastructure systems in four regions: Amhara, Oromia, Tigray and Southern Nations, Nationalities and Peoples Region. PASIDP had three main components: (1) institutional development; (2) small-scale irrigation development; and (3) agricultural development. Through these components, PASIDP sought to develop sustainable irrigation systems and empower project communities by engaging community members in designing, constructing, operating, managing and repairing such systems. The project was expected

to improve the food security and incomes of households in project communities.

The total cost of the project was US\$57.8 million, of which about 70 per cent was supported by IFAD as a grant and a highly concessional loan. The remaining portion of the project cost was funded by the Government of Ethiopia as well as by direct payments of water user fees to the water user associations (WUAs). This study examines the evidence on the impacts of this project and considers lessons that can be applied to similar future projects.

### The project's theory of change

PASIDP institutionalized a participatory approach to small-scale irrigation development in rural Ethiopia by helping members of project communities form WUAs. These WUAs consisted of farmers whose agricultural plots were located within range of the project's irrigation systems and were suitable for crop cultivation. WUA members pooled their financial, technical, material and labour resources to plan, operate, maintain and repair the irrigation systems. WUAs elected their leaders and committee members, collected water fees, maintained the irrigation systems, and settled water-related conflicts and disputes within the WUAs.

The project also built new irrigation schemes or rehabilitated existing schemes, including river diversion, spate irrigation, spring sourcing

and shallow wells. Finally, as part of the project interventions, capacity-building and training activities related to best practices in agricultural production were delivered to farmers in the project communities.

PASIDP interventions were expected to improve the outcomes of households that received the project through a number of possible channels. Most importantly, an irrigation system can help improve farm productivity by increasing crop yields as farmers receive a greater overall volume of water for cultivation, a more consistent water supply, and timely access to water when they most need it for crop production (Hussain and Hanjra, 2003). In addition, irrigation allows farmers to cultivate a larger area and cultivate crops over multiple rotations in a given year (Huang et al., 2006). Access to irrigation may also complement farmers' use of inputs including improved seeds, fertilizer and pesticides (Evenson and Gollin, 2003). Previous studies have noted other possible channels through which irrigation can improve

farmers' productivity and income. Irrigation can: lead to more diverse income or livelihood strategies (Smith, 2004); buffer the effects of drought (Prasad, Van Koppen and Strzepek, 2006); increase access to output markets (Gidwani, 2002; Dorward et al., 2004); raise demand for wage labour on irrigated farms (Narayanamoorthy and Deshpande, 2003); reduce fluctuations in output prices (Lipton, Litchfield and Faurès, 2003); and increase resilience to exogenous shocks and adverse weather events (Barrett, Reardon and Webb, 2001). Figure 5.1 illustrates the theory of change of the PASIDP project, presenting the project's causal chain from inputs to outputs, outcome and impacts.

Based on this theory of change, the research team designed an ex post impact assessment to investigate whether households with access to irrigation systems developed under PASIDP exhibited higher farm productivity and welfare outcomes than those in a comparison group – that is, a group of households facing similar agroclimatic conditions and with similar socio-economic

**Figure 5.1** The theory of change of PASIDP

<b>Inputs/activities</b>	<ul style="list-style-type: none"> <li>• Formation of water user associations (WUAs)</li> <li>• Training of WUA leaders and members about water management and water distribution/allocation</li> <li>• Provision of agricultural capacity-building and training services</li> <li>• Construction of irrigation infrastructure systems</li> </ul>
<b>Outputs</b>	<ul style="list-style-type: none"> <li>• Greater access to water available for crops (through construction of irrigation infrastructure system)</li> <li>• More efficient water management (through formation and training of WUA leaders and members)</li> <li>• More efficient water distribution/allocation (through formation and training of WUA leaders and members)</li> <li>• Greater ability to adopt risk management and risk coping strategies (through construction of irrigation infrastructure system)</li> <li>• Improved access to information about agricultural knowledge and technology (through training activities)</li> </ul>
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Adoption of new and more suitable agricultural technology</li> <li>• Expansion of cultivation areas (extensive margin) and crop rotations (intensive margins)</li> <li>• Increased crop production / higher yields of crop</li> <li>• More higher-valued crops cultivated</li> <li>• Increased agricultural diversification</li> <li>• Greater resilience against negative shocks</li> </ul>
<b>Impacts</b>	<ul style="list-style-type: none"> <li>• More stable and increased household income</li> <li>• Higher ability to adopt risk coping and risk management strategies against negative shocks</li> </ul>

characteristics that did not access PASIDP irrigation systems. Specific focus was devoted to assessing the project's impact on crop revenues and on household consumption levels (in terms of both food and non-food expenditures). The impact assessment complements existing studies that explore the extent to which changes in household-level productivity and welfare outcomes are attributable to the development of small-scale irrigation infrastructure systems (Hamdy, Abu-Zeid and Lacirignola, 1998; Del Carpio, Loayza and Datar, 2011; Dillon, 2011).

## Project outreach and outputs

Before proceeding to explore the project impact, an analysis was conducted of the project's coverage, the types of people reached, and the outputs generated as a result of the project interventions. Between 2008 and 2015, PASIDP interventions facilitated the formation of 175 WUAs and developed 116 small-scale irrigation schemes that covered at least 12,020 hectares of arable land. The project interventions were estimated to have reached more than 311,000 people in 62,200 households in the four regions covered by the project.

## Project impact

### Data and methods

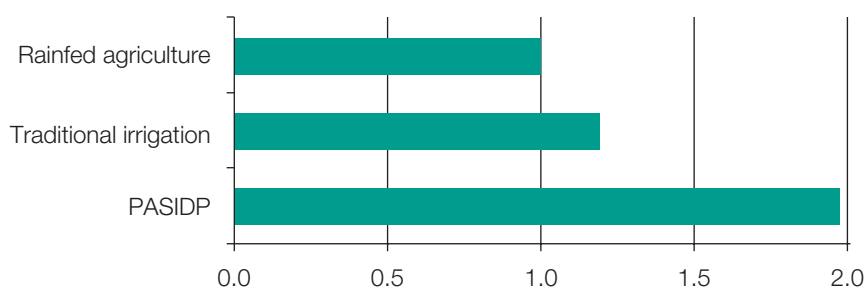
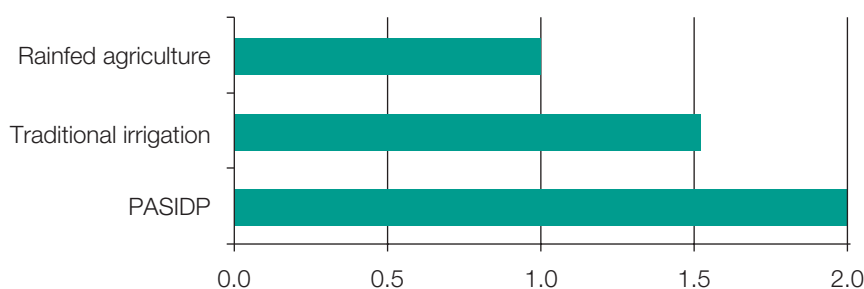
The impact assessment drew on both quantitative and qualitative data. The quantitative data consisted of a household survey collected from 1,531 households in 20 *kebeles* (or subdistricts) in the four Ethiopian regions. To identify households similar to the ones receiving the project as potential candidates for the comparison group, the research team first conducted an enumeration survey to collect information about agricultural production, poverty status, agroclimatic conditions, and source of irrigation in all 20 *kebeles*. The purpose of this enumeration survey was to help ensure that the characteristics of the households in the comparison group (those not receiving the project) were similar to those in the treatment group (those receiving the project) so that the outcomes of such groups

could be compared to measure the project impact. To establish valid comparison groups, researchers used a number of characteristics that should have been uninfluenced by the project. These included: household size; sex, age and education level of the household head; an asset-based wealth index based on recalled measures prior to the project start (with durable, livestock and productive assets); landownership; elevation; average precipitation during the past five years; and time employed by farmers to reach the market.

Then, based on the information collected in the enumeration survey, the household survey was carried out with one treatment group (households with access to PASIDP-built irrigation schemes) and two comparison groups (those using water from traditional irrigation sources, and those relying solely on rainfall for agricultural production). To further ensure that the households in the two comparison groups were comparable to the ones in the treatment group, extensive discussions with the staff members from the project management unit and the development agents office were held to validate the selection of the households to be part of the comparison groups. Of the 1,531 households in the full sample, 766 (50 per cent) were households with access to PASIDP-supported irrigation systems, 438 (29 per cent) were traditional irrigation users, and 327 (21 per cent) relied mainly on rainfall for agriculture.

Qualitative data were used to support and triangulate the findings from the quantitative household surveys. These qualitative surveys consisted of key informant interviews with *kebele* leaders and development agents and focus group discussions with households in project and comparison *kebeles*. In total, 24 key informant interviews (six in each project, four in treatment *kebeles* and two in comparison *kebeles*), and 24 focus group discussions (six in each region, four in treatment *kebeles* and two in comparison *kebeles*) were administered.

The impact of the PASIDP project was estimated using a non-experimental approach. Researchers looked at the treatment group and the two comparison groups in pairs to compare the observed outcomes of households in each group. This approach allowed them to observe

**Figure 5.2** Average crop yield (factor)**Figure 5.3** Per capita food expenditure (factor)

the gradient of effects ranging from farmers with access to PASIDP-supported irrigation, to those with traditional irrigation only, to those relying only on rainfall.

## Key quantitative findings

The key impact estimates centred on indicators of agricultural production and household consumption, and the impacts in these areas were sizeable. In terms of agricultural production, the largest impact was on average crop yields (figure 5.2). Compared with households that relied mainly on rainfed agriculture (the reference group in the figure), PASIDP households had average crop yields that were twice as high, and traditional irrigation users 20 per cent higher.

PASIDP had similar impacts on crop revenues. Households using PASIDP-supported irrigation doubled their revenue compared with rainfed farmers, and those using traditional irrigation had crop revenues 30 per cent higher than those relying only on rainfall. Given that the project had no significant effects on other production outcomes, such as use of physical inputs

(improved seeds, fertilizers and pesticides), size of crop cultivation area, or number of crops grown, the results provide evidence that the increase in revenues observed among PASIDP households was driven largely by the increase in crop yields.

For outcomes related to household consumption, and particularly food consumption expenditures, results indicated similar impact magnitudes (figure 5.3). Relative to households relying mainly on rainfall, the per capita food expenditures of PASIDP households were twice as high, and those of farmers that relied on traditional irrigation were 50 per cent higher. However, the project had no significant impact on non-food expenditures.

This impact assessment also explored project impacts on other outcome indicators. These indicators included: poverty measures (whether or not the household was above asset-based and expenditure-based poverty lines); asset accumulation (durable assets and productive assets); and measures of female empowerment (level of participation in agricultural-related decisions and income-related decisions). However, no significant effects of the project were observed on such outcome indicators.



## Key qualitative findings

Key informant interviews with *kebele* leaders and development agents highlighted the importance of forming WUAs before constructing the irrigation schemes. This approach engaged potential water users in developing the irrigation schemes in an organized manner according to their local needs. Community members contributed labour, construction materials and cash to construct the irrigation schemes. In addition, capacity-building and training activities on water management, operation and maintenance of irrigation schemes, WUA rules and regulations, and bookkeeping skills were delivered to WUA leaders and committee members to ensure efficient management of WUAs. After the training, project staff members transferred responsibility for managing and maintaining the irrigation schemes to WUAs.

Interviews with *kebele* leaders and development agents revealed a number of capacity gaps within the WUAs. WUAs commonly faced difficulties collecting membership and water-use fees, mobilizing financial resources, and controlling members' water use. Several incidents of water theft and conflicts over water use took place. Key informant interviews also suggested that training in agricultural marketing would have been useful for those who received the project. However, such training was not contemplated in the training package provided by PASIDP.

Focus group discussions with those who received the project confirmed that project benefits took the form of increased agricultural productivity through improved yields, and promotion of new agricultural technologies and crop cultivation practices through strengthened extension services and formation of farmer research groups. However, the discussions also revealed several development challenges, including lack of access to input and output markets, high input prices, and low crop prices.

## Lessons learned

This ex post impact assessment of PASIDP offers a number of lessons for future project design and implementation, as well as for future policy and country strategies. Notably, the scale-up phase of

this project, PASIDP – Phase II, has included these lessons in its design and implementation stages.

The main lessons learned can be summarized as follows:

- Returns on investment in irrigation infrastructure systems can be transformative. By raising agricultural revenues, mainly through higher crop yields, the project increased household income and consumption levels of treated households. Relative to farmers who relied only on rainfall for agricultural production, the crop yields of those with access to PASIDP-supported irrigation doubled.
- Better-off farmers, who were usually more productive farmers, benefited the most from the investments in irrigation in terms of increased crop yields and crop revenues. Interventions that benefit mostly more productive farmers may raise questions about equity, so this finding implies the need for other complementary interventions for farmers with less productive capacity. For example, climate-smart solutions compounded with irrigation could be a potential intervention for worse-off farmers who live in the watersheds and depend on rainfed agriculture. The main channel through which access to irrigation raises crop revenues is through higher crop yields. The project had no significant effects on other intermediate channels such as input expenditures (seed, fertilizer and pesticide), cultivation area or number of crops cultivated in a season. Follow-up projects should devote further attention to these aspects.
- PASIDP fostered a strong participatory approach that engaged community members in forming WUAs and involved them in planning, designing, constructing, managing and maintaining the irrigation systems. This approach helped create a sense of ownership within the community and was crucial to the project's sustainability.
- Although improved access to irrigation can help produce higher levels of agricultural outputs, farmers may not be able to take full advantage of the project interventions if they cannot sell their crops at the market at the right time. To help farmers manage post-harvest

losses, interventions that strengthen market access and agricultural marketing should be included along with irrigation development interventions. A key lesson learned is that projects need to take into account markets and viable crop models to meet these markets. The participatory processes during project design and implementation must allow farmers to understand their options and the financial implications in terms of production cost. At the same time, the project should facilitate linkages with aggregators, service providers, financial institutions and input dealers, among others, to build transparent and trusting relationships between all of these value chain operators. These relationships can form the basis on which marketing associations (or cooperatives) can elaborate concrete production plans (agricultural development plans).

- Project implementation activities experienced a number of delays. One approach to address this issue is to recruit and train project staff early on, and to involve relevant stakeholders in the early stages of planning. The roles and responsibilities of project staff and other stakeholders should be well defined within a strict implementation timeline.

## References

- Barrett, C. B., Reardon, T. and Webb, P. 2001. Non-farm income diversification and household livelihood strategies in rural Africa: Concepts, dynamics, and policy implications. *Food Policy*, 26(4): 315-331.
- Del Carpio, X. V., Loayza, N. and Datar, G. 2011. Is irrigation rehabilitation good for poor farmers? An impact evaluation of a non-experimental irrigation project in Peru. *Journal of Agricultural Economics*, 62(2): 449-473.
- Dillon, A. 2011. The effect of irrigation on poverty reduction, asset accumulation, and informal insurance: Evidence from Northern Mali. *World Development*, 39(12): 2165-2175.
- Dorward, A., Kydd, J., Morrison, J. and Urey, I. 2004. A policy agenda for pro-poor agricultural growth. *World Development*, 32(1): 73-89.
- Escobal, J. 2005. The role of public infrastructure in market development in rural Peru. PhD dissertation, Wageningen University.
- Evenson, R. E. and Gollin, D. 2003. Assessing the impact of the Green Revolution, 1960 to 2000. *Science*, 300(5620): 758-762.
- Gidwani, V. 2002. The unbearable modernity of development? Canal irrigation and development planning in Western India. *Progress in Planning*, 58(1): 1-80.
- Hamdy, A., Abu-Zeid, M. and Lacirignola, C. 1998. Institutional capacity building for water sector development. *Water International*, 23(3): 126-133.
- Huang, Q., Rozelle, S., Lohmar, B., Huang, J. and Wang, J. 2006. Irrigation, agricultural performance and poverty reduction in China. *Food Policy*, 31(1): 30-52.
- Hussain, I. and Hanjra, M. A. 2003. Does irrigation water matter for rural poverty alleviation? Evidence from South and South-East Asia. *Water Policy*, 5(5-6): 429-442.
- Kassahun, D. 2007. Rainwater harvesting in Ethiopia: Capturing the realities and exploring opportunities. Working paper. Addis Ababa: Forum for Social Studies.
- Lipton, M., Litchfield, J. and Faurès, J.-M. 2003. The effects of irrigation on poverty: A framework for analysis. *Water Policy*, 5(5-6): 413-427.
- Matouš, P., Todo, Y. and Mojo, D. 2013. Roles of extension and ethno-religious networks in acceptance of resource-conserving agriculture among Ethiopian farmers. *International Journal of Agricultural Sustainability*, 11(4): 301-316.
- Narayanamoorthy, A. and Deshpande, R. 2003. Irrigation development and agricultural wages: An analysis across states. *Economic and Political Weekly*, 38(35): 3716-3722.
- Prasad, K. C., Van Koppen, B. and Strzepek, K. 2006. Equity and productivity assessments in the Olifants River basin, South Africa. *Natural Resources Forum*, 30(1): 63-75.
- Smith, L. E. D. 2004. Assessment of the contribution of irrigation to poverty reduction and sustainable livelihoods. *International Journal of Water Resources Development*, 20(2): 243-257.

## Chapter 6

---

# Kenya's Smallholder Dairy Commercialization Programme

by  
**Romina Cavatassi**  
**Peter Brueckmann**  
**Nancy McCarthy**  
**Juan Bonilla**

Agriculture is the largest contributor to Kenya's GDP, and it employs 61 per cent of the country's workforce, mainly represented by smallholder farmers living in rural settings (Muriuki, 2011; FAO, 2014). Within agriculture, the country's livestock dairy sector has special importance. Kenya is one of the largest milk-producing countries in Africa – it currently has more than 5.6 million dairy cattle, accounting for about 15 per cent of East Africa's dairy livestock (FAO, 2017). Investing in smallholder dairy farming is an effective way to improve farmers' production and commercialization, which in turn can help alleviate poverty and increase food security (Burke et al., 2007; Muriuki, 2011; Olwande et al., 2015; Randolph et al., 2007; Smith et al., 2013). The need to invest in and improve Kenya's dairy industry was especially strong after the collapse of the monopolistic dairy cooperative structure in the 1990s (Muriuki, 2011), when farmers faced high transaction costs for production and marketing (Staal, Delgado and Nicholson, 1997), and dairy groups and cooperatives were unable to address these issues (Holloway et al., 2000). Smallholder dairy farmers faced additional barriers to improving their dairy production, including poor and unreliable quality of feed, lack of access to animal health and breeding services, loss of milk production, and inadequate access to milk markets (Atieno and Kanyinga, 2008).

The Smallholder Dairy Commercialization Programme (SDCP), which started in 2005,

was designed to increase the income of resource-poor rural smallholders who depend substantially on production and trade of dairy and dairy-related products for their livelihoods in nine dairy commercialization counties in central and central-western Kenya. To this end, the project aimed to address constraints to smallholders' milk production, productivity and participation in milk markets by training dairy groups, offering technical support for household dairy production, and developing milk marketing chains. Special emphasis was placed on ensuring women's participation in all project activities, given that women play a key role in dairy production in Kenya and have been traditionally disadvantaged (e.g. in terms of education and access to credit). The first phase of this programme was implemented from 2005 to 2015 at a total cost of US\$19.75 million, jointly funded by IFAD, the Government of Kenya and beneficiary communities. In December 2015, IFAD decided to extend this project, with completion expected in September 2019.

A number of studies and impact assessments of interventions in the dairy sector in Kenya have shown that technical support to dairy groups and farmers, as well as stronger market linkages, can have important and positive impacts on the livelihoods of smallholder dairy farmers. Given the great relevance of dairy cattle as a source of food consumption and income for smallholder dairy farms in Kenya and East Africa as a whole

(Bingi and Tondel, 2015; Muriuki, 2011), the SDCP has been selected as the subject of a rigorous impact assessment, the results of which are presented in this chapter. This study aims to provide further evidence on the effectiveness of investments in dairy agriculture, and to identify challenges and barriers that could be addressed to improve future project and policy designs and development impact.

## The project's theory of change

Before the SDCP, dairy groups in the nine selected milk-producing counties suffered from: weak links with input suppliers and output purchasers; a limited ability to disseminate production advice to farmers; weak business and commercialization skills; and financial services constraints. To address these barriers, the SDCP trained beneficiary dairy groups on organizational and enterprise skills, and helped them establish and maintain links with input providers, output purchasers and extension systems. In addition, the project sought to improve dairy groups' access to financial services by promoting competitive investment grants designed to improve dairy business activities and techniques. Through these activities, the SDCP aimed to: establish sustainable dairy enterprises; enable members to obtain financial services; reduce transaction and input costs; raise output prices; and increase beneficiaries' production and market knowledge (Atieno and Kanyinga, 2008).

To further boost productivity and reduce production costs, the project used training sessions, field days and demonstrations to provide smallholder farm households with technical support on artificial insemination, fodder production and management, dairy enterprise management practices, and animal diseases and disease management. With the help of newly established community-level artificial insemination schemes, community-based animal health funds, and information-dissemination activities, the project was expected to result in: better-bred and healthier dairy cows (Gelan and Muriithi, 2015; VanLeeuwen et al., 2012); greater production

and better management of fodder and feed (Nafula, 2013; Richards et al., 2016); and better enterprise management practices. These results would lead to more milk per cow, higher and more stable output, and lower production costs.

Furthermore, the programme sought to improve the linkages of small-scale milk producers, traders and processors with local milk markets, and to increase producer access to the processing sector. To this end, the project invested in improving market infrastructure, such as milk-cooling facilities, improved road infrastructure, conducted capacity-building activities for milk marketing groups, developed low-cost market information systems and trained beneficiaries on hygienic milk handling, among other things. These activities should lead to better-quality milk (which is likely to lead to higher prices), reduced transaction costs, an overall increase in the size of the country's dairy market, and more reliable trade relations and sales (Burke, Myers and Jayne, 2015).

Through these highly interrelated and mutually supportive activities, the SDCP was expected to achieve the overall objective of the project: increasing incomes through dairy farming. This in turn should have led to an increase in the food security of participating dairy farmers (Smith et al., 2013). Moreover, given the overall importance of resource-poor farmers and the special emphasis on women in the Kenyan dairy sector, it was expected to have a positive impact on the participation of these groups in milk markets and as leaders in dairy groups (Walton et al., 2012).

## Project outreach and outputs

The first phase of the SDCP was implemented in 27 divisions within nine counties across three regions of central and central-western Kenya – namely, Rift Valley Region, Western Region and Nyanza Region, home to about 350,000 dairy farmers. The beneficiaries of the programme and the members of the targeted dairy groups comprised mainly: resource-poor dairy farmers; part-time and small-scale

intensive dairy farmers; crop-oriented farmers with dairy cows; and small-scale milk bars, shop operators and mobile milk traders. As mentioned above, particular attention was paid to women, given that many female-headed households in the project's districts had dairy cows. Even in male-headed households, females controlled more than 60 per cent of the income from dairy activities. Women in these counties face a number of constraints. They own smaller farms, which affects their access to credit using land as collateral. They are less educated and receive less extension advice, which limits their access to technical information for enhancing production. They often do not play a vital role in dairy groups. The project sought to address all of these constraints. The first phase of the SDCP intervention supported 13,132 small dairy farmers, of whom 60 per cent were women, through 556 dairy groups and apex organizations, reaching 120,000 beneficiaries overall. Upon completion of the extended SDCP in September 2015, various outputs had been achieved, including:

- 8 milk-cooling or -processing facilities had been set up.
- 6,123 farmers had participated in educational and exchange tours.
- 500 fodder-bulking sites had been established by dairy groups.
- 27 community-level artificial insemination schemes had been established.
- 81 dairy groups and 13 apex organizations had benefited from dairy enterprise grants, with an average amount of Ksh 638,000 (about US\$6,250).
- 1,821 goats had been procured and distributed to the 801 most vulnerable resource-poor women.

## Project impact

### Data and methods

The estimation of the project's impact was based on a comprehensive quantitative survey covering 2,562 dairy farmers who are members

of 184 dairy groups in the nine project counties. To conduct a valid assessment of the project's impact on the livelihoods of smallholder dairy farmers, it was also necessary to identify and establish a valid comparison group that shares the same characteristics as the SDCP beneficiaries.

The impact assessment focused on the first phase of the SDCP project, which was completed in September 2015; data were collected throughout November and December 2016. Given the ex post nature of the evaluation, a quasi-experimental matching approach was used to establish a meaningful comparison group. As a first step, this assessment aimed to replicate the initial targeting process conducted by the SDCP in 2005, in order to identify non-programme areas that had characteristics similar to the project areas before the programme started. Drawing on the original database used to identify the 27 SDCP divisions, and taking into account the opinions of local experts, the research team identified eight study sites as valid comparison areas to serve as controls.

Within these SDCP divisions and the eligible control area divisions, 95 treatment and 89 control dairy groups were identified. From these, 1,297 beneficiary and 1,265 comparison dairy farm households were randomly selected and interviewed on household characteristics and dairy farming activities, including inputs, production activities, costs and sales. In addition, each existing dairy group was surveyed to obtain information on its structure, activities and performance. Based on the available and collected information, and using dairy group performance indicators, household characteristics, dairy farming information, and pre-project divisional and community characteristics, SDCP beneficiaries were matched with comparison smallholder farming households, and the outcome indicators of interest were compared using a doubly robust estimator (see Van der Laan and Robins, 2003). The impact of the SDCP – the average of the differences between the matched treatment and comparison households – was estimated for numerous indicators, including:



- husbandry practices;
- extension services;
- input and transaction costs;
- gross margins and milk prices.

To better understand the experiences, opinions and perspectives of the SDCP beneficiaries, 12 focus group discussions with six to eight farmers each from 12 dairy groups were conducted. Moreover, key informants were interviewed on the uptake of the programme, coordination of government departments and the functioning of the dairy sector in the regions of interest. These qualitative results augment the quantitative findings.

Given the SDCP's main objective of increasing the incomes of resource-poor rural smallholder households engaged in dairy farming activities, the impact evaluation addressed the following main questions of interest: (1) Does the project improve the well-being of dairy farmers through improved animal management, increased production and productivity, improved efficiency and increased incomes for farmers? and (2) Does increased income from dairy farming ultimately improve food security?

## Key impact estimates

In line with the main research questions, the impact evaluation investigated the effect of the SDCP project on various intended intermediate and final outcome indicators of dairy farming households.

### Animal management practices

Regarding the impact of the intervention on animal management activities, the project was estimated to have had statistically significant positive effects on beneficiaries' feeding practices. SDCP participants were 8 per cent more likely to practise zero grazing with their cattle – a practice that gave farmers better control over how much and what cows ate, and reduced losses in potential milk production that resulted from searching for grazing land across large areas. Farmers recognized the

positive effect, and the improvement in animal management was the most reported benefit of the SDCP. A female participant stated: "Initially I would send the children to go and graze, [but] I now practice zero grazing. I realized I used to lose a lot on milk yields."

Furthermore, the SDCP increased the likelihood that farmers kept their cattle in a paddock with a stall floor made of concrete. Such paddocks are easier to clean and reduce the chances of milk being contaminated.

The SDCP also led to an improvement in breeding services. Programme participants were 7 per cent more likely to monitor their cattle on a regular basis, and 12 per cent more likely to have used artificial insemination services in the preceding 12 months. No differences between participants and comparison farmers were observed in the availability of livestock technology, showing that the SDCP was successful in promoting the benefits of new artificial insemination breeding practices, which resulted in a higher uptake of these services.

Finally, the SDCP project had positive and significant effects on the availability and accessibility of specific animal health services. Relative to non-participants, SDCP farming households were 25 percentage points more likely to have access to and use vaccination services, 10 percentage points more likely to have access to curative treatment services, and 7 percentage points more likely to make use of them. However, the programme did not seem to have changed access to other health services, including deworming or tick control services.

### Access to extension and information

One of the project's key activities was to disseminate information on farming practices through extension services and training of dairy group members. The impact evaluation shows that beneficiary farmers were 12-18 percentage points more likely to have cattle extension services available in their village. The categories of information for which the effects were estimated to be greatest were: general livestock best practices (15 percentage points); milk

processing and quality control (10 percentage points); and fodder establishment and fresh milk marketing (7 percentage points). Most importantly, farmers tended to adopt these new practices, although adoption rates remained, as did the probability of receiving information, mainly below 15 per cent.

## Dairy group performance

The SDCP aimed to establish sustainable dairy groups with formalized structures and better performance indicators to link these groups to the milk value chain. In terms of formalized structures, the evidence was mixed. There were no differences between SDCP groups and control dairy groups with respect to legal registration, the election of chairs and representation of women. SDCP groups were more likely to have an elected secretary and treasurer as well as to have more monthly meetings to share information and engage in decision-making.

Treatment dairy groups were far more likely to obtain financing from microfinance institutions, local credit and savings groups, and commercial banks, and this financing can help farmers gain access to input and output markets. However, both SDCP and comparison groups still relied heavily on members' financial contributions, with 93 per cent of all groups stating that they depended on membership dues.

For the most part, SDCP and comparison groups faced similar levels of conflict among members, with the exception of conflict surrounding unpaid dues. Only 21 per cent of beneficiary dairy groups reported conflicts over unpaid dues compared with 37 per cent of comparison groups.

The most striking difference in the performance between the two groups concerned the number of training sessions provided to the dairy group members. SDCP group members were more likely to be trained on fodder management, proposal writing or dairy group management.

Few differences between SDCP and comparison dairy groups existed in terms of services provided by the respective dairy groups. Both groups organized educational exchange tours, collected

and shared milk price data, and facilitated links between members and input suppliers and milk purchasers. The only exception was that SDCP groups were more likely to contract with milk purchasers on behalf of members, even though the rate was relatively low: 11 per cent, as opposed to 2 per cent for the comparison groups. This result shows that significant room remains to improve the performance of SDCP dairy groups, particularly in terms of providing services that aim to reduce smallholders' transaction costs.

## Number of livestock and milk production

Overall, the project had positive and statistically significant effects on the composition and number of cattle per household as well as on milk production and the value of milk sold. Relative to the comparison group, SDCP farmers owned 0.49 more head of cattle, 0.35 more cows that had calved at least once, and 0.44 more animals they were currently milking (figure 6.1). These results were explained mostly by a higher number of cross-bred cattle and not of the exotic, more productive breeds.

The intervention's positive impact on the number of livestock was reflected in the effect on milk production. Beneficiary farmers had 37 per cent higher total milk production and 58 per cent more total milk production at calving compared with non-beneficiaries. SDCP farmers were 8 percentage points more likely to have sold milk at any time during the day before the interview, indicating positive impacts on milk marketing. The evidence suggests that there was no statistical significant difference between participants and comparison farmers in terms of quantity sold. Nevertheless, those SDCP farmers who sold to the market obtained a 31 per cent higher selling price than that received by non-beneficiaries. This finding could mean that beneficiaries have better linkages with the milk market or higher-quality dairy products. The total value of milk sold – that is, the quantity of milk sold times the price obtained – obtained by SDCP farming households was 43 per cent higher than the value obtained by the control group (figure 6.2).



These quantitative positive results on farmers' incomes were supported by the beneficiaries' comments during the qualitative fieldwork. One SDCP farmer said: "My milk production has increased, and that's more income. With it, I have taken my children to school." Moreover, many farmers perceived a significant increase in their productivity. Another SDCP farmer reported: "Initially I would only get 3 cups of milk, but currently my cow production is 7 bottles." Based on these results, it can be assumed that overall the SDCP was successful in increasing smallholder dairy farmers' milk production, milk marketing and milk prices received.

### Food security

Did this positive impact on dairy farmers' income also lead to increased food security, as envisaged by the project?

According to multiple SDCP participants, the increase in income as a result of the SDCP intervention enabled them to keep a variety of foods available in their households, confirming the objective of the project. One farmer stated that his family's general health had improved, while others said that they now consistently had tea with milk in their house. Farmers' perception of increased food security may have resulted partially from their increased understanding of better practices for growing crops, including the use of cow dung as fertilizer to obtain higher yields. One beneficiary farmer said: "The animal manure from both the goats and cattle is channelled on the farm, which in turn accelerates

the growth of crops and more yields – this too has ensured a consistent supply of food in the household."

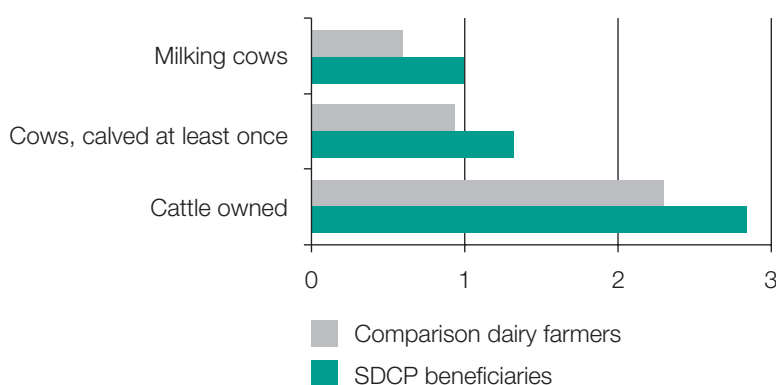
These qualitative findings were supported by the estimated quantitative data on food consumption within households (using seven-day recall). Those results provided some evidence that programme beneficiaries exhibited higher levels of food diversification, a good proxy for food security. As highlighted in figure 6.3, SDCP households were more likely to have a more diverse food basket, with higher levels of animal and vegetable proteins (such as red meat, milk products and legumes) and lower levels of tubers and fruits. All of these findings suggest that SDCP activities contributed to a positive overall impact on Kenyan dairy farmers, particularly for dairy production.

### Lessons learned

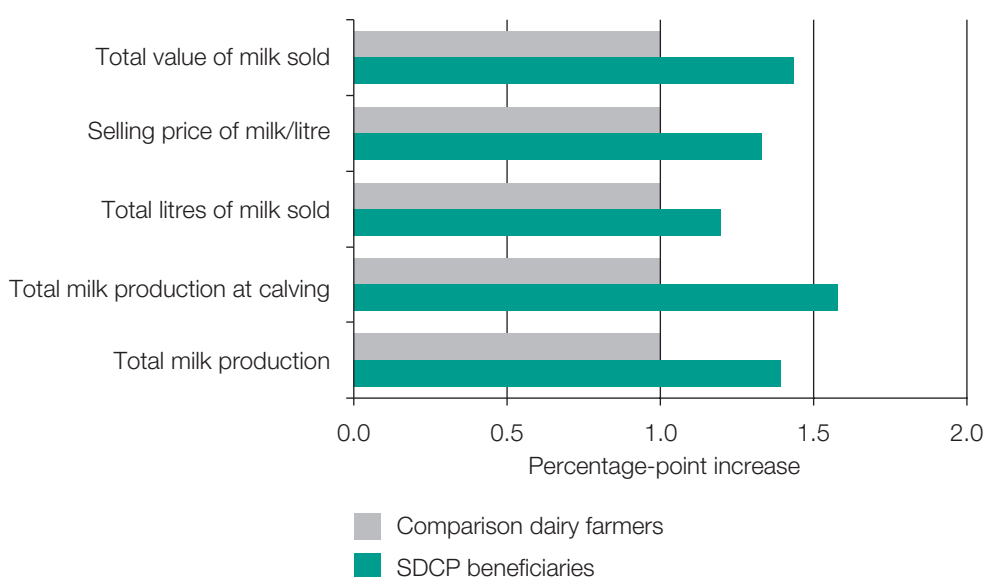
These quantitative and qualitative results point to a number of important lessons for informing the design and implementation of similar dairy policies and projects elsewhere in Kenya and in other developing countries:

- Interventions that aim to support dairy groups, enhance farmers' productivity through training and strengthen market linkages for small-scale milk producers can translate into higher incomes for smallholder farmers. The results presented here show that this is determined mainly by the higher per-litre selling price that participants were able to obtain.

**Figure 6.1** Average number of animals



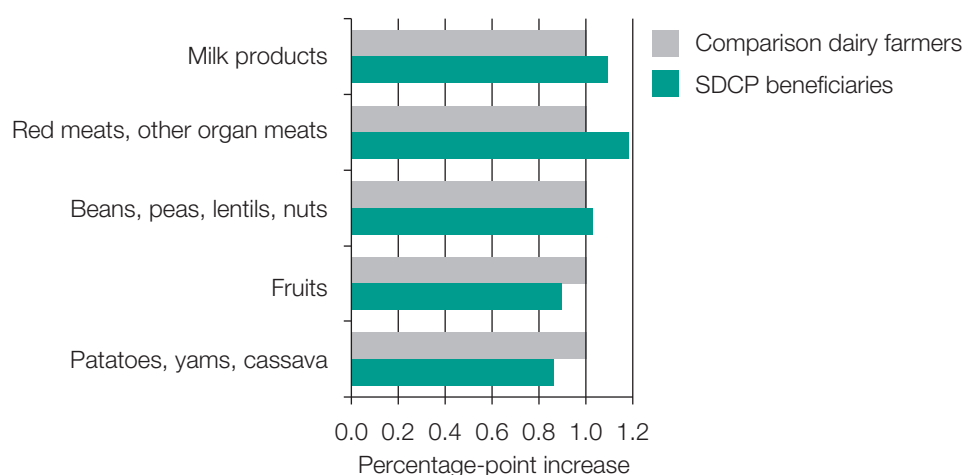
**Figure 6.2** Average milk production and total value



- Disseminating information on different aspects of production through training, field days and demonstrations to dairy group members increases the availability of extension services, and beneficiaries tend to adopt these practices more than do comparison farmers. However, adoption rates for all promoted activities remain low, suggesting that there is still significant room to improve activities and training in future project designs.
- Special emphasis should be placed on disseminating market-related information and promoting dairy group marketing. Quantitative results show that the services provided to dairy group members have limited impacts on marketing. Only a minority of dairy groups facilitate links between members and input suppliers as well as milk purchasers. Although SDCP dairy groups contracted more with milk purchasers than comparison groups did, the number remained low. Despite these low numbers, SDCP farmers obtained higher prices in the market, indicating the considerable potential to strengthen market linkages for small-scale milk producers.

## References

- Atieno, R. and Kanyinga, K. 2008. *The revitalisation of Kenya Cooperative Creameries: The politics of policy reforms in the dairy sector in Kenya*. Research Paper 9. Brighton, UK: Future Agricultures Consortium.
- Bingi, S. and Tondel, F. 2015. *Recent developments in the dairy sector in Eastern Africa*. Briefing Note 78. Maastricht, Netherlands: European Centre for Development Policy Management.
- Burke, W., Myers, J. and Jayne, T. 2015. A triple-hurdle model of production and market participation in Kenya's dairy market. *American Journal of Agricultural Economics*, 97(4): 1227-1246.
- Burke, W. J., Jayne, T., Freeman, H. and Kristjansen, P. 2007. *Factors associated with rural farm households' movements into and out of poverty: The rising importance of livestock*. International Development Working Paper 90. East Lansing, USA: Department of Agricultural Economics, Michigan State University.
- FAO (Food and Agriculture Organization of the United Nations). 2014. FAOSTAT Statistics Database. Statistical Yearbook-Kenya, [http://faostat.fao.org/static/syb/syb\\_114.pdf](http://faostat.fao.org/static/syb/syb_114.pdf)

**Figure 6.3** Food consumption (seven-day recall)

FAO. 2017. FAOSTAT Statistics Database. Cattle, dairy stocks Kenya and Eastern Africa, [www.fao.org/faostat/en/#data/GE](http://www.fao.org/faostat/en/#data/GE)

Gelan, A. and Muriithi, B. W. 2015. Examining returns to scale in smallholder dairy farms in East Africa. *Quarterly Journal of International Agriculture*, 54(3): 239-261.

Holloway, G., Nicholson, C., Delgado, C., Staal, S. and Ehui, S. 2000. Agroindustrialization through institutional innovation: Transaction costs, cooperatives and milk-market development in the east-African highlands. *Agricultural Economics*, 23(3): 279-288.

Muriuki, H. G. 2011. *Dairy development in Kenya*. Rome: FAO.

Nafula, S. S. 2013. The impact of enhanced nutritional and feeding practices on growth and health of dairy calves in Mukurweini district of Kenya. Doctoral dissertation, University of Nairobi.

Olwande, J., Smale, M., Mathenge, M. K., Place, F. and Mithöfer, D. 2015. Agricultural marketing by smallholders in Kenya: A comparison of maize, kale and dairy. *Food Policy*, 52: 22-32.

Randolph, T. F., Schelling, E., Grace, D., Nicholson, C. F., Leroy, J. L., Cole, D. C. and Ruel, M. 2007. Role of livestock in human nutrition and health for poverty reduction in developing countries. *Journal of Animal Science*, 85(11): 2788-2800.

Richards, S., VanLeeuwen, J. A., Shepelo, G., Gitau, G. K., Wichtel, J., Kamunde, C. and Uehlinger, F. 2016. Randomized controlled trial on impacts of dairy meal feeding interventions on early lactation milk production in smallholder dairy farms of Central Kenya. *Preventive Veterinary Medicine*, 125: 46-53.

Smith, J., Sones, K., Grace, D., MacMillan, S., Tarawali, S. and Herrero, M. 2013. Beyond milk, meat, and eggs: Role of livestock in food and nutrition security. *Animal Frontiers*, 3(1): 6-13.

Staal, S., Delgado, C. and Nicholson, C. 1997. Smallholder dairying under transactions costs in East Africa. *World Development*, 25(5): 779-794.

Van der Laan, M. and Robins, J. 2003. *Unified methods for censored longitudinal data and causality*. New York, USA: Springer-Verlag.

VanLeeuwen, J. A., Mellish, T., Walton, C., Kaniaru, A., Gitau, R., Mellish, K., et al. 2012. Management, productivity and livelihood effects on Kenyan smallholder dairy farms from interventions addressing animal health and nutrition and milk quality. *Tropical Animal Health and Production*, 44(2): 231-238.

Walton, C., VanLeeuwen, J. A., Yeudall, F. and Taylor, J. 2012. Association between duration of community-based group membership and sustainable livelihoods for Kenyan women dairy farmers. *Journal of Agriculture, Food Systems, and Community Development*, 3(1): 43-60.

## Chapter 7

---

# Madagascar's AD2M-I Project

by  
**Romina Cavatassi**  
**Peter Brueckmann**  
**Nancy McCarthy**  
**Mitchell Morey**

Madagascar, Africa's largest island state, remains one of the least-developed countries in the world after decades of slow economic growth, unstable governance and political turmoil. About 65 per cent of its population lives in rural settings, mainly relying on subsistence-oriented farming practices, exploiting small areas of land (INSTAT, 2011; World Bank, 2017a), and suffering from persistent high levels of poverty, food insecurity and malnutrition (Dostie, Haggblade and Randriamamonjy, 2002; Minten and Barrett, 2008). Rice is the main staple crop and the main source of income for farming households in Madagascar, with 87.5 per cent of all farming households growing rice and 48 per cent of agricultural income generated through rice cultivation (INSTAT, 2011). As such, rice is of critical importance to the welfare of the Malagasy population and farmers, as well to the development of the country's agriculture sector. Nonetheless, Malagasy rice farmers face numerous barriers to improving their agricultural production and well-being, including: tenure insecurity, land degradation, lack of irrigation infrastructure, high marketing transaction costs, inadequate agricultural production techniques, and low adoption rates of new rice cultivation techniques and of improved rice varieties (Barrett et al., 2004; Harper et al., 2007; Harvey et al., 2014; Minten and Barrett 2008; Moser, Barrett and Minten, 2009).

In the mid-2000s, the Government of Madagascar began adopting laws and implementing policies aimed at empowering the poor and decentralizing administration and public services. Beginning in 2005, this process focused strongly on land reforms and decentralization of land offices. The 2009 coup delayed activities significantly; nevertheless, the new government managed to continue the land reform and other decentralization plans. At the same time, despite relatively generous rainfall and water resources within the country, many farm households remained mired in poverty and vulnerable to the vagaries of weather (Harvey et al., 2014; Tadross et al., 2008). Climate change increases the need to protect farmers from weather shocks that reduce agricultural yields. This is particularly true for farmers in the regions of Menabe and Melaky in central western Madagascar, who currently face very high levels of poverty and malnutrition.

Most of the empirical evidence suggests that when irrigation infrastructure is well built and governance of the irrigated areas is well functioning, investments in irrigation infrastructure can both increase agriculture's climate resilience and also significantly raise farmers' yields, leading to higher and more stable productivity and increased net revenue (Hussain and Hanjra, 2004; Knox, Daccache and Hess, 2013; Nakano et al., 2013). In the case of Madagascar, Jacoby

and Minten (2007) documented higher yields and net revenues per hectare (of more than 30 per cent in each case) on irrigated lands compared with non-irrigated lands. At the same time, experience has shown that many projects aiming to increase the area under irrigation have not led to the hoped-for gains. The literature cites a number of reasons, including: the quality of initial feasibility studies; the quality and location of irrigation infrastructure; and the efficacy of governance structures put in place to regulate water uses and users, and ensure maintenance of irrigation infrastructure.

Madagascar is one of the six most-irrigated countries in Africa (You et al., 2011), but only 2.18 per cent of its agricultural land is under irrigation (World Bank, 2017b). Thus, increasing and rehabilitating irrigation facilities in Madagascar was considered of key importance by policymaker and development organizations. As such, between 2006 and 2015, IFAD implemented the Appui au Développement du Menabe et du Melaky (AD2M-I) project in the two regions. The project consisted of two components designed to strengthen farmers' tenure security and result in higher, more stable and sustainable agricultural incomes. It sought to meet these goals by increasing access to irrigation, introducing new seed varieties, promoting additional cash crops, increasing access to agricultural equipment, and increasing access to markets through road construction and rehabilitation, waterway infrastructure and microfinance kiosks. The project had a total cost of US\$27.2 million, cofinanced by IFAD, the Millennium Challenge Account, the European Union and the Government of Madagascar. A second phase of the project is currently ongoing and expected to be completed by the end of 2022 (AD2M-II).

To analyse the effects of the AD2M-I project and provide insights on the impact of irrigation infrastructure on the agricultural production and well-being of smallholder farmers, IFAD conducted a rigorous ex post impact assessment through the International Initiative for Impact

Evaluation, the American Institutes for Research, and Lead Analytics. This impact assessment can provide evidence on the effectiveness of irrigation to promote more stable crop production and farmer livelihoods, and it can be used to better design and implement future irrigation interventions and policies, not only in Madagascar but also in other countries that share the features and challenges of Madagascar's rural farmers. The descriptive analysis of infrastructure construction, management and maintenance also sheds light on the relative importance of these components in generating gains at the farm level.

## The project's theory of change

Given the complexity of the project and its various components, the impact assessment focused on household-level outcomes and impacts from access to certificated irrigation land. However, this chapter describes the theory of change for the entire project, including both the certification and irrigation activities that were the focus of the impact assessment, as well as all other project inputs on which data were collected and thus controlled for in the analysis in order to provide a more comprehensive picture of the assessment conducted.

### Strengthening local governance and tenure security

Customary tenure institutions alone were insufficient to guarantee tenure security to many farmers, including women and other vulnerable groups, or to resolve conflicts adequately. The resulting tenure insecurity dampened farmers' incentives to invest in sustainable land management practices. The purpose of the AD2M-I intervention was to complement and take part in the Governmental National Land Programme process by establishing and training local land administration offices. These would be part of a well-functioning decentralized land administration system that establishes local land management plans and issues land certificates

efficiently and effectively. This would give farmers more tenure security and therefore greater incentives to engage in sustainable soil and land management practices.

### Support for sustainable development of the productive base

Despite relatively generous rainfall and water resources in the regions of Menabe and Melaky, farmers' rice yields had been low and stagnating in the years before project inception. Farming households in the project regions either had access to irrigation systems that were in poor condition or they had no access at all, suggesting that one key intervention should focus on irrigation. As such, the AD2M-I project focused on building new, or rehabilitating existing, irrigation perimeters in rice-growing communities. This work was supported by capacity-building activities aimed at better coordination and management of irrigation facilities through new or informally existing water user associations (WUAs). WUAs – with formalized leadership structures, rules and chains of command – are an important element in operating, maintaining and repairing irrigation schemes, and they are a key determinant in whether farmers will gain benefits from irrigated land (Burney and Naylor, 2012; Hamdy, Abu-Zeid and Lacirignola, 2009; Meinzen-Dick, 2007). Improved access to irrigation and increased capacity of associated WUAs should lead to higher-efficiency water use and, most importantly, to stable irrigation of farm plots. The consistent availability of irrigation water should allow rice and other crop production throughout the year by enabling a second or even a third crop season, and this in turn should lead to higher, more diversified and more stable productivity and yields for farm households (Knox, Daccache and Hess, 2013; Minten and Barrett, 2008; Nakano et al., 2013).

To achieve an even more ambitious objective, the AD2M-I project conducted training on integrated

crop and resource management systems, including the system of rice intensification<sup>15</sup> and the improved rice system. The project undertook farmers field schools, demonstrations and workshops to encourage farmers to adopt cultivation techniques, more resistant seed varieties, livestock management techniques, environmental protection practices, and crop diversification. These were complemented with the provision of agricultural inputs, including seeds and farming tools, to project beneficiaries. The expectation was that adoption would lead to more diversified agricultural production and income sources, enhanced land productivity and lower costs of cultivation (Barrett et al., 2004; Tsujimoto et al., 2009) through more productive inputs and techniques, and through reduced erosion and increased adaptation to climatic events.

As an important complementary subcomponent, rural roads and waterway transport infrastructure were constructed or rehabilitated. This improved transportation and infrastructure was expected to reduce marketing transaction costs and raise marketable surpluses.

All activities of this multifaceted and complex AD2M-I project strongly complemented one another. Overall, it was expected that the outputs of the AD2M-I activities would lead to positive impacts on the community environment, land use and management and, most importantly, the level and stability of beneficiaries' incomes. This in turn should lead to present and future household welfare gains and reduced poverty.

### Project outreach and outputs

Given the intervention's complex approach in 19 communes throughout five districts across the Menabe and Melaky Regions, the AD2M-I project targeted numerous groups of beneficiaries. Among these groups were: landless

15. The system of rice intensification is an agroecological methodology intended to increase the productivity of irrigated rice by changing the management of plants, soil, water and nutrients. Originating in Madagascar in the 1980s, it is based on the cropping principles of significantly reducing the plant population, improving soil conditions and irrigation methods for root and plant development, and improving plant establishment methods (Uphoff, 2002; Glover, 2011).



agricultural wage earners; farm households with non-irrigated landholdings smaller than two hectares; poor, often indigenous, households focusing on fishing activities; farmers with small irrigated landholdings and small numbers of cattle; and pastoral farmers engaged mainly in cattle breeding. Project activities reached 40,000 households – about 40 per cent of the rural households in both project regions – and 16,000 of these households constituted direct beneficiaries.

Over the project's nine years, many activities were undertaken and outputs obtained. With respect to land administration and legal land rights, project activities included land-use diagnostics, the development of local land-use plans and the establishment of 15 land offices, as well as numerous training sessions for land office staff, local leaders and community members. In addition, 8,840 land certificates, covering 7,257 hectares, were issued.

With respect to irrigation, 18 sites received new or rehabilitated infrastructure covering 5,588 hectares of irrigated land (3,393 hectares covered by new infrastructure and 2,195 hectares covered by rehabilitated infrastructure) reaching 5,600 agricultural producers (4,000 in Menabe and 1,600 in Melaky). In addition, 32 WUAs and 2 WUA unions were created or strengthened, accounting for a total of 3,724 members.

## Project impact

### Data and methods

In every impact evaluation, great importance is attached to carefully selecting an appropriate control group in order to be able to assess and attribute project impacts. For this evaluation, the strategy for constructing a reliable comparison group was to replicate the targeting process used to select AD2M-I beneficiaries during the

implementation of the project itself, which was mostly based on agroecological observable characteristics. During the inception process of AD2M-I, the project conducted detailed irrigation feasibility studies to identify irrigated areas in need of rehabilitation, as well as sites for new irrigation infrastructure. The feasibility studies included detailed information on hydrological and topographical features, rainfall, the size of the irrigable area and cost estimates for irrigation infrastructure as well as basic information on the socio-economic characteristics of potential beneficiaries. Of 62 sites considered, 36 were deemed feasible, of which 18 obtained new irrigation infrastructure or had existing irrigation infrastructure rehabilitated.

For the impact evaluation, the overall sampling strategy replicated the targeting process used in 2007 by using the same or similar available historic data sources. As a first step, observation-based targeting was used, with AD2M-I project sites being plotted on a map to identify the common characteristics of the sites. This information was then used to determine a group of potential non-project areas that had characteristics similar to AD2M-I areas before the project started. Once the first group of potential areas had been selected, criteria-based targeting was used to refine the selection of the comparison sites.<sup>16</sup>

From the final list of AD2M-I intervention and comparison areas, 1,986 households in 62 villages were interviewed in October and November 2016 (682 treatment households and 1,304 comparison households), and these interviews produced detailed information on household and plot management characteristics. In addition, one survey in each treatment and comparison commune was conducted to obtain additional community-level variables.

Given the complexity of the project, the impact assessment focuses on households that benefited from access to irrigated plots

16. Criteria-based targeting is based on expert opinions to determine to what extent non-targeted areas could have been chosen for the project. These expert opinions relied on historical variables likely to be associated with the uptake of the intervention in 2007 such as climate, population density and other agroecological conditions.



in Menabe.<sup>17</sup> To complement characteristics obtained from household interviews, additional control variables covering biophysical characteristics and a set of spatial dummies were used to account for differences that would have explained differences in the outcome indicators of interest between treatment and comparison households. These indicators included a normalized difference vegetation index – a useful measure of soil fertility computed by using available satellite images of the treatment and comparison areas. Based on this comprehensive dataset, treatment households were matched with comparison households, and the impact of the AD2M-I irrigation activities was quantified.<sup>18</sup>

The quantitative data collection and subsequent estimation of results were complemented with focus group discussions and key informant interviews with programme beneficiaries and relevant officials. These qualitative data were collected to: facilitate a better understanding of projects' mechanisms and impacts; support and validate or amend key impact findings; and identify challenges and potential moderating factors. Moreover, they allowed the research team to draw conclusions not only about the impact of the irrigation component itself but also about the role of the WUAs and of other project components.

Based on the theory of change and the focus of the impact evaluation of AD2M-I investments in new and rehabilitated irrigation infrastructure, the following key research questions were addressed:

- Did access to irrigated land increase farmers' rice yields, the total value of their irrigated crop production, their total net crop revenues and the value of crop output they marketed?
- Did access to irrigated land enable farmers to increase the number of cropping seasons within the year and to have a more diversified crop portfolio?

Answers to both questions can be used to draw conclusions about the extent to which farmers obtained higher and more stable incomes. In addition, the following questions were addressed:

- Did project activities lead to an increase in sustainable land management practices at both the community and household levels?
- Given the importance of well-functioning WUAs in maintaining irrigation infrastructure and regulating water use, did measures of WUA performance affect the extent to which farmers were able to realize benefits from their irrigated plots?

## Key results

### Impacts on annual crop production

Overall, the impact assessment estimated that the intervention made meaningful improvements to the agricultural production and productivity of beneficiaries.<sup>19</sup> As shown in figure 7.1, the annual per hectare value of beneficiaries' crop production was 24 per cent higher than that of control households, and the annual per capita value of their crop production was 23 per cent higher than that of control households.

Results show similarly positive effects for project participants' rice yields. Annual rice yields were estimated to be 27 per cent higher for beneficiary households compared with control farmers, whereas the quantity of rice harvested per capita was 22 per cent higher for beneficiary farmers than for control farmers.

These positive impacts on crop production were supported by the qualitative analysis that complemented the impact assessment. A farmer from Belo, one of the beneficiary villages, reported: "The harvests improved, mostly thanks to the increased water supply." A farmer from Mahabo said: "Yes, we are able to produce in excess and have to sell [the rice] outside our region."

17. Melaky was excluded for a number of reasons, including logistics, resources and the fact that some areas were not covered by irrigation, the main component being assessed.

18. Specifically, the inverse-probability-weighted regression adjustment estimator was used. For more information, see Wooldridge (2010).

19. All results reported are statistically significant at a 95 per cent confidence interval level or higher (in most cases at 99 per cent) unless otherwise specified.

These quantified and perceived benefits also had positive effects on the community, according to many key informants and group discussion participants. These effects included positive impacts on the labour market, households' purchasing power and village economies as a whole. "The community is also more peaceful, we eat well, our harvests are successful and even the unemployed get work," stated a farmer from Mahabo. A key informant from Mahabo reported: "In the past, a farmer, one family did not own a zebu working the fields, but now after they harvested the rice, they bought two zebus, and this resulting in that, this transformed the economy in general in the ... village."

One important reason behind the rise in beneficiaries' annual crop production is that irrigation allows farmers to increase the number of cropping seasons per year. Beneficiary households are 19 per cent more likely to engage in a second cropping season compared with control farmers. Moreover, researchers found no statistically significant impacts for crop and rice production when looking only at the primary season. This combination of results implies that most of the gains come from farmers' ability to crop for a second season, which counteracts the reduced yield and higher risk of agricultural production linked to the vagaries of weather patterns. Indeed, among the factors reported during the qualitative fieldwork and documented in the literature mentioned above that can potentially reduce or impede improvements in crop production per season, it is worth reporting recurring weather shocks (mainly cyclones and floods), in addition to local market constraints and safety concerns.

### **Impacts on farmers' access to extension services and crop inputs**

In contrast to control households, of which 30 per cent reported having received extension services from any source, 38 per cent of beneficiaries reported having participated in

training sessions and workshops, and they are also 8 per cent more likely to attend training than were control households.

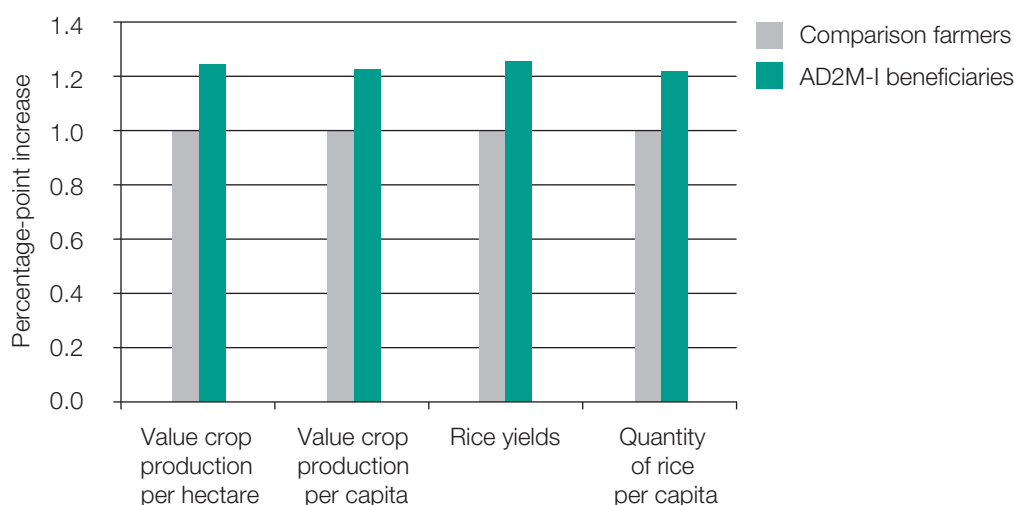
Beneficiaries are also 8 per cent more likely to use pesticides than control farmers – although the average number of beneficiary farmers applying herbicides or pesticides remains low, with an overall average of 9 per cent and 23 per cent, respectively. It is estimated that the project had no impact on the use of inorganic fertilizers.

Further evidence that farmers' addition of a second cropping season, thanks to irrigation, was behind the increase in agricultural production also comes from the results on adoption of new farming practices, which were expected to produce higher yields per se but which the farmers largely failed to adopt or soon abandoned after the completion of the AD2M-I project. During the qualitative analysis, a farmer from Belo said: "Crop production has decreased since AD2M-I left the town. Some farmers went back to traditional agricultural practices."

Similarly, quantitative data show limited evidence of farmers in beneficiary areas expanding into new crops. However, the qualitative analysis does not validate this finding. During interviews and focus group discussions with beneficiaries, many respondents reported that AD2M-I encouraged farmers to cultivate new crops (besides only rice), such as onions, beans, peanuts and tomatoes, and that farmers in Mahabo and Belo continue to harvest these crops today. According to a community leader from Ankilizato Nord (Mahabo): "Onions and beans are the main alternative crops that AD2M has introduced here. Now they have a warehouse where the onions are stored here." A community leader from Antrobiky corroborated this statement: "We continued growing peanuts and onions. We have truly continued."

Several respondents also commented that multicropping improved the quality of their soil and ultimately the quality of their rice. However, experiences cultivating new crops in Belo were

**Figure 7.1** Crop production and management indicators



slightly less positive, and both farmers and WUA members seemed more reluctant to focus on cultivating crops other than rice.

### Impacts on household welfare gains

Given that annual rice yields and total annual value of crop production increased significantly, clear higher welfare impacts were expected. Indeed, farmers and project implementers from both districts reported higher incomes thanks to higher rice yields. The quantitative impact evaluation confirms these findings to a certain extent. In contrast to control households, of which 57 per cent reported worrying about securing enough food in the preceding seven days, 46 per cent of project beneficiaries reported such worries. Nonetheless, no significant differences were found in annual food security, indicating high levels of intra-annual food insecurity across the entire sample. Beneficiary households also had 1.1 more household durable assets than control households, and they spent more on education. Perceived broader community benefits include lessened disputes over water supply, enhanced communication between neighbourhoods, and a unifying effect on the local community.

### Quality of irrigation and performance of water user associations

According to quantitative and qualitative results, the project had positive effects on the quality and efficiency of irrigation compared with the control. AD2M-I beneficiaries with plots located in a gravity-based irrigation system were 15 per cent more likely to receive water on time, and 26 per cent more likely to receive good-quality, non-brackish water. However, only 40 per cent of the beneficiaries rated the quality of the water as good, and 27 per cent of project participants did not receive water on time. Moreover, there is no difference between beneficiaries and controls with regard to whether they received their full allocation of water. About 37 per cent of both groups claimed that they did not receive all of the promised water allocation. These results show that significant room for improvement remains.

It is crucial to meet the irrigation needs of farmers who follow different harvesting schedules and have varying water needs, and to maintain the irrigation infrastructure. The performance of WUAs is particularly important to maintaining this infrastructure and using it effectively. According to the qualitative results, one main challenge was a lack of communication by AD2M-I between

the WUAs' leadership and farmers. In particular, some AD2M-I farming households reported having been left uninformed about water supply schedules, resulting in unforeseen water cuts and crop losses. In addition, some farmers were not informed about the objectives and importance of WUAs, and thus were not encouraged to spend their time actively participating in WUA activities.

The importance of WUA leadership that has the trust of the community was often stressed in the qualitative analysis. WUAs led by trustworthy people elected by the community resulted in more active community participation, fewer concerns about corruption and fewer disputes about members' fees. After project completion, some respondents stated that groups fell apart or became ineffective, preventing farmers from benefiting from irrigation schemes in a sustainable manner. This was a less serious problem among groups for which community leaders stepped up and took more responsibility; these groups continued to function and maintain the irrigation schemes successfully.

## Lessons learned

The AD2M-I programme experience offers a number of important lessons:

- Improved access to irrigation infrastructure and a more efficient water supply increase the rice yields and annual value of crop production of smallholder farmers in Madagascar, mainly by allowing them to cultivate for a second season. Future project designs could promote agricultural strategies – including adoption of techniques, crops or varieties – specifically geared to cultivating land for a second cropping season.
- To address farmers' reluctance to adopt new farming techniques, future project designs must use activities and information dissemination that will raise awareness of interventions' long-term benefits for sustainability.
- Well-constructed and well-functioning WUAs are key to successfully implementing projects and to achieving positive impacts. Trusted and well-respected WUA leaders who communicate transparently with community members on the benefits of maintaining and improving irrigation schemes can do much to improve community cohesion and engagement, and generate higher benefits from irrigated plots.
- Given the importance of land tenure insecurity in Madagascar, further evidence on the effectiveness of tenure interventions, especially in combination with irrigation investments, will help determine the need for additional investments in land administration systems (Jacoby and Minten, 2007).
- The long-term success and cost-effectiveness of irrigation investments depend largely on sustainable irrigation structures that will last and can be maintained by local community members and WUAs after project completion. As such, capacity-building activities to improve WUAs' management of irrigation structures are of great importance.
- Quantitative results suggest a good success of the project following its logic that a well-managed irrigation system translates into higher yields and harvests, mainly thanks to a second agricultural season. However, a deeper analysis of the social capital and networking system of the WUA, as well as strengthening of training and capacity to maintain the adoption of improved techniques, would be advisable in order to better understand social aspects, particularly given the fact that some farmers seem to suggest scope for improvement.

## References

- Barrett, C. B., Moser, C. M., McHugh, O. V. and Barison, J. 2004. Better technology, better plots, or better farmers? Identifying changes in productivity and risk among Malagasy rice farmers. *American Journal of Agricultural Economics*, 86(4): 869-888.
- Burney, J. A. and Naylor, R. L. 2012. Smallholder irrigation as a poverty alleviation tool in sub-Saharan Africa. *World Development*, 40(1): 110-123.
- Dostie, B., Haggblade, S. and Randriamamonjy, J. 2002. Seasonal poverty in Madagascar: Magnitude and solutions. *Food Policy*, 27(5): 493-518.
- Glover, D. 2011. The System of Rice Intensification: Time for an empirical turn. *NJAS – Wageningen Journal of Life Sciences*, 57: 217-224.
- Hamdy, A., Abu-Zeid, M. and Lacirignola, C. 2009. Institutional capacity building for water sector development. *Water International*, 23(3): 126-133.
- Harper, G. J., Steininger, M. K., Tucker, C. J., Juhn, D. and Hawkins, F. 2007. Fifty years of deforestation and forest fragmentation in Madagascar. *Environmental Conservation*, 34(4): 325-333.
- Harvey, C. A., Rakotobe, Z. L., Rao, N. S., Dave, R., Razafimahatratra, H., Rabarijohn, R. H., et al. 2014. Extreme vulnerability of smallholder farmers to agricultural risks and climate change in Madagascar. *Philosophical Transactions of the Royal Society B*, 369(1639): 20130089.
- Hussain, I. and Hanjra, M. A. 2004. Irrigation and poverty alleviation: Review of the empirical evidence. *Irrigation and Drainage*, 53(1): 1-15.
- INSTAT (Institut National de la Statistique de Madagascar). 2010, 2011. Enquêtes périodique auprès des ménages 2010, 2011. Antananarivo, catalog.ihsn.org/index.php/catalog/5127/download/62289
- Jacoby, H. G. and Minten, B. 2007. Is land titling in Sub-Saharan Africa cost-effective? Evidence from Madagascar. *The World Bank Economic Review*, 21(3): 461-485.
- Knox, J., Daccache, A. and Hess, T. 2013. What is the impact of infrastructure investments in roads, electricity and irrigation on agricultural productivity? Systematic review. *CEE Review*, 11-007. Bedford, UK: Collaboration for Environmental Evidence.
- Meinzen-Dick, R. 2007. Beyond panaceas in water institutions. *Proceedings of the National Academy of Sciences*, 104(39): 15200-15205.
- Minten, B. and Barrett, C. B. 2008. Agricultural technology, productivity, and poverty in Madagascar. *World Development*, 36(5): 797-822.
- Moser, C., Barrett, C. and Minten, B. 2009. Spatial integration at multiple scales: Rice markets in Madagascar. *Agricultural Economics*, 40(3): 281-294.
- Nakano, Y., Bamba, I., Diagne, A., Otsuka, K. and Kajisa, K. 2013. The possibility of a rice Green Revolution in large-scale irrigation schemes in Sub-Saharan Africa. In K. Otsuka and D. Larson, eds., *An African Green Revolution*. Dordrecht, Netherlands: Springer.
- Tadross, M., Randriamarolaza, L., Rabefitia, Z. and Zheng, K. Y. 2008. *Climate change in Madagascar: Recent past and future*. Washington, D.C.: World Bank.
- Tsujimoto, Y., Horie, T., Randriamihary, H., Shiraiwa, T. and Homma, K. 2009. Soil management: The key factors for higher productivity in the fields utilizing the system of rice intensification (SRI) in the central highland of Madagascar. *Agricultural Systems*, 100(1): 61-71.

Uphoff, N. 2002. Opportunities for raising yields by changing management practices: the system of rice intensification in Madagascar. In N. Uphoff, ed. *Agroecological innovations: increasing food production with participatory development*, 145-161. London: Earthscan.

Wooldridge, J. M. 2010. *Econometric analysis of cross section and panel data*. Second edition. Cambridge, USA: MIT Press.

World Bank. 2017a. World development indicators. Rural population (% of total population), <http://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=MG>

World Bank. 2017b. World development indicators. Agricultural irrigated land (% of total agricultural land), <http://data.worldbank.org/indicator/AG.LND.IRIG.AG.ZS?locations=MG>

You, L., Ringler, C., Wood-Sichra, U., Robertson, R., Wood, S., Zhu, T., Nelson, G., Guo, Z. and Sun, Y. 2011. What is the irrigation potential for Africa? A combined biophysical and socioeconomic approach. *Food Policy*, 36(6): 770-782.

## Chapter 8

---

# The Philippines's Irrigated Rice Production Enhancement Project

by  
**Aslihan Arslan**  
**Daniel Higgins**  
**Paul Winters**

Although agriculture generates about 11 per cent of the GDP of the Philippines, it provides livelihoods for 30 per cent of the population (OECD, 2017). This share is higher in rural areas, where 70 per cent of the population is poor and depends on agriculture – primarily rice production. Rice is one of the most important commodities for the Philippines. In Filipino diets, rice is the principal source of energy and protein, accounting for 46 per cent of calorie availability and 34 per cent of protein (WFP, 2017). Therefore, improving rice production and productivity remain major policy priorities. The country has one of the largest yield gaps in South-East Asia (FAO, 2010), and a large focus of agricultural policy is on how best to improve smallholder family farm rice productivity in order to keep prices down in the face of production efficiency issues (Bordey et al., 2016), rising demand from a fast-growing population (PSA, 2016), and climate change effects (Rosegrant et al., 2016). However, trade restrictions in the sector<sup>20</sup> undercut rice accessibility by leading to artificially high consumer prices and negatively affecting food security (OECD, 2017). At the same time, the government allocates large amounts of money to irrigation support, but the effectiveness of the methods and management of irrigation projects has been questioned (Inocencio et al., 2016). There is debate about

the extent to which irrigation management should be decentralized to communal irrigation systems and irrigators associations (IAs), and how best the IAs should be organized (Bandyopadhyay, Shyamsundar and Xie, 2007; Kakuta, 2014; Nguyen et al., 2015). The impact assessment of the Irrigated Rice Production Enhancement Project (IRPEP) contributes timely evidence to the ongoing discourse on the policy agenda and programme design.

IRPEP was implemented in three regions of the Philippines between 2010 and 2015 with funding from IFAD, the European Union and the Government of the Philippines. IRPEP was a subproject of the Rapid Food Production Enhancement Project, along with the two-year Rapid Seed Supply Financing Project that directly preceded it. While the latter provided emergency seeds to smallholder rice farmers in response to the 2008 food price spike, IRPEP targeted longer-term rice productivity and income increases by expanding and improving irrigation infrastructure, building capacity of IAs, and providing farmer field schools (FFSs), rice marketing support, and seed buffer stocks. The project was implemented by six agencies of the Government of the Philippines, with technical support from IFAD.

This assessment adds to a small number of in-depth impact assessments conducted on

---

20. The Government of the Philippines recently decided to extend quantitative restrictions on rice imports for another three years (President of the Philippines, 2017).



similar projects in the region. An assessment of an irrigation project in Bohol Province found positive effects on yields and income but noted that downstream households may have benefited less. It also suggested that downsizing IAs led to increased benefits through reduced water conflict (JICA, 2012). Similarly, a study of the Communal Groundwater Irrigation Sector Project in Nepal found an increase in yields, especially for smaller water user groups (ADB, 2012). Finally, highlighting the difficulty of conducting such assessments, a study of the Mao Lao Irrigation Project in Thailand produced inconclusive findings, attributed to difficulties in identifying a comparison group of non-beneficiary households that had not received similar support from elsewhere (Palmer-Jones et al., 2012).

## The project's theory of change and research questions

IRPEP was implemented by first identifying suitable communal irrigation systems (CISs) in Regions VI, VIII and X of the country, and by offering support to the smallholder rice farmers that use them and the IAs that manage them. CISs have smaller land coverage than national or private irrigation systems and have a more decentralized management system run by the IAs (Decena, 2016). IRPEP used the following criteria to select beneficiary CISs:

- baseline annual paddy productivity less than 3.78 tons per hectare;
- average landholding size less than 0.76 hectares;
- low or inadequate supply of water through CIS;
- high incidence of poverty;
- sufficient irrigation potential of CIS;
- feasibility of support from implementing agency;
- willingness and capacity of local government units to provide timely counterpart funding.

Figure 8.1 presents the theory of change for IRPEP, which maps the pathways linking its activities to its expected impacts. The project aimed to address constraints to farmers'

agricultural productivity and income generation, primarily by improving their supply of irrigation water, as well as teaching new skills and practices, and providing input and marketing support. By expanding and rehabilitating irrigation canals to improve water supply, strengthening IAs to improve management and maintenance, and teaching improved practices through FFSs, the project is expected to help farmers increase their productivity and the quality of their produce, contributing to food security and nutrition. The increased yields, plus improved post-harvest processing facilities and other marketing support, are expected to contribute to increased incomes. Because IRPEP also promoted women's involvement in IAs as both members and officers, improved gender empowerment is also expected.

This impact assessment focuses only on the impact of the irrigation, IA capacity-building and market support activities of IRPEP. This is because in the three project regions similar FFS and buffer stock support was offered to all non-IRPEP smallholder households. Thus, no suitable comparison group could be found to assess the impact of these components. This assessment effectively compares households that have received only FFS and buffer stock support with those that have also received irrigation, IA capacity-building and marketing support. It also focuses mainly on the production of rice – the project's target crop and the only crop grown by most of the households. Project implementation and operations differed significantly across regions. Activities started two years later in Region VI, and a severe typhoon damaged canals and storage facilities, particularly in Region VIII. The impact assessment takes these differences into account. With this in mind, and based on the expected impact chains of IRPEP and the findings of previous studies, the following research questions were used to guide this impact assessment:

- Did IRPEP have the intended impacts on irrigation supply, rice productivity, market participation and other outcomes? Are there constraints that limit farmers from achieving these objectives that should be addressed?

**Figure 8.1** Theory of change for IRPEP activities



- Did the impact of IRPEP vary across regions, parcel locations, and small and large IAs?
- Did IRPEP strengthen IA participation and the capacity of IAs to support their members and to sustain improvements in smallholders' livelihoods?

## Project outreach and outputs

The project reached a total of 14,082 smallholder rice farmer beneficiaries – of whom 4,225 were women – in 112 IAs. Irrigation facilities of 109 CISs were rehabilitated and restored, covering 9,347 hectares of irrigated rice land, exceeding the original target of 4,664 hectares (mainly thanks to the expansion of the project to include Region VI). As part of the support provided to the 112 IAs, 5,048 IA officers (30 per cent women) and members were trained on irrigation operation and maintenance, and given access to post-harvest facilities and marketing. The FFS component (not evaluated here for the reasons mentioned above) covered 5,295 farmers, mainly focusing on the Palay Check technology (Pinoy Rice Knowledge Bank, 2017).

## Project impact

### Data and methods

The analysis of IRPEP's impact is based on quantitative data collected from 2,104 households and 112 IAs, both evenly spread across regions. The quantitative data were supplemented by qualitative information gathered through focus group discussions and key informant interviews with national, regional and provincial project staff and IA officers. The key to a robust ex post impact assessment is to compare treatment (beneficiary) units with control (non-beneficiary) units that represent how treatment units would have fared in the absence of the project. The sampling frames of both quantitative and qualitative data were designed to ensure that the treatment and control households and IAs met this requirement.

The sample was further refined during the analysis stage to ensure that the impacts were estimated using a valid comparison group.

For the household and IA samples, the process of identifying the control samples sought to mirror IRPEP's process for selecting beneficiary households and IAs. As the project first identified suitable CISs, and provided support to the households that use them and the IAs that manage them, the first stage of sample selection was conducted at the CIS level. First, using a small set of variables on CIS characteristics before the project had started, researchers estimated propensity scores for each CIS. These propensity scores were used to identify treatment and control CISs that would have had similar chances of being selected for the project (Austin, 2011). Second, regional project staff selected well-matched treatment and control CISs for the final sample based on their contextual knowledge. The IA sample was thus comprised of those managing the 58 treatment and 55 control CISs selected through this process, and the household sample was comprised of 1,082 treatment and 1,022 control households randomly selected from within the selected CISs. Table 8.1 presents the distribution of the CISs and households covered by the data collection.

The quantitative data were collected between March and June 2017. Household questionnaires gathered detailed information about: households' sociodemographic characteristics; all agricultural production activities over all seasons during the previous 12 months at the plot level; agricultural marketing; other income-generating activities; access to basic services; and food security indicators. IA questionnaires gathered information on: the IA structure and improvements since 2010; efficiency in irrigator fee collection; details of irrigation water supply; post-harvest processing facilities; access to marketing and finance; and membership by gender. The qualitative information gathered through the focus group discussions and key informant interviews helped the research team better understand the challenges faced during implementation.

**Table 8.1** Distribution of communal irrigation systems (CISs) and household samples

Region	Treatment		Control	
	CISs	Households	CISs	Households
Region VI	21	361	19	360
Region VIII	20	359	20	361
Region X	17	362	16	301
Total	58	1,082	55	1,022

The quantitative impacts were estimated using an inverse probability weighted regression adjustment model, which reduces important differences between treatment and control units, using both propensity scores and a regression adjustment based on a specification of a model for the outcomes of interest (Austin and Stuart, 2015). This method was chosen as the main model because of its robustness in case of misspecification of treatment or the outcome models, and it had been used effectively in a previous impact assessment of a similar irrigation project in Madagascar (see Chapter 7).

## Key impact estimates

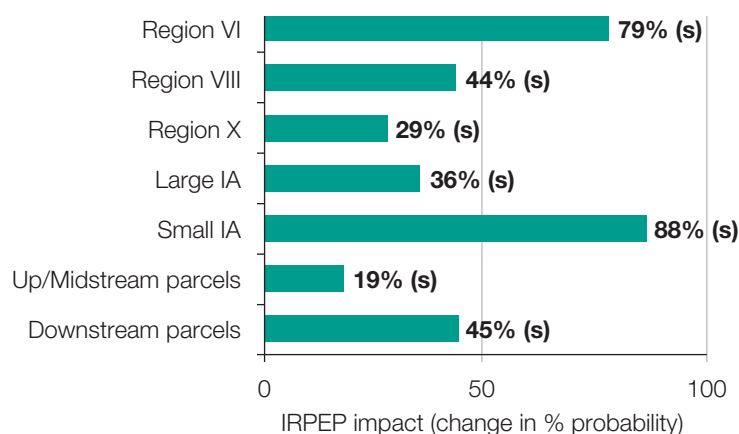
### Irrigation water supply

Various indicators were used to assess the impact of the project on irrigation water supply, and all showed highly positive effects. Overall, IRPEP households were 50 per cent more likely to have a sufficient level of irrigation across both of the main cropping seasons, and their irrigation expenditure per hectare was on average 204 per cent higher. These positive effects were observed across regions (figures 8.2 and 8.3), except for irrigation expenditure in Region X, which was actually found to decrease despite the apparent improvements in supply. The results also show that improvements in supply were more marked for households based in smaller IAs and for parcels located downstream from the irrigation source.

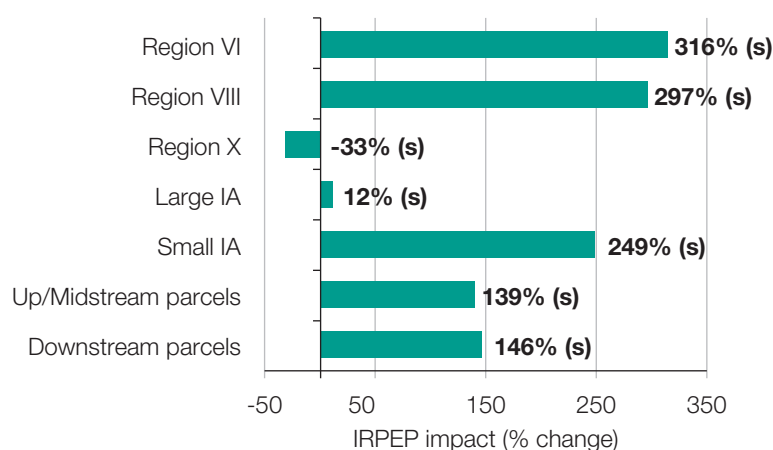
### Production and market participation

In contrast to the unanimously positive findings for irrigation supply, findings for rice production were mixed. First, cropping intensity – a measure of land use across seasons – was found to increase only in Regions VIII and X, whereas expenditure on production inputs increased only in Region VI. As shown in figure 8.4, rice yields were found to increase significantly in Region VI, by 13 per cent, and in Region X, by 8 per cent, while a significant decrease of 8 per cent was observed for Region VIII. The qualitative research suggests that the lack of impact in Region VIII was probably caused by the extensive typhoon damage experienced in the region, as well as by a lack of capital for inputs. The value-cost ratio of rice production – an efficiency indicator that measures the value of harvest divided by the value of inputs – was found to increase only in Region X, suggesting that the increase in yields in Region VI may have been driven by an increased volume of inputs rather than increased efficiency.

Figure 8.5 presents the differential results of IRPEP on market participation, measured in rice sales revenue. In Region X, the increase in yields was translated into a higher proportion of rice harvest being sold and a higher proportion of processed rice sales, leading to an average increase in revenue from sales of rice of 128 per cent. However, the same is not observed in Region VI, where farmers channelled the yield increase into non-sale uses – mainly paying back the costs related to their increased

**Figure 8.2** Differential impacts on likelihood of sufficient irrigation in wet and dry seasons

Note: s = statistically significant above 90 per cent confidence level.

**Figure 8.3** Differential impacts on irrigation expenditure per hectare

Note: s = statistically significant above 90 per cent confidence level.

inputs – and thus did not experience an increase in rice revenue. The ineffectiveness of the marketing support provided by IRPEP was widely noted in the qualitative research, which identified the encouragement of collective marketing and the provision of market information services as ill-suited to the operating context and, thus, having a low level of uptake.

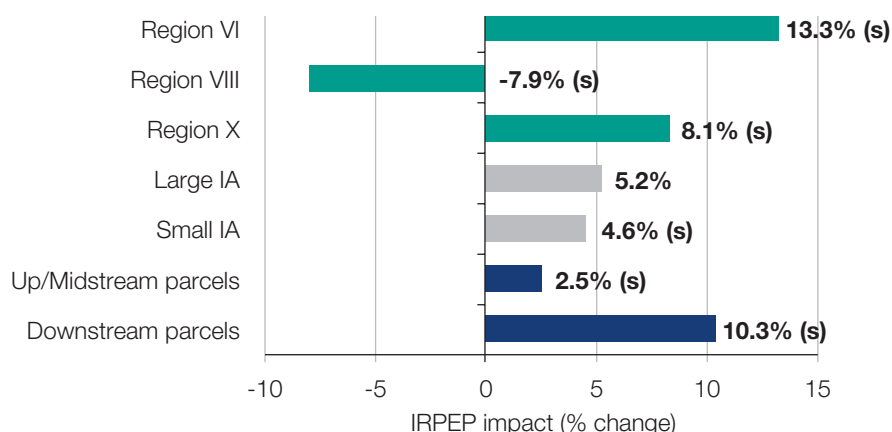
Figures 8.4 and 8.5 also show that the results for yields and market participation continue the trend of more favourable results for smaller IAs and downstream households. A non-significant impact on large IA households is contrasted with a significant increase in yields of 5 per cent and a non-significant increase in rice revenue of 57 per cent for households located in smaller IAs.

Although both upstream and downstream parcels experienced a significant increase in yields, the increase for downstream parcels was found to be, on average, about 8 percentage points larger. However, possibly reflecting their lower need for increased household consumption, upstream and midstream households experienced a much higher effect on rice sales revenue than did downstream households.

### Overall income and other impacts

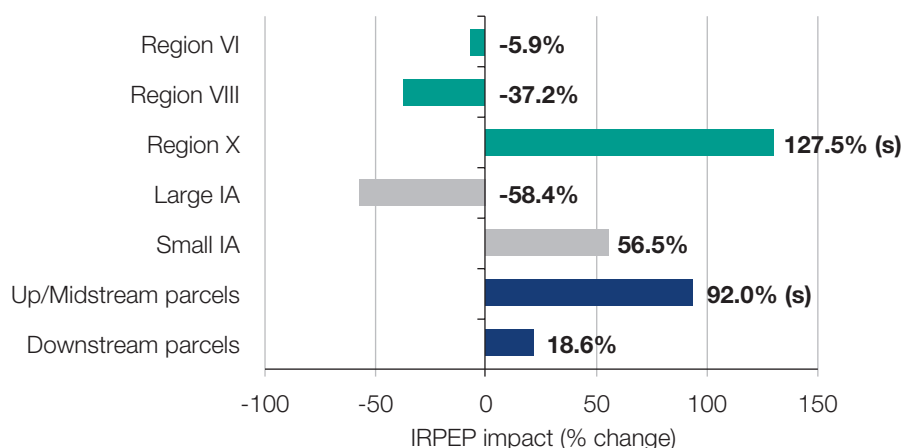
IRPEP was found to have a significant positive impact on household per capita income of 11 per cent. However, as with yields and rice income, this finding masks significant regional differences (figure 8.6). Although Region VI

**Figure 8.4** Differential impacts on rice yields (harvest per hectare)



Note: s = statistically significant above 90 per cent confidence level.

**Figure 8.5** Differential impacts on rice sales revenue per hectare



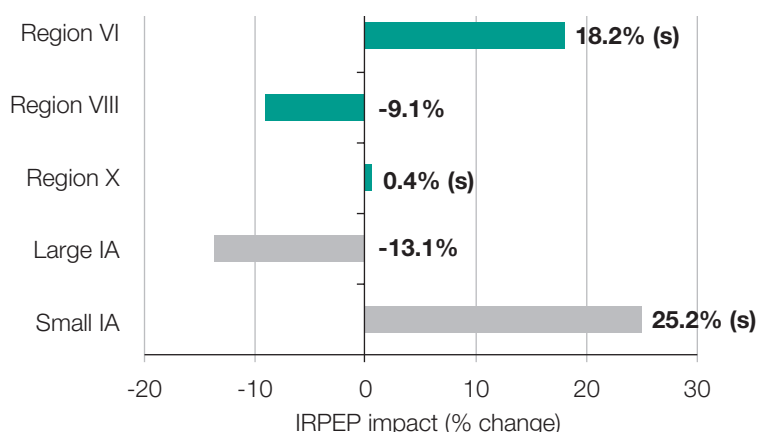
Note: s = statistically significant above 90 per cent confidence level.

did not experience a significant increase in rice revenue, IRPEP was found to have increased household income there by about 18 per cent, which seems to have been driven by increases in household enterprise and livestock activities. This finding suggests that improvements in irrigation supply may allow households to dedicate less time to rice farming, leaving them more time to spend on other income-generating activities. In contrast, Region X experienced a large increase in rice revenues but only a small significant increase in household income. This suggests that, unlike households in Region VI, households in Region X chose to devote more time to rice farming in response to the IRPEP support, at

the expense of other income sources. Finally, in Region VIII, household income was found to have slightly decreased – although this decrease was not statistically significant – reflecting the poor all-round project performance in this region.

Once again, households based in smaller IAs showed more favourable results than households in larger IAs (figure 8.6). Household income in small IAs was found to increase significantly by about 25 per cent, whereas a negative although not significant effect was observed for larger IA households. Assessment of household income effects was not done by parcel location because households could have multiple parcels across different locations.



**Figure 8.6** Differential impacts on household income per capita

Note: s = statistically significant above 90 per cent confidence level.

The project's theory of change also anticipated positive effects on household nutrition.

A measure of household dietary diversity ranging from 0 to 12 was found to significantly increase on average by 0.4, but breaking this figure down by region shows that the result was driven largely by improvements in Region VI. Also, in contrast to most of the other results, dietary diversity was found to improve in households based in larger IAs but not in smaller IAs.

### IA-level impacts

Figures 8.7, 8.8 and 8.9 show that IRPEP was found to produce positive effects across the board at the IA level. Although these effects were mostly not significant, this is likely to be due to the small sample size in many cases. The number of members in IAs was found to have increased by an average of 32 overall, by an average of 9 for female members, and by an average 3 for members under 30, with the latter starting from a low base. There was a significant increase of 1.5 in the number of female IA officers, reflecting favourably on the IA capacity-building activities that focused on increasing women's involvement in CIS management.

The increased irrigation expenditure found in the household analysis is reflected at the IA level with a 49 per cent increase in water user fee collection, and an overall increase in IA income per member of 90 per cent. This increase in income – highly relevant to the sustainability

of the project's effects – is converted into a 102 per cent increase in IA spending per member on operation and maintenance, and an 85 per cent increase in overall spending per member.

## Lessons learned

IRPEP proved very effective in improving the irrigation water supply of households across the project regions, and this effect translated into higher rice yields in two of the regions. However, mixed results for production, market participation and household income highlight the following:

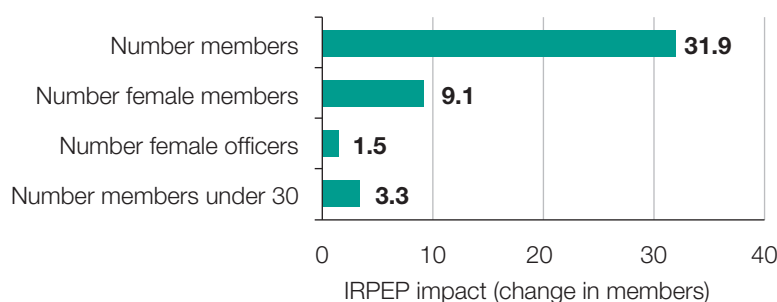
- Further supplementary support is required when households are coping with extreme weather conditions.
- Production efficiency does not automatically increase with improved irrigation supply; other supplementary supports should be provided to ensure that yields increase in proportion with increased expenditure on water and other inputs.
- Capital constraints may have limited the beneficiaries' use of production inputs. This suggests that the yield impact may be greater if future projects can address these constraints.
- Market support must be rethought. More research is needed on whether, and how, to encourage collective marketing, and how best to provide market information services.

- Future projects must consider household income in its entirety and should be wary of encouraging concentration of livelihoods on a narrow range of activities to the potential detriment of livelihood resilience.

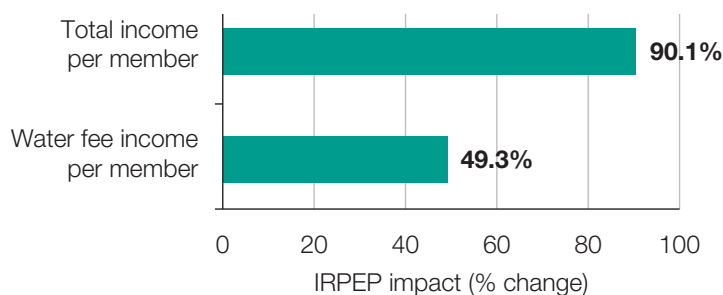
a conducive institutional environment can have distinct benefits for sustainable improvements in smallholder livelihoods, including significant increases in IA participation, income, operation and maintenance expenditure, and women's empowerment.

Project performance was notably better for downstream parcels and households located in smaller IAs. This highlights the pro-poor potential of this type of project, and supports the view that smaller IAs are easier to organize and mobilize, as found in previous studies. Strengthening the capacity of IAs combined with

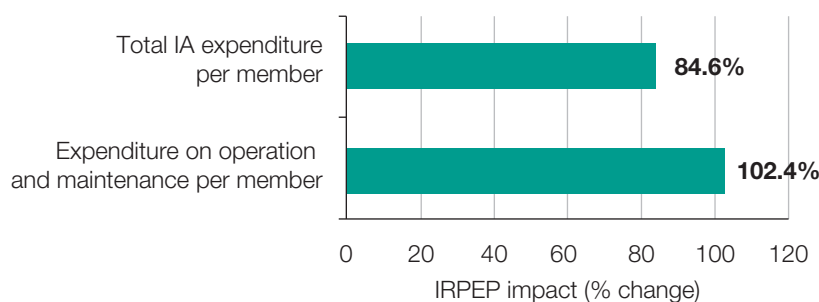
**Figure 8.7** Irrigators associations – membership impacts



**Figure 8.8** Irrigators associations – income impacts



**Figure 8.9** Irrigators associations – expenditure impacts



## References

- ADB (Asian Development Bank). 2012. *Shallow tubewell irrigation in Nepal: Impacts of the Community Groundwater Irrigation Sector Project*, [www.adb.org/sites/default/files/evaluation-document/35900/files/ies-nep-final.pdf](http://www.adb.org/sites/default/files/evaluation-document/35900/files/ies-nep-final.pdf)
- Austin, P. C. 2011. An introduction to propensity score methods for reducing the effects of confounding in observational studies. *Multivariate Behavioural Research*, 46(3): 399-424.
- Austin, P. C. and Stuart, E. A. 2015. Moving towards best practice when using inverse probability of treatment weighting (IPTW) using the propensity score to estimate causal treatment effects in observational studies. *Statistics in Medicine*, 34(28): 3661-3679.
- Bandyopadhyay, S., Shyamsundar, P. and Xie, M. 2007. Yield impact of irrigation management transfer: *Story of the Philippines*. Policy Research Working Paper No. 4298. Washington, D.C.: World Bank.
- Bordey, F. H., Moya, P. F., Beltran, J. C. and Dawe, D. C., eds. 2016. *Competitiveness of Philippine rice in Asia*. Science City of Muñoz, Philippines: Philippine Rice Research Institute.
- Decena, F. L. C. 2016. *Analysis of the effects of various irrigation service fees for national irrigation systems in the Philippines*. FFTC Agricultural Policy Article. Taipei, Taiwan Province of China: Food and Fertilizer Technology Center for the Asian and Pacific Region (FFTC-AP), [http://ap.fttc.agnet.org/ap\\_db.php?id=585](http://ap.fttc.agnet.org/ap_db.php?id=585)
- FAO (Food and Agriculture Organization of the United Nations). 2010. Global agro-ecological zones: Yield and production gaps, [www.fao.org/nr/gaez/about-data-portal/yield-and-production-gaps/en/](http://www.fao.org/nr/gaez/about-data-portal/yield-and-production-gaps/en/)
- Inocencio, A. B., Ureta, C., Baulita, A. and Baulita, A. 2016. *Technical and institutional evaluation of selected national and communal irrigation systems and characterization of irrigation sector governance structure*. Discussion Paper Series No. 2016-12. Quezon City, Philippines: Philippine Institute for Development Studies.
- JICA (Japan International Cooperation Agency). 2012. *Impact evaluation of the Bohol Irrigation Project (Phase 2) in the Republic of the Philippines*. Tokyo, [http://open\\_jicareport.jica.go.jp/pdf/1000008651.pdf](http://open_jicareport.jica.go.jp/pdf/1000008651.pdf)
- Kakuta, I. 2014. Impact of participatory irrigation management on the Bohol Irrigation Project in the Philippines. *Journal of the Institute for Asian Studies*, 41: 123-162.
- Nguyen, M. R., Rola, A. C., Arcala-Hall, R., Lizada, J. C., Abansi, C. L. and David, M. E. 2015. Comparative analysis of the national and communal irrigation systems' water governance: The Philippines case. *Journal of Public Affairs and Development*, 2(2): 1-35.
- OECD (Organisation for Economic Co-operation and Development). 2017. *Agricultural policies in the Philippines*. Paris: OECD Publishing. [www.oecd-ilibrary.org/docserver/download/5117011e.pdf?expires=1513772073&id=id&accname=ocid195767&checksum=B17BBA91326D0491351C324F8CBA9855](http://www.oecd-ilibrary.org/docserver/download/5117011e.pdf?expires=1513772073&id=id&accname=ocid195767&checksum=B17BBA91326D0491351C324F8CBA9855)
- Palmer-Jones, R., Dilokkunanant, N., Phonyiam, B., Punyaratabandhu, S., Sutthiwongse, T. and Hanpongpanth, S. 2012. *Impact evaluation of Mae Lao Irrigation Improvement project, Thailand*. 3ie Grantee Final Report. Washington, D.C: International Initiative for Impact Evaluation (3ie).
- Pinoy Rice Knowledge Bank. 2017. Palay Check system for the Philippine irrigated lowland rice, [www.pinoyrice.com/palaycheck/](http://www.pinoyrice.com/palaycheck/)
- President of the Philippines. 2017. *Executive Order No. 23: Extending the effectivity of the most-favoured-nation rates of duty on certain agricultural products under Republic Act No. 10863*, [www.officialgazette.gov.ph/2017/04/28/executive-order-no-23-s-2017/](http://www.officialgazette.gov.ph/2017/04/28/executive-order-no-23-s-2017/)
- PSA (Philippine Statistics Authority). 2016. *Highlights of the Philippines population 2015 Census of Population*. Quezon City, Philippines, <https://psa.gov.ph/content/highlights-philippine-population-2015-census-population>
- Rosegrant, M. W., Perez, N., Pradesha, A. and Thomas, T. S. 2016. *The economywide impacts of climate change on Philippine agriculture*. Climate Change Policy Note 1. Washington, D.C.: International Food Policy Research Institute.
- WFP (World Food Programme). 2017. *Food security and nutrition in the Philippines*. Strategic Review, <https://docs.wfp.org/api/documents/WFP-0000015508/download/>







## PART III

---

# **Analysing the evidence on thematic activities**

# Land administration interventions: a systematic review

by  
**Daniel Higgins**  
**Tim Balint**  
**Harold Liversage**  
**Paul Winters**

The agenda for the Sustainable Development Goals (SDGs) cites secure access to land as a key means of meeting SDG 2: “end hunger, achieve food security and improved nutrition and promote sustainable agriculture.” With proof of ownership and reduced risk of appropriation, rural households with secure tenure are expected to: invest more in production and land conservation (Meinzen-Dick, 2009); have greater access to collateral-based credit (De Soto, 2000); rent and sell their land with more ease (Deininger and Binswanger, 1999); and experience less land-related conflict (Nuesiri, 2014). In addition, land tenure security is expected to contribute to women’s empowerment when women’s names are included on land titles (USAID, 2016).

These perceived benefits have led to large investments in land tenure interventions, particularly through national land reform, which has been widespread across Asia and Africa since the early 1990s (Holden, Otsuka and Deininger, 2013). Specific activities implemented have consisted mainly of:

- demarcating and issuing formal titles to already-held land parcels;
- allocating and redistributing formally registered land to those with low landholdings;
- strengthening institutions tasked with administering land ownership;
- raising awareness of land rights and how to obtain them.

Despite the investments by governments and donor agencies, questions remain over the validity of the expected benefits of land tenure security. Many observers call for more clarity on how best to implement land tenure security interventions in complex contexts (Everest-Phillips, 2008; Gignoux, Macours and Wren-Lewis, 2013). To help fill this knowledge gap, IFAD commissioned a systematic review of high-quality evidence on the effects of strengthening rural peoples’ land tenure security in an effort to gain insights for a key area of its portfolio. This review aims to test the expected effects and to provide insights to guide policy and practice, taking advantage of the significant number of studies published since a similar review was conducted in 2012 (Lawry et al., 2017).

The systematic review presented in this chapter is the only known example of such a rigorous review being conducted based on one organization’s portfolio, and it is expected to be the first in a series of reviews of various IFAD-funded activity types. In considering all forms of land tenure security activity, the review’s insights are also applicable to non-IFAD projects. Moreover, the review has additional external value as a potential best-practice example of how to systematically use evidence in decision-making within a development organization.



## Review methodology

Owing to its rigour and neutrality, the systematic review methodology is considered the gold standard among approaches to literature reviews (Bryman, 2008). This review followed the standard procedure for the method (Higgins and Green, 2011), first conducting an exhaustive search of all relevant sources of published and unpublished literature for relevant studies, using a detailed set of predefined inclusion criteria.<sup>21</sup> These criteria restricted eligible studies to those undertaken after 1990 that: (1) use quantitative or qualitative data to investigate the impact of land tenure security in a middle- or low-income country; and (2) use a methodology that exceeds a specified level of rigour. For the second criterion, quantitative studies were mainly required to have assessed the effects of land tenure security using a well-constructed comparison/control group, and qualitative studies needed to perform well on the widely used Critical Appraisal Skills Programme checklist (CASP, 2015). Eligible studies were also given a ranking for their methodological rigour, which was then considered when interpreting the study findings.

The research team synthesized the studies identified through the search using the narrative approach, which was conducted in a way that ensured that the findings of all studies were considered. Another method of synthesizing

study findings in a systematic review is to combine the quantitative study results through a meta-analysis, producing aggregate estimates of effects on a given outcome (McDonald, 2008). However, given the review's coverage of a wide range of land tenure activities, contexts and outcomes, and its aim of drawing rich in-depth insights, the research team decided that such aggregate figures would not suit the nature or purpose of the review.

## Review findings

### Distribution of the research base

From among almost 30,000 identified studies, 278 were selected as eligible based on title and abstract screening. After full-text screening and assessment of methodological quality, a final set of 59 studies – 36 based on quantitative data, and 23 based on qualitative data – were selected for a transparent and neutral synthesis of their findings.

Figure 9.1 shows the distribution of studies by publication/completion year. No eligible studies from 1990-1999 were identified, and a particularly high number were identified from the past five years. These two results could be due to an increasing research focus on land tenure effects, or to recent improvements in methodological rigour.

**Figure 9.1** Distribution of studies by publication year



21. The search was conducted between February and April 2016.

Table 9.1 shows the distribution of studies by location, with countries in Asia and the Pacific, and in East and Southern Africa receiving the most focus. In terms of individual countries, Ethiopia, China, Viet Nam and Peru were the most covered – unsurprising given their histories of land reform measures.

Table 9.2 shows the distribution of studies by their methodology and their ranking for methodological rigour. Few studies, either quantitative or qualitative, scored highly in terms of methodological rigour. Among quantitative studies, only two employed the randomized control trial design for constructing a comparison/control group, and many of the qualitative studies did not report enough details of the research method to justify a higher ranking.

In terms of the specific focus of the studies and the outcomes they assessed, both the quantitative and qualitative studies investigated mainly land reforms, and interventions that issued land ownership certificates and conducted land parcel mapping. A number also assessed the effects of varying levels of land tenure status in non-intervention settings. The quantitative studies mainly focused on how interventions affected investment, and some also assessed effects on credit access and income. Few focused on agricultural productivity, land rental, land sales, or conflict. Qualitative studies were concerned mainly with how the interventions and reforms were implemented rather than the outcomes themselves.

**Table 9.1** Distribution of studies by location

Region/country	Number of studies
<b>Asia and the Pacific</b>	<b>24</b>
China	6
Viet Nam	5
India	4
Cambodia	2
Fiji	2
Pakistan	1
Philippines	2
Nepal	1
Tajikistan	1
<b>Latin America and Caribbean</b>	<b>10</b>
Peru	5
Bolivia (Plurinational State of)	2
Guatemala	1
Mexico	1
Nicaragua	1

Region/country	Number of studies
<b>Sub-Saharan Africa</b>	<b>25</b>
<b>East and Southern Africa</b>	<b>21</b>
Ethiopia	8
Uganda	4
South Africa	3
United Republic of Tanzania	2
Madagascar	1
Malawi	1
Rwanda	1
Zimbabwe	1
<b>West and Central Africa</b>	<b>4</b>
Ghana	2
Benin	1
Democratic Republic of the Congo	1

**Table 9.2** Distribution of studies by methodology and ranking

Study type	Number of studies
Quantitative studies	
Methodology	
Instrumental variable	14
Propensity score matching (PSM)	8
Difference-in-difference (DD)	6
PSM and DD	4
Randomized control trial	2
Regression discontinuity	2
Risk of bias level	
Low	2
Medium-low	15
Medium-high	19
Qualitative studies	
Grade	
A	3
B	6
C	14

### Themes in the study findings

The findings of the 59 identified studies can be separated into those focusing on the economic, social and environmental effects of land tenure security. Although the studies analyse different settings (ranging from different land tenure security interventions to situations where land tenure security already exists), evidence for positive effects across such different settings can provide an evidence-based rationale for investments in land tenure security.

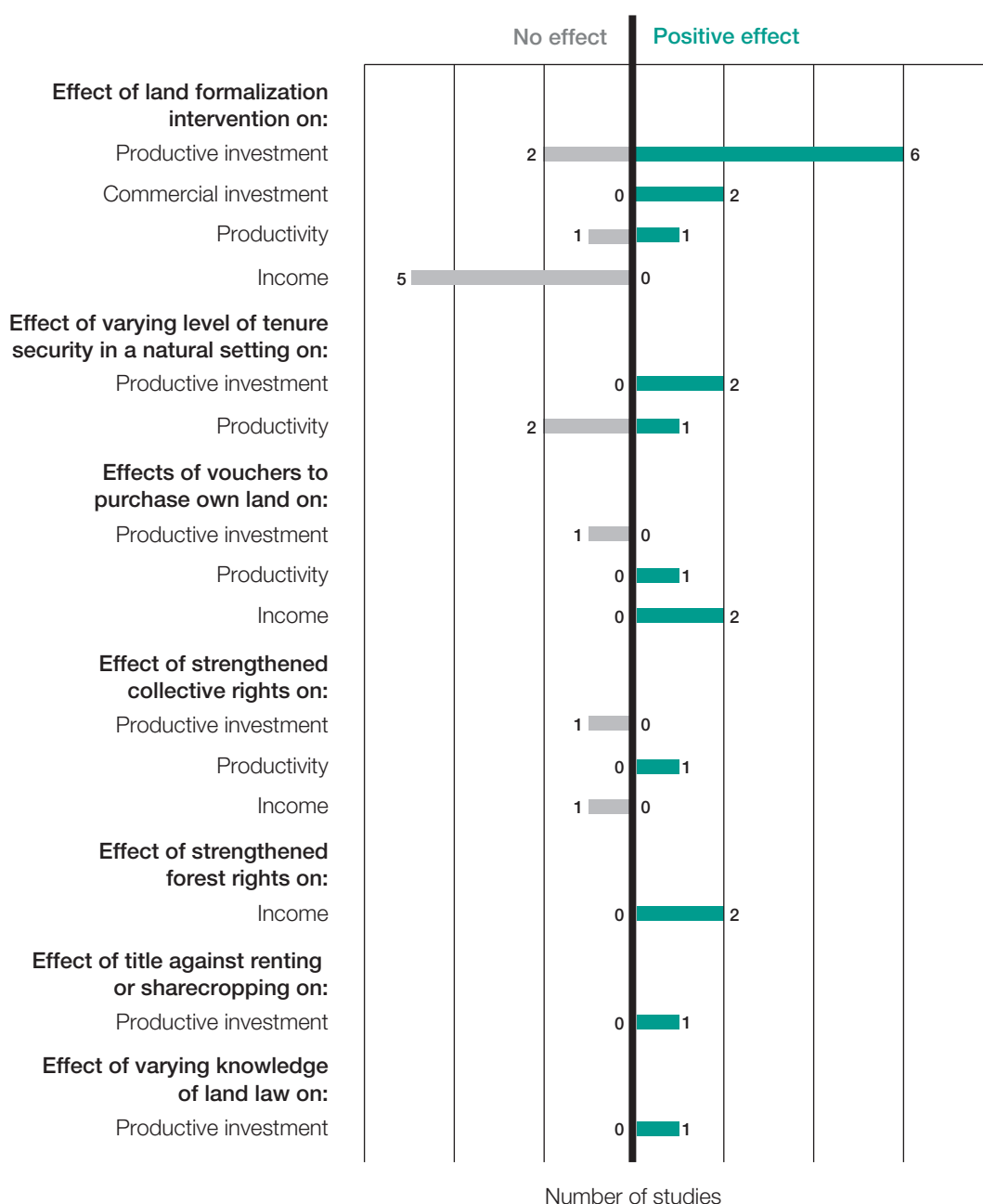
#### Economic effects

Productive investment, productivity and income were among the most heavily studied effects in the identified studies. Figure 9.2 presents the findings

of the included quantitative studies on these three outcomes, separating them by study focus. The findings show a clear divergence between investment and income effects, with the majority of studies showing positive effects on investment but not on income. With most of the studies focusing on reasonably short periods, it is unclear whether this divergence occurs because the expected income effect is not valid – which would be surprising given the support for positive investment effects – or because the studies did not have time to capture the income effects that may have followed increased investment.

Some qualitative studies highlight factors that may mitigate the economic effects. Many studies noted that formally titled households still

**Figure 9.2** Quantitative results of land tenure security on productive investment, productivity and income



perceived their tenure security to be low, most often as a result of past experience of state-led land appropriation, and as a result they did not change their investment behaviour. In addition, many qualitative studies found that certain groups – mainly women, minorities and the very poorest – were often hindered or excluded from obtaining titles through interventions and reforms, mainly because of discrimination,

corruption, elite capture, and expensive, complex application procedures within local land administration institutions.

The other main expected economic effect of land tenure security is improved credit access, but it received little support from the quantitative or qualitative studies that investigated this link. According to the qualitative studies, the main explanation was that lending institutions often

employ non-collateral-based lending policies, thus nullifying the mechanism through which credit access is expected to improve. In addition, households were found to face other barriers to credit access unrelated to land tenure security, including excessive distance from lending institutions, and long and complex loan application processes.

### Social effects

The quantitative studies found unanimously positive effects on gender empowerment for interventions that specifically target women's secure land access. However, three of the four studies were based in one country – India – raising doubts about whether the effect crosses contexts. Moreover, one qualitative study of a joint-titling programme, which found positive effects for joint-titled women, noted that women were often excluded from participating, either by their spouses or by local institutions.

Another social effect commonly expected from land tenure security is a reduction in conflict over land. Although the handful of quantitative studies that tested this effect produced inconclusive outcomes, some of the qualitative studies provided important insights. The most salient was that interventions that do not pay proper consideration to the pre-existing land administration system can actually increase land contestation, either through ineffective land mapping or by disrupting and weakening existing mechanisms for conflict resolution.

### Environmental effects

Eight quantitative studies assessed the effect of land tenure security on environmentally beneficial investment, using indicators such as organic fertilizer use and frequency of land fallowing. Few focused on any other environmental outcomes, such as soil degradation or deforestation.

Of the studies focused on conservation investments, all but one observed a positive effect. A number of qualitative studies suggest that these effects were probably caused by households being induced to take a longer-term

approach to farming, in the knowledge that their land was safe from appropriation. However, other qualitative studies noted that poorly designed or poorly implemented interventions can actually induce overfarming of titled land. This result occurred mainly when households were required to provide ongoing payments for their land title or were threatened with eviction if the land was not used. In these cases, neither actual nor perceived security was increased, leading to detrimental effects on the environment.

## Key implications of review findings

This review aimed to use high-quality evidence to test the expected benefits of land tenure security and to generate insights to inform future work using land tenure security to reduce poverty and to promote rural development. The synthesized findings of 59 studies identified through an exhaustive search point to the following policy, practice and research implications:

- It is valid to expect increased land tenure security to lead farmers to invest more in agricultural production and land conservation. However, interventions must ensure that farmers' perceptions of tenure security increase along with their actual tenure status; whether farmers trust the state to protect their access rights is a key consideration. Interventions must also address the potential economic and social barriers – discrimination, long and expensive application procedures, and elite capture of land administration institutions – facing intended beneficiaries.
- The expected increase in credit access seemingly relies on a number of contingent factors. Practitioners hoping to improve credit access using land tenure security should assess whether local lending institutions have collateral-based lending policies, are within spatial reach of beneficiaries, and have manageable application processes. On the demand side, in light of the positive findings on

investment in the absence of a credit effect, practitioners should also consider whether beneficiaries are actually capital constrained and, therefore, in need of credit.

- There appears to be strong potential for boosting women's empowerment by improving their access to secure land, although more research is needed on interventions beyond India. However, to ensure that all women can benefit, the research highlights the need to understand community and household gender dynamics, and the other potential barriers women face in obtaining secure access to land.
- To avoid increasing the level of land conflict or producing other unintended effects, land tenure security interventions should seek to fully understand existing land administration systems, and to align activities with them accordingly.
- Further research is required in a number of areas: (1) capturing the longer-term effects of land tenure security; (2) assessing the effect of women-focused land tenure interventions on gender empowerment beyond India; and (3) filling the research gaps relating to effects on land rental, land sales and conflict.

The results of this review will feed into the Global Land Indicators Initiative to help produce better impact measurement indicators and techniques. In collaboration with the Millennium Challenge Corporation, IFAD is also developing an interactive study database that the development community can use as a one-stop source for high-quality land tenure security studies.

## References

### General references

- Bryman, A. 2008. *Social research methods*. Third edition. Oxford: Oxford University Press.
- CASP (Critical Appraisal Skills Programme). 2017. *CASP qualitative checklist*, [http://docs.wixstatic.com/ugd/dded87\\_25658615020e427da194a325e7773d42.pdf](http://docs.wixstatic.com/ugd/dded87_25658615020e427da194a325e7773d42.pdf)
- De Soto, H. 2000. *The mystery of capital: Why capitalism triumphs in the West and fails everywhere else*. New York, USA: Basic Books.
- Deininger, K. and Binswanger, H. 1999. The evolution of the World Bank's land policy: Principles, experience, and future challenges. *World Bank Research Observer*, 14(2): 247-276.
- Everest-Phillips, M. 2008. *The myth of "secure property rights": Good economics as bad history and its impact on international development*. SPIRU Working Paper No. 23. London: Overseas Development Institute, Strategic Policy Impact and Research Unit.
- Gignoux, J., Macours, K. and Wren-Lewis, L. 2013. *Evaluating the impact of land administration programs on agricultural productivity and rural development*. IDB Technical Note No. IDB-TN-506. Washington, D.C.: Inter-American Development Bank.
- Higgins, J. P. T. and Green, S., eds. 2011. *Cochrane handbook for systematic reviews of interventions*. Version 5.1.0 [updated March 2011]. The Cochrane Collaboration, [www.handbook.cochrane.org](http://www.handbook.cochrane.org)
- Holden, S., Otsuka, K. and Deininger, K. 2013. Land tenure reforms, poverty and natural resource management: Conceptual framework. In S. Holden, K. Otsuka and K. Deininger, eds. *Land tenure reform in Asia and Africa: Assessing impacts on poverty and natural resource management*. London: Palgrave Macmillan.



Lawry, S., Samii, C., Hall, R., Leopold, A., Hornby, D. and Mtero, F. 2017. The impact of land property rights interventions on investment and agricultural productivity in developing countries: A systematic review. *Journal of Development Effectiveness*, 9(1): 61-81.

McDonald, J. H. 2008. *Handbook of biological statistics*. Baltimore, USA: Sparky House.

Meinzen-Dick, R. 2009. *Property rights for poverty reduction?* DESA Working Paper No. 91. New York, USA: United Nations Department of Economic and Social Affairs.

Nuesiri, E. O. 2014. *Secure tenure must be the foundation of adaptation in East and Southern Africa*. Conflict sensitive adaptation: Use human rights to build social and environmental resilience. Brief 4. Indigenous Peoples of Africa Co-ordinating Committee and IUCN Commission on Environmental, Economic and Social Policy.

USAID (US Agency for International Development). 2016. *Fact sheet: Land tenure and women's empowerment*. Washington, D.C., [www.land-links.org/issue-brief/fact-sheet-land-tenure-womens-empowerment](http://www.land-links.org/issue-brief/fact-sheet-land-tenure-womens-empowerment)

### References for quantitative studies identified through the search

Ali, D. A., Deininger, K. and Goldstein, M. 2014. Environmental and gender impacts of land tenure regularization in Africa: Pilot evidence from Rwanda. *Land and Property Rights*, 110: 262-275.

Ameha, A., Nielsen, O. J. and Larsen, H. O. 2014. Impact of access and benefit sharing on livelihoods and forest: Case of participatory forest management in Ethiopia. *Ecological Economics*, 97: 162-171.

Bellemare, M. F. 2013. The productivity impacts of formal and informal land rights: Evidence from Madagascar. *Land Economics*, 89(2): 272-290.

Brulé, R. 2010. Changes in India's rights regime and the implications for gender parity: Evidence from regression discontinuity analysis of panel data for 17 Indian states. American Political Science Association 2010 annual meeting paper.

Deininger, K. and Jin, S. 2002. The impact of property rights on households' investment, risk coping, and policy preferences: Evidence from China. *Economic Development and Cultural Change*, 51(4): 851-882.

Deininger, K., Ali, D. A. and Alemu, T. 2009. Impacts of land certification on tenure security, investment and land market participations: Evidence from Ethiopia. *Land Economics*, 87(2): 312-334.

Deininger, K., Ayalew, D. and Yamano, T. 2006. *Legal knowledge and economic development: The case of land rights in Uganda*. World Bank Policy Research Working Paper 3868. Washington, D.C.: World Bank.

Deininger, K., Goyal, A. and Nagarajan, H. 2010. *Inheritance law reform and women's access to capital: Evidence from India's Hindu Succession Act*. World Bank Policy Research Paper No. 5338. Washington, D.C.: World Bank.

Do, Q.-T. and Iyer, L. 2007. Land titling and rural transition in Vietnam. *Economic Development and Cultural Change*, 56(3): 531-579.

Dower, P. C. and Pfutze, T. 2013. Specificity of control: The case of Mexico's ejido reform. *Journal of Economic Behaviour and Organisation*, 91: 13-33.

Fatema, N. and Kibriya, S. 2015. Can land and food entitlement reduce conflict? Evidence from violence prone Eastern DR Congo. Selected paper prepared for presentation at the 2015 Agricultural and Applied Economics Association and Western Agricultural Economics Association Joint Annual Meeting, San Francisco, CA, July 26-28.

- Field, A. J., Field, E. and Torero, M. 2006. *Property rights and crop choice in rural Peru, 1994-2004*. MTID Discussion Paper No. 100. Washington, D.C.: International Food Policy Research Institute.
- Fort, R. 2008. The homogenization effect of land titling on investment incentives: Evidence from Peru. *NJAS – Wageningen Journal of Life Sciences*, 55(4): 325-343.
- Gelo, D. and Koch, S. F. 2014. The impact of common property right forestry: Evidence from Ethiopian villages. *World Development*, 64: 395-406.
- Goldstein, M., Hounbedji, K., Kondylis, F., O'Sullivan, M. and Selod, H. 2015. *Formalizing rural land rights in West Africa: Early evidence from a randomized impact evaluation in Benin*. Policy Research Working Paper No. 7435. Washington, D.C.: World Bank.
- Gordoncillo, P. U. 2012. The economic effects of the Comprehensive Agrarian Reform Programme in the Philippines. *Journal of ISSAAS (International Society for Southeast Asian Agricultural Sciences)*, 18(1): 76-86.
- Hagos, H. G. and Holden, S. 2013. *Efficiency and productivity differential effects of land certification program in Ethiopia*. IFPRI Discussion Paper 01295. Washington, D.C.: International Food Policy Research Institute.
- Ito, J., Bao, Z. and Ni, J. 2016. Land rental development via institutional innovation in rural Jiangsu, China. *Food Policy*, 59: 1-11.
- Kemper, N., Ha, L. V. and Klump, R. 2015. Property rights and consumption volatility: Evidence from a land reform in Vietnam. *World Development*, 71: 107-130.
- Kemper, N., Klump, R. and Schumacher, H. 2011. Representation of property rights and credit market outcomes: Evidence from a land reform in Vietnam. *Proceedings of the German Development Economics Conference*, Berlin, No. 45.
- Keswell, M. and Carter, M. 2011. *Poverty and land distribution: Evidence from a natural experiment*. UNU-WIDER Working Paper No. 2011/46. Helsinki: United Nations University – World Institute for Development Economics Research.
- Kousar, R. and Abdulai, A. 2015. Impact of non-farm work and land tenancy contracts on soil conservation measures. Paper prepared for the 88th annual conference of the Agricultural Economics Society, April 9-11, 2014, Paris.
- Kumari, R. and Nakano, Y. 2015. *Does land lease tenure insecurity cause decreased productivity and investment in the sugar industry? Evidence from Fiji*. Tsukuba Economics Working Papers No. 2015-001. Tsukuba, Japan: University of Tsukuba.
- Lawson-Remer, T. 2013. Do stronger collective property rights improve household welfare? Evidence from a field study in Fiji. *World Development*, 43: 207-225.
- Li, G., Rozelle, S. and Huang, J. 2000. *Land rights, farmer investment incentives, and agricultural production in China*. Working Paper No. 00-024. Davis, USA: University of California, Davis, Department of Agricultural and Resource Economics.
- Ma, X., Heerink, N., van Ierland, E. C., van den Berg, M. and Shi, X. 2013. Land tenure security and land investments in Northwest China. *China Agricultural Economic Review*, 5(2): 281-307.
- Macours, K. 2009. *Land titles and conflicts in Guatemala*. IDB Working Paper CS 1-164. Washington, D.C.: Inter-American Development Bank.
- Markussen, T. 2008. Property rights, productivity, and common property resources: Insights from rural Cambodia. *World Development*, 36(11): 2277-2296.
- Mendola, M. and Simtowe, F. 2015. The welfare impact of land redistribution: Evidence from a quasi-experimental initiative in Malawi. *World Development*, 72: 53-69.

Nakasone, E. 2011. *The impact of land titling on labor allocation: Evidence from rural Peru*. IFPRI Discussion Paper 01111. Washington, D.C.: International Food Policy Research Institute.

Petracco, C. K. and Pender, J. 2009. *Evaluating the impact of land tenure and titling on access to credit in Uganda*. IFPRI Discussion Paper 00853. Washington, D.C.: International Food Policy Research Institute.

Reyes-Garcia, V., Orta-Martinez, M., Gueze, M., Luz, A. C., Paneque-Galvez, J., Macia, M. J. and Pinto, J. 2012. Does participatory mapping increase conflicts? A randomized evaluation in the Bolivian Amazon. *Applied Geography*, 34: 650-658.

Santos, F., Fletschner, D., Savath, V. and Peterman, A. 2014. Can government-allocated land contribute to food security? Intrahousehold analysis of West Bengal's Microplot Allocation program. *World Development*, 64: 860-872.

Wiig, H. 2013. Joint titling in rural Peru: Impact on women's participation in household decision-making. *World Development*, 52: 104-119.

Xie, L., Berck, P. and Xu, J. 2016. The effect on forestation of the collective forest tenure reform in China. *China Economic Review*, 38: 116-129.

### References for qualitative studies identified through the search

Ali, D. A., Collin, M., Deininger, K., Dercon, S., Sanderfur, J. and Zeitlin, A. 2014. *The price of empowerment: Experimental evidence on land titling in Tanzania*. World Bank Policy Research Paper 6908. Washington, D.C.: World Bank.

Antwi-Agyei, P., Dougill, A. J. and Stringer, L. C. 2015. Impacts of land tenure arrangements on the adaptive capacity of marginalised groups: The case of Ghana's Ejura Sekyedumase and Bongo districts. *Land Use Policy*, 49: 203-212.

Bajracharya, B. 2008. Institutional factors that influence access of the poor to forest benefits: Case studies of community and leasehold

forestry regimes in Nepal. PhD dissertation, Massey University.

Bezu, S. and Holden, S. 2014. Demand for second-stage land certification in Ethiopia: Evidence from household panel data. *Land Use Policy*, 41: 193-205.

Bose, P. 2013. Individual tenure rights, citizenship, and conflicts: Outcomes from tribal India's forest governance. *Forest Policy and Economics*, 33: 71-79.

Bradstock, A. 2006. *Implementing land reform in South Africa's Northern Cape Province*. Network Paper No. 137. London: Overseas Development Institute, Agricultural Research and Extension Network.

Broegaard, R. B. 2009. Land access and titling in Nicaragua. *Development and Change*, 40: 149-169.

Cardona, W. C., de Jong, W., Zuidema, P. A. and Boot, R. 2014. Diverse local regulatory responses to a new forestry regime in forest communities in the Bolivian Amazon. *Land Use Policy*, 39: 224-232.

Castella, J.-C., Boissau, S., Thanh, N. H. and Novosad, P. 2006. Impact of forestland allocation on land use in a mountainous province of Vietnam. *Land Use Policy*, 23(2): 147-160.

Chen, J. and Innes, J. L. 2013. The implications of new forest tenure reforms and forestry property markets for sustainable forest management and forest certification in China. *Journal of Environmental Management*, 129: 206-215.

Gondo, T. and Kyomuhendo, V. 2011. Between reality and rhetoric in land conflicts: An anecdotal anatomy of the lawful, bonafide occupants and customary tenants in Kyenjonjo district, Uganda. *Land Tenure Journal*, 1: 27-50.

Keating, N. B. 2013. Kuy alterities: The struggle to conceptualise and claim Indigenous land rights in neoliberal Cambodia. *Asia Pacific Viewpoint*, 54(3): 309-322.

- Kuusaana, E. D. and Bukari, K. N. 2015. Land conflicts between smallholders and Fulani pastoralists in Ghana: Evidence from the Asante Akim North District (AAND). *Journal of Rural Studies*, 42: 52-62.
- Mazhawidza, P. and Manjengwa, J. 2011. *The social, political and economic transformative impact of the Fast Track Land Reform on the lives of women farmers in Goromonzi and Vungu-Gweru Districts of Zimbabwe*. Harare: Women Farmers Land and Agriculture Trust and Center for Applied Social Sciences, University of Zimbabwe.
- Mukhamedova, N. and Wegerich, K. 2014. *Land reforms and feminization of agricultural labor in Sughd province, Tajikistan*. IWMI Research Report No. 157. Colombo: International Water Management Institute.
- Pedersen, R. H. 2015. A less gendered access to land? The impact of Tanzania's new wave of land reform. *Development Policy Review*, 33(4): 415-432.
- Rakolojane, M. J. 2013. The gender dimensions of land reform in South Africa: A case study of Daggakraal Rural Housing and Resettlement project. PhD dissertation, University of South Africa.
- Sikor, T. 2006. Politics of rural land registration in post-socialist societies: Contested titling in villages of northwest Vietnam. *Land Use Policy*, 23(4): 617-628.
- Shibeshi, G. B. 2012. Lessons from systematic evaluation of land administration systems: The case of Amhara National Regional State of Ethiopia. *World Development*, 68: 282-295.
- Teklu, A. 2005. *Land registration and women's land rights in Amhara region, Ethiopia*. London: International Institute for Environment and Development.
- Van Leeuwen, M. 2015. Localising land governance, strengthening the state: Decentralization and land tenure security in Uganda. *Journal of Agrarian Change*, 17(1): 208-227.
- Vista B. M., Nel, E. and Binns, T. 2012. Land, landlords and sustainable livelihoods: The impact of agrarian reform on a coconut hacienda in the Philippines. *Land Use Policy*, 29(1): 154-164.
- Yami, M. and Snyder, K. A. 2015. After all, land belongs to the state: Examining the benefits of land registration for smallholders in Ethiopia. *Land Degradation Development*, 27(3): 465-478.

# Smallholder irrigation in a broader productivity and value chain framework: implications for IFAD investments

by  
Chandra Madramootoo  
Rui Benfica

Irrigation is critical for smallholder agriculture. Insufficient rainfall, changing weather patterns, and climatic variability all reduce crop yields and often lead to crop failure and food scarcity. In arid and semi-arid regions, prolonged drought has led to hunger and malnutrition, and in some cases to famine.

Irrigation offers protective insurance against variations in rainfall and drought. It meets cropwater demands by increasing soil moisture and, if properly managed, enhances plant uptake of nutrients. It leads to changes in cropping patterns – farmers who depend on rainfall generally have only one cropping season per year, whereas irrigation permits at least two cropping seasons a year. Irrigation supports the production of high-value crops and improves overall crop quality. Recent studies show that beneficial agricultural management practices in combination with irrigation increase food production and minimize the impacts of climate change on food security (Verge, De Kimpe and Desjardins, 2007; Heard et al., 2012). Apart from food security, irrigation systems, if properly designed and managed, can contribute to poverty alleviation and environmental sustainability (Walker, 1989; Madramootoo, Wiyo and Enright, 1992; Hussain and Hanjra, 2004; Hanjra, Tadele and Gutta, 2009; Dukhovny, 2011), and drive economic development (Sezen et al., 2010; Gao et al., 2012).

Irrigation covers about 16 per cent of the world's cropland, and these irrigated lands make a disproportionate contribution to global food security, producing 36 per cent of the world's food (World Food Summit, 1996). However, irrigated area is unevenly distributed worldwide, and net irrigated area is declining. Whereas agricultural land under irrigation was estimated to be about 263 million hectares in the mid-1990s, in 2013 it was estimated at about 255 million hectares (Amede, 2015). More than 70 per cent of the irrigated area is in Asia. Sub-Saharan Africa, a highly food-insecure region, has just over 3 per cent of the irrigated area (FAO, 2016). While the area that could be exploited globally for irrigation could be significantly more 300 million hectares, there are several constraints to achieving this potential, particularly in Africa. These constraints include: inadequate technical skills and institutional capacity; lack of financial capital (You et al., 2010); problems with water and land rights (Gunda et al., 2013; Wanvoeke et al., 2016); transboundary constraints; future climates (Muller et al., 2015); and difficulties obtaining the necessary environmental permits.

Over the years, IFAD has made loan and grant funds available for the development of new irrigation schemes, rehabilitation of existing schemes, the capacity-building of water user associations (WUAs), and strengthening processes such as irrigation management

**Box 10.1** IFAD's programmatic approach to water/irrigation investments by geographic region

Region	Programmatic focus
West and Central Africa	Small-scale garden irrigation; watershed management; soil and water conservation; water harvesting, small dams and ponds, tube wells; lowland development for rice irrigation; climate-smart agriculture; economic poles/clusters; value chains.
East and Southern Africa	Irrigation infrastructure expansion, rehabilitation and modernization; watershed and land management; water resources and basin development; soil and water management; adaptation to climate change; farmer capacity- and institution-building; markets and value chains.
Asia and the Pacific	Improvements in irrigation infrastructure; expansion of irrigation facilities; water harvesting, pond and tube-well development; drought proofing; drinking-water supply and sanitation; strengthening of water user associations; farmer capacity- and institution-building; markets and value chains.
Latin America and Caribbean	Limited involvement in irrigation in the region. Irrigation improvements; capacity-building of water user associations; natural-resource protection and management; water harvesting. Limited indication about markets and value chains in these water/irrigation projects.
Near East and North Africa	Irrigation development, expansion and rehabilitation; strengthening of water user associations; watershed management; soil and water conservation; climate-smart agriculture; markets and value chains.

transfers. This chapter argues that IFAD can significantly increase the water-use efficiency, irrigation system performance, and crop water and economic productivity of smallholder irrigation schemes, as well as the financial returns to irrigation, by linking the design, operation and management of irrigation systems to markets, value chains, and input supplies and services. It seeks to explore business opportunities and technological innovations in smallholder irrigation, and to develop a framework to inform programmatic development relevant to IFAD in building irrigation value chains.

## IFAD's irrigation portfolio

IFAD has few projects focused exclusively on water, and even fewer focused exclusively on irrigation. It currently has some 76 active projects with investments in irrigation/water, with only about 11 devoted primarily to both the hard and soft components of irrigation. While

these 11 projects focus primarily on smallholder irrigation systems, they include complementary components that cover capacity and institution building, management, extension and technical advice, markets, inputs, rural infrastructure and credit. Without these other functions and services, the irrigation projects could not achieve their full potential. The largest investments are in Asia and the Pacific. The primary characteristics of IFAD's irrigation investments in its five operational regions are shown in box 10.1.

## IFAD's approach to value chain development

IFAD recognizes that poverty reduction, economic resilience among the rural poor, and rural transformation are increasingly dependent on a value chain approach. Whereas in 1999 only 3 per cent of IFAD projects had a value chain development component, today that figure is more than 50 per cent. This significant increase



is linked to the adoption of IFAD's Private Sector Development and Partnership Strategy in 2005. While earlier value chain projects centred on cooperatives, today public-private-producer partnerships (4Ps) are being promoted.

IFAD projects use three types of value chain models: producer-driven, buyer-driven and intermediary-driven. In the producer-driven model, producers are organized in groups, associations or cooperatives that take on production and, sometimes, post-production functions aiming at capturing the largest share of the retail value. Through IFAD and other project support, these groups become strong enough to network, search for buyers and negotiate contracts with them. In many cases, they become the leaders of the value chains and are able to transform, process, transport and market their commodities themselves, thereby earning a higher share of value addition along the value chain. Examples of such models are most prominent in Latin America, where farmers' organizations are strong and well established. In the buyer-driven model, the private sector (e.g. processors, retailers, traders and wholesalers) organizes producers into suppliers through various contractual arrangements (e.g. outgrower schemes, contract farming and joint ventures). This model is particularly appealing when a private company is identified from the start of the project and the value chain is a large infrastructure or processing investment that only a private-sector entity can undertake. In the intermediary-driven model, the most common intermediary is usually an NGO or a service provider that brings the parties together, provides them with services (e.g. capacity building of farmers, information and sourcing to private companies, and networking between the parties), and brokers and monitors value chain linkages. This model is useful when the value chain linkages are not very strong, the private-sector presence is weak, and value chains are identified during project implementation.

There is no single right or optimal way to organize a value chain. Models will vary according to country, commodity, local context,

capacity of value chain actors, policy framework and the business environment. IFAD observes that, for commodity value chains where marketing arrangements or prices are controlled by governments, these tend to distort markets and displace the private sector.

## IFAD and irrigation value chains

Of the 76 active IFAD projects with a water/irrigation component, 43 have a component on value chains. Although in some projects the value chain model is not specified, most of the projects seem to favour the producer-driven and the intermediary-driven models, or a combination of the two. For example, the economic clusters that are part of the small garden irrigation projects in Benin and the Niger require producers and intermediaries, such as brokers and retailers, to work in tandem. The Market Access Alliances in Ethiopia's Participatory Small-Scale Irrigation Development Programme II (PASIDP II) are a combination of commodity organizations, farmers' organizations and retailers. The Swaziland Market-led Project links irrigated producers to small local traders and larger wholesalers, but is not a complete buyer-driven model. At present, the full buyer-driven model seems to be more oriented to outgrower schemes such as the Bagamoyo Sugar Infrastructure and Sustainable Community Development Programme in the United Republic of Tanzania.

## Emerging opportunities in irrigation value chains

Global demand for food is expected to at least double over the next 25 years. An emerging middle class, particularly in Asia, will also demand more higher-value food products. Therefore, smallholder irrigators will have multiple opportunities to contribute to local and regional food security, and to manage environmental services within watersheds. These scenarios will lead to more economic and financial opportunities for small irrigators.

However, to date, investments in value-chain irrigated agriculture are severely lacking in public smallholder irrigation schemes. Such investments have the potential to drive economic growth, reduce poverty, and fulfil domestic and global demand for agricultural products (Seville, Buxton and Vorley, 2011). Linking smallholders to markets and identifying which markets have the potential to benefit certain producers are crucial steps towards improving the livelihoods of the rural poor. The small irrigator is at the base of the economic pyramid, and the objective is to lift such smallholders from the bottom of the pyramid.

A new development pathway for the design of smallholder irrigation projects is proposed in order to enhance crop water productivity and to significantly augment the economic, social and environmental benefits of irrigated agriculture. The emphasis should be not just on upstream irrigation hardware components but also on the value chain – and particularly on lengthening the chain from irrigated production of high-value commodities to local, national, regional and international markets.

Stronger links between irrigators, farmers organizations and marketing systems could lead to a stronger asset base, new employment opportunities, and increased income generation in rural areas. Moreover, a more robust irrigation business enterprise model offers potential to leverage co-investments from the private sector, impact investors, venture capitalists, microcredit agencies, and emerging NGOs with a strong interest in agricultural value chains and financial inclusivity.

This development pathway is rooted in the inclusion of women and rural youth in irrigated agriculture, and in the emergence of new economic and employment opportunities for the people who depend on rural areas and agriculture for their livelihoods. Building value chains and markets will raise the asset base of women, indigenous groups and the rural poor. Through new entrepreneurship programmes around irrigation value chains, poorly educated youth, who represent almost 40 per cent of the agricultural workforce in rural areas, will be in a better economic and financial position.

## Strengthening IFAD's investments in irrigation value chains

An analysis of IFAD's work in irrigation value chains has revealed the following shortcomings:

- Few projects have significant investments in agroprocessing, cold storage and transportation.
- Most projects appear to lack investments in marketing infrastructure and marketing information systems.
- There are few successful examples of the 4Ps in current project execution.
- With the exception of the PASIDP II project, there is no strong attempt to link the irrigation water user associations to marketing organizations and value chains.
- Few projects address gender and inclusivity, and financial inclusivity, in the value chain.

Based on these observations, IFAD can improve its activities in irrigation value chains in several ways, as outlined below.

### **Increase private-sector involvement.**

Apart from the traders, wholesalers and outgrower schemes, there is little full private-sector involvement in irrigation value chains. More private-sector involvement should be encouraged given that, in conjunction with the public sector, private companies can help cover capital investments and logistics along the cold chain, including storage and transportation infrastructure. Moreover, the private sector can provide an integrated package of services, ranging from irrigation equipment and pumps to improved seed availability, agronomic advisory services, transport, grading and packaging, storage, agroprocessing and, ultimately, high-end markets. In addition, the private sector, mainly large commercial firms and multinationals, has experience with contract farming, whereby farmers are provided with seed, inputs and technical advice to grow specific high-quality products (cocoa, coffee, horticulture and potatoes). Contract farming with private firms also allows farmers to know in advance what their prices will be, and may also include mechanisms to pay farmers a premium price for top-quality products.

**Expand the scope of the 4Ps.** Given the high capital costs associated with irrigation, transportation and storage infrastructure, the 4Ps model should be explored much more significantly in irrigation value chains. It can be used to fund the high upfront investment costs of agricultural value chains, cover the risks, provide a stronger regulatory and contractual framework, and ensure fuller farmer participation. When farmers are involved structuring and implementing the value chains, they could be more fairly compensated.

**Enhance the intermediary-driven model.**

NGOs and companies are working to link small farmers to regional and global formal markets. An advantage of NGOs is that they put the farmer first, and they have the ability to raise funds from private investors, angel investors, venture capitalists, impact investors, financial intermediaries and microcredit agencies. Another emerging marketing mechanism consists of commodity exchanges. Buyers employed by the commodity exchange and working on commission can link to farmers in the field and offer prices based on commodity trading prices in markets in other countries. The goal is to have a pyramid whereby food producers are aggregated upward in the pyramidal structure, and the commodity exchange then purchases the raw commodities. The exchange deals with the aggregators at the top of the pyramid rather than with hundreds of small farmers at the bottom of the purchasing pyramid. This significantly reduces transaction costs.

## Challenges to successful value chains

Efforts to establish successful value chains face several hurdles. One is the lack of strong market intelligence systems in many developing countries. There are few institutionalized mechanisms for linking irrigated production to market demand, in terms of timely supplies of product in the right volumes to specific markets. Formal markets have requirements – such as quality, consistency, traceability, food safety and third-party certified standards – that necessitate

direct communication and coordination along the supply chain. Although these requirements raise the barrier to entry for new producers, they also present potential opportunities for diversification, income generation and high-end value-added production. Poor households in rural areas can also participate in formal supply chains as wage labourers in production, grading, sorting, labelling, handling or processing, and as providers in the service markets that support value chains (Seville, Buxton and Vorley, 2011).

Small and medium-sized companies have had mixed success with smallholder value chains. These companies are risk averse and need the financial backing of governments, which is not always forthcoming. In many instances, they are not able to pay the high costs of cold chain logistics, and they depend on government to pay for roads, electricity, transport and storage facilities. In some cases, small farmers do not honour contracts with these firms if they can suddenly obtain a better price elsewhere. In other cases, the firms do not honour the prices to small farmers if they suddenly have a glut of a specific commodity.

## A new irrigation business model

The proposed business model for new irrigation projects is tied to value chains, and it frames smallholder irrigation in a more sustainable financial, economic, environmental and social context (figure 10.1). By incorporating aspects of youth entrepreneurship, women's empowerment and gender inclusivity, the proposed business model can create new economic opportunities, jobs and wealth in rural areas.

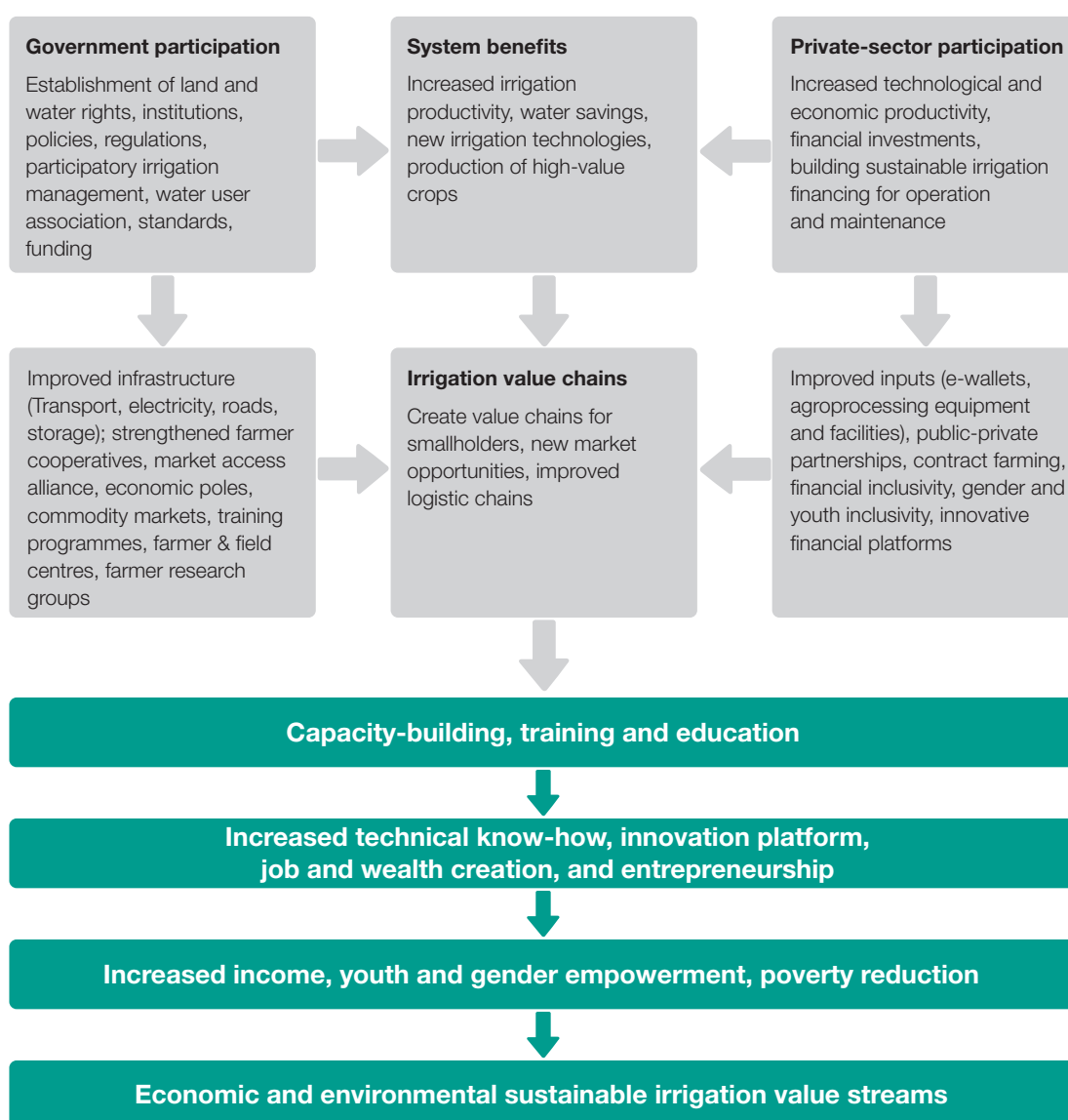
In both smallholder irrigation projects and value chain projects, IFAD has a unique opportunity to support women with access to training, productive assets (including rights to land and water) and financial tools so that they can more easily access concessionary credit. Any development of irrigation value chains should be firmly anchored in educating and promoting women as business managers. This will require a suite of training programmes not just on the technical aspects but in areas such as

purchasing, retailing, keeping financial records, understanding balance sheets, business development, financial planning, marketing, procurement, entrepreneurship and banking.

More than 40 per cent of the population in rural regions of developing countries are under the age of 18, and a large number of these people are unemployed. Creating irrigation value chains will stimulate the need for technicians, truck drivers and handlers, mechanics, packers and graders. IFAD is uniquely positioned to implement a signature programme in youth empowerment and inclusivity in irrigation value chains. Such a programme would require investments in short-term, hands-on, applied,

practical training courses at high schools, technical schools, and agricultural, technical and vocational education and training schools for disenfranchised youth. Training is also required in post-harvest handling techniques, food handling, preparation and recipe creation to promote consumption of traditional vegetables across cultures. At training hubs, farmers learn how to identify markets, grow vegetables that meet quality attributes required by specific consumers, and work collaboratively with other key players in a given value chain. The outcomes will be more opportunities for profitable self-employment in peri-urban and rural areas, and better production and consumption of nutritious value-added commodities.

**Figure 10.1** Proposed irrigation business model



## Innovation and entrepreneurship

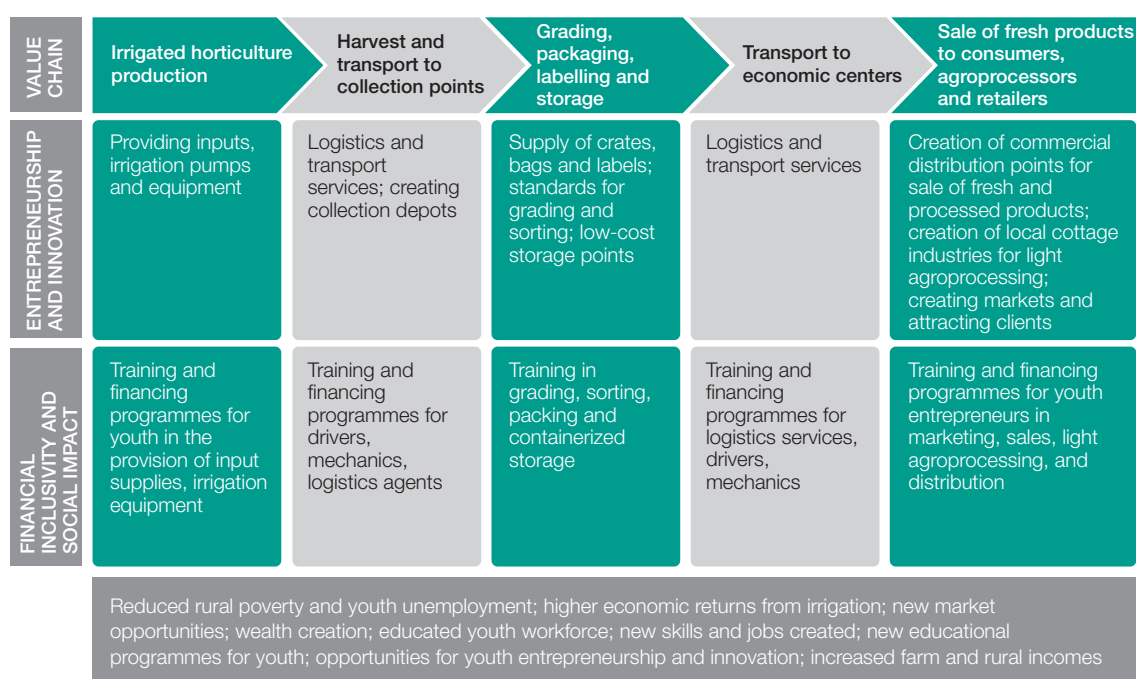
As part of the new business model for smallholder irrigation, there is an opportunity to develop a unique programme on innovation and entrepreneurship. Figure 10.2 shows a series of activities within the innovation and entrepreneurship pathway that are necessary for successful irrigation value chains.

A range of entrepreneurial capabilities will be required. Skilled people will be needed as pump and irrigation system technicians, truck drivers and handlers, mechanics, packers and graders. Local technical colleges and agricultural, technical and vocational education and training schools can train unemployed youth in such skills. In addition, women and young people can be employed in packinghouses and can

undertake small cottage-level agroprocessing – they will need training in food processing, food safety and quality control. New microcredit vehicles are required so that these skilled people can take out small loans to purchase hand tools and other items.

Technological innovations will also be necessary. For example, high energy costs and scarce energy availability in rural villages are impediments to prolonged shelf life and marketability of high-value, perishable commodities. Solutions could include solar-powered irrigation pumps, solar-cooled storage tents in the fields, and solar- or biofuel-powered transport systems. Another innovation is the use of e-wallets to procure credit and agricultural inputs, and to sell commodities, thereby minimizing the handling of cash, and cutting transaction costs.

**Figure 10.2** The development pathway towards building irrigation value chains



## Recommendations to advance IFAD's investment programme in smallholder irrigation

Based on the analyses conducted, meetings held with IFAD staff and leading international irrigation experts, this chapter makes several recommendations for advancing IFAD's investment programme in smallholder irrigation.

### Irrigation water management

These recommendations pertain to all geographic regions and are of equal importance:

- **Harvest and use rainwater efficiently.** More than 80 per cent of cultivated cropland worldwide relies on rainwater. Therefore, water harvesting, water conservation, soil moisture management, water-use efficiency, dryland cropping and conservation agriculture in the rainfed areas must continue to receive investments.
- **Continue to emphasize the multiple uses of water.** In rural areas, irrigation is the largest water user and is often the stimulus for providing water for other uses such as aquaculture, livestock, agroprocessing, water supply and sanitation. It would be good to formalize the broader water allocation, pricing and institutional framework for multiple-use systems, and to ensure that irrigation water supplies are not jeopardized.
- **Fit irrigation design and management into a holistic framework.** Irrigation practices must be in support of natural-resource management and integrated watershed management, and more emphasis must be placed on impacts of irrigation schemes on downstream water quality. This will mean working with environmental regulators and agencies to establish water-monitoring networks and to develop environmental management plans.
- **Play a stronger role in managing groundwater irrigation.** Given concerns about the injudicious pumping of groundwater and the depletion of aquifers, IFAD should place greater emphasis on

technical and institutional frameworks for groundwater use in irrigation in order to protect the resource and the terrestrial and aquatic ecosystems that depend on groundwater.

- **Adapt to climate change, improve water management in rainfed areas, and adopt climate-smart practices.** Drought, water scarcity and desertification will limit agricultural productivity. Therefore, investments in climate-smart agriculture should reflect funding of water conservation and water reuse, and make use of new sources of climate-resilient and green corridor funds.
- **Establish an IFAD study group on water productivity.** A study group on water productivity should identify the exact causes of low irrigation efficiencies by region, and define a package of technological improvements for enhancing efficiencies. In addition, the study group could use data from the Performance Management System for various IFAD water/irrigation projects to quantify both physical water productivity and economic water productivity for selected projects, and determine the scope for possible productivity increases.

### Technological innovations

These recommendations pertain to all regions and are prioritized as follows:

#### High priority

- **Promote water-saving technologies.** These technologies include, among others, improved on-farm water management, land levelling, and drip and microsprinkler irrigation. They can be combined with conservation agriculture and climate-smart agriculture to reduce greenhouse gas emissions and sequester soil carbon.
- **Control soil salinity in arid and semi-arid areas.** Mitigation measures are required in order to prevent and control soil salinity in both irrigated and rainfed schemes.



- **Introduce irrigation scheduling techniques.** Simple soil moisture sensors and weather stations installed in irrigation districts with support from WUAs can help conserve water and improve water-use efficiency.
- **Investigate the potential for water table control/subirrigation.** This technology is especially suited to lowland and river valley irrigation developments, particularly when adopted by several farmers in a drainage/irrigation district.

#### Lower priority

- **Examine new models for allocating and delivering water.** This includes shifting from a supply-driven irrigation system to one that is demand driven. To reduce current problems of over- and under-irrigation, existing irrigation systems will need to be re-engineered as part of investments in irrigation modernization.
- **Use modern water assessment models.** Apply integrated decision-making platforms comprising climate forecasting models, geographic information systems (GIS), and hydrological and crop models to assess water availability and water allocations for irrigation project designs.
- **Apply new irrigation sensor technologies for precision irrigation management.** This involves the use of automated weather stations, soil sensors, and remote sensing of soil, climate and crop stress to schedule irrigation, thereby conserving water and improving water-use efficiency.

#### Value chain development

These recommendations pertain to all geographic regions and are of equal importance:

- **Tie irrigation investments more closely to value chains.** Appropriate business models need to be developed, and each project will need to be designed to fit the marketing situation, institutional and financial circumstances, and stakeholder interests.
- **Place increasing emphasis on private-sector involvement.** Apart from in sugar cane outgrower schemes, there appears to be limited larger private-sector involvement in irrigation value chains. It will be increasingly important to engage larger private-sector interests, through the buyer-driven model or 4Ps, in order to finance more costly infrastructure investments of storage, transport, shipping and logistics chains.
- **Support the public-private-producer partnership (4Ps) model.** This model allows farmers (or their representatives) to participate more in securing markets, engaging in contract negotiations and obtaining fairer compensation.
- **Use private-sector partnerships to increase investments in agroprocessing, cold storage, marketing facilities and transportation.** Existing projects invest little in agroprocessing and other stages of the value chain. These activities add value to perishable, high-value horticultural commodities.
- **Partner with the private sector to provide an integrated package of services.** These services range from selling irrigation equipment and pumps to improved seed availability, to fertilizer and other chemicals, to soil nutrient testing, to agronomic advisory services, and to value chain logistics, such as transport, grading and packaging, storage, agroprocessing and ultimately high-end markets. This provides a one-stop service for irrigators.
- **Build stronger marketing information systems in value chains.** There is a weak link between market demand and farmer supplies. Most projects appear to lack strong marketing information systems and market intelligence, and this aspect should be strengthened.
- **Strengthen the linkage between the irrigation water user associations and marketing organizations.** This can be a natural link to enhance the producer-driven

value chain model, as the associations comprise the irrigation farmers, and they can operate within a legal and administrative framework.

- **Introduce new service providers and financial models.** These include agroclimate agencies, mobile phone companies, insurance companies, information technology companies, digital banking, e-wallets, venture capitalists, impact investors and village-based microcredit agencies, in order to support indigenous entrepreneurial development of value chains.
- **Build a new class of rural entrepreneurs, and promote stronger gender and inclusivity in irrigation value chains.** This would focus on capacity-building for women and young people through targeted hands-on, applied training programmes, thereby enabling them to create jobs, wealth and assets.
- **Implement a robust monitoring, evaluation and learning programme.** This is necessary in order to verify the value chain approach and models, and use lessons learned to make necessary course corrections.

## References

- Amede, T. 2015. Technical and institutional attributes constraining the performance of small-scale irrigation in Ethiopia. *Water Resources and Rural Development*, 6: 78-91.
- Dukhovny, V. 2011. Water and food security in Central Asia. In C. A. Madramootoo, ed. *Water management for global food security*. Montreal, Canada: McGill Institute for Global Food Security.
- FAO (Food and Agriculture Organization of the United Nations). 2016. *The State of Food and Agriculture: Climate change, agriculture and food security*. Rome.
- Gao, X., Shi, Y., Zhang, D. and Giorgi, F. 2012. Climate change in China in the 21st century as simulated by a high-resolution regional climate model. *Chinese Science Bulletin*, 57(10): 1188-1195.
- Gunda, C., Gasasira, J., Sithole, S., Liversage, H. and Jonckheere, S. 2013. Securing smallholder farmers' land and water rights and promoting equitable land access in irrigation and watershed management in Malawi, Rwanda and Swaziland. Paper presented for the annual World Bank Conference on Land and Poverty. Washington, D.C.: World Bank.
- Hanjra, M. A., Tadele, F. and Gutta, D. G. 2009. Reducing poverty in sub-Saharan Africa through investments in water and other priorities. *Agricultural Water Management*, 96(7): 1062-1070.
- Heard, J., Porker, M., Armstrong, D., Finger, L., Ho, C., Wales, W. and Malcolm, B. 2012. The economics of subsurface drip irrigation on perennial pastures and fodder production in Australia. *Agricultural Water Management*, 111: 68-78.
- Hussain, I. and Hanjra, M. 2004. Irrigation and poverty alleviation: Review of the empirical evidence. *Irrigation and Drainage*, 53(1): 1-15.
- Madramootoo, C. A., Wiyo, K. A. and Enright, P. 1992. Nutrient losses through tile drains from two potato fields. *Applied Engineering in Agriculture*, 8(5): 639-646.

- Müller, C., Elliott, J., Chryssanthacopoulos, J., Deryng, D., Folberth, C., Pugh, T. and Schmid, E. 2015. Implications of climate mitigation for future agricultural production. *Environmental Research Letters*, 10(12): Article 125004.
- Seville, D., Buxton, A. and Vorley, W. 2011. *Under what conditions are value chains effective tools for pro-poor development?* Report for the Ford Foundation. London: Sustainable Food Laboratory and International Institute for Environment and Development.
- Sezen, S. M., Celikel, G., Yazar, A., Tekin, S. and Kapur, B. 2010. Effect of irrigation management on yield and quality of tomatoes grown in different soilless media in a glasshouse. *Scientific Research and Essays*, 5(1): 41-48.
- Verge, X. P. C., De Kimpe, C. and Desjardins, R. 2007. Agricultural production, greenhouse gas emissions and mitigation potential. *Agricultural and Forest Meteorology*, 142(2): 255-269.
- Walker, W. 1989. *Guidelines for designing and evaluating surface irrigation systems*. FAO Irrigation and Drainage Paper No. 45. Rome: Food and Agriculture Organization of the United Nations.
- Wanvoeke, J., Venot, J. P., De Fraiture, C. and Zwarteveen, M. 2015. Smallholder drip irrigation in Burkina Faso: The role of development brokers. *Development Studies*, 52(7): 1019-1033.
- World Food Summit. 1996. *Rome Declaration on World Food Security and World Food Summit Plan of Action*. Rome: Food and Agriculture Organization of the United Nations.
- You, L., Ringler, C., Wood-Sichra, U., Robertson, R., Wood, S., Zhu, T., Nelson, G., Guo, Z. and Sun, Y. 2010. *What is the irrigation potential for Africa? A combined biophysical and socioeconomic approach*. IFPRI Discussion Paper No. 993. Washington, D.C.: International Food Policy Research Institute, Environment and Production Technology Division.

## Chapter 11

---

# Assessment of IFAD's policy impact in four countries in Asia

by  
**Anna McCord**  
**Edward Heinemann**  
**Lauren Phillips**

The possibility of achieving inclusive and sustainable rural transformation is determined in large part by the policies that national governments put in place and implement. Thus, the policy framework can have a dramatic impact – positive or negative – on the opportunities open to rural men and women. IFAD recognizes that it has a key role to play in shaping the policy framework in its Member States, drawing on its specialized expertise to promote enabling country-level policies for rural people. For this reason, beyond the more traditional activities embedded in IFAD's lending programme, an increasing number of loans have the specific objective of engaging in country-level policy, to enable poor rural men and women and their organizations to participate in policy processes, to stimulate the production and use of evidence for policy processes, and to enhance the policy capacity of governments.

Today, it is widely understood that projects alone cannot eradicate rural poverty or generate rural transformation because, inevitably, they reach a limited number of people. However, projects can serve as a space in which to innovate and experiment with new possible policy solutions. Moreover, by feeding the lessons learned back to local, national and international actors, projects can also be a lever for influencing public policies and national-level programmes, thus bringing about systemic change. Policy engagement can serve the more immediate purpose of

improving the impact of IFAD's projects as well. Implementation of projects may be constrained by a mismatch between the project objectives and the policy framework, or a gap between the policy and its implementation. Therefore, addressing policy bottlenecks or weaknesses in policy implementation can help to create an enabling environment for project implementation, thereby improving the chances that outcomes are realized, and development impacts achieved.

IFAD has defined country-level policy engagement (CLPE) as a process in which the Fund can collaborate, directly and indirectly, with partner governments and other country-level stakeholders to influence policy priorities or the design, implementation and assessment of formal policies that shape the opportunities for inclusive and sustainable rural transformation. It is a broad definition that is rooted in an understanding of a "policy cycle" and one that enables a relatively broad range of activities to be considered as contributing to a policy engagement agenda. IFAD's approach is to facilitate, support and inform nationally owned policy processes so as to enable governments and other national stakeholders themselves to determine the policy change required. Its approach is characterized by building national capacities for dialogue and the design, implementation and assessment of policies, and by bringing evidence to those processes where appropriate and useful. It includes, but goes

beyond, policy dialogue. IFAD does not impose policy change as a condition for its support for investment projects, and rarely does it seek specific policy change.

In 2016, as part of a broader series of activities aimed at facilitating a consistent approach to monitoring and evaluating its CLPE efforts, IFAD commissioned a study to assess the impact of its policy engagement on policy change in four countries in the Asia and the Pacific region. This chapter is based on the findings of this review (McCord, Heinemann and Phillips, 2018). The study had three objectives:

- Review the experience of sampled IFAD CLPE activities associated with five IFAD-supported projects in four countries (India, Indonesia, Nepal and Viet Nam), and analyse their outcomes and impact.
- Identify the factors that contributed to these outcomes and those that limited success, drawing out lessons for future policy work.
- Propose a credible, cost-effective and replicable methodology that can be used to undertake similar exercises.

## Methodology

The study was implemented by a two-person team comprising an international evaluation and policy specialist, and a national expert in the area of agricultural policy under review. The case study countries and CLPE interventions for review were selected to focus on activities linked to policy development, policy outcomes or policy implementation, in line with the IFAD definition of CLPE, as part of a narrative that identifies IFAD as a contributing agent in that change.

A methodology was devised to enable a rapid review of a single CLPE case study in each of the four countries. This entailed a two-phase process. First, in each country, the national expert prepared a background report providing summary information on IFAD programming and the case study CLPE intervention, with guidance from the IFAD country office. This report included a statement of the IFAD contribution narrative, which articulated IFAD's perception of the impact

of the intervention under review on national policy and formed the hypothesis to be tested during the second phase. It also identified potential key informants from across a range of sectors who were knowledgeable about the policy process under review. The national expert then arranged an interview schedule for the research visits.

Second, once this preparatory phase had been completed, the review team (the international consultant and the national expert) made five-day research visits to each country. In three of the four countries, the research took place exclusively in the capital, although in India both the capital and the state were visited. The research visits started with an orientation session with IFAD staff that covered the national programme, the programme associated with the CLPE, and the CLPE activity itself, including the IFAD contribution narrative under review. A bellwether approach was adopted, using semi-structured interviews to explore the CLPE intervention and the policy-related change under review. This entailed interviewing 15-30 of the previously identified informants in each country, drawing on civil servants, politicians, civil society representatives, international development partners, academics and media actors.

In cases where IFAD was mentioned as a driver or contributor, the research team sought evidence in support of this assertion. When it was not mentioned as such, they probed the context and sought evidence to identify and assess the relative importance of other drivers, as well as asked questions in order to assess the informant's knowledge and perception of IFAD. To elicit further insights, open-ended questions regarding IFAD's role in relation to the broader policy debate and its potential contribution were also asked. This approach to identify the main drivers of a change in discourse or policy did not in all cases identify IFAD as a factor, and thus not all cases were consistent with the IFAD narrative. The review team reviewed findings after each interview and analysed the set of responses overall in order to appraise CLPE performance in relation to the IFAD change narrative, and also to explore the specific questions set out in the terms of

reference. The findings were validated with IFAD country staff at the end of the research period where possible. A final review team workshop was held to finalize the findings, which were then shared with the IFAD country staff in draft format for verification.

The methodology adopted could not provide any formal scoring of CLPE performance to allow for geographical or intertemporal comparisons. However, it did provide insights and draw out nationally and internationally relevant themes that could not be extracted using more quantitative or formal approaches. The approach also had the advantage that it could also be applied consistently, despite the extreme differences in the case studies under review. Finally, because the methodology relied on interpretation and synthesis by the authors and was influenced by the selection of informants, there was a degree of subjectivity to the findings. However, extensive discussion and triangulation were used to minimize this challenge.

## Nepal: Transforming an IFAD-financed pilot into a national programme for leasehold forestry

The IFAD-supported projects associated with the policy engagement experience under review were the Hills Leasehold Forestry and Forage Development Project (1992-2002) and its successor, the Leasehold Forestry and Livestock Programme (2005-2014). IFAD introduced these projects to address the lack of a pro-poor dimension in the community forestry approach prevalent in Nepal. The initial Hills Leasehold Forestry and Forage Development Project programme did not have a policy engagement agenda. However, CLPE relating to leasehold forestry is consistent with the strategic goal of the 2013-18 Country Strategic Opportunities Programme (COSOP), which explicitly includes policy engagement objectives relating to the programme in Nepal overall and to leasehold forestry in particular. These policy objectives include incorporating farmer participation in local

and national policy processes, and promoting policymaker capacity and programme innovation.

Over a sustained period covering two projects, IFAD made the case for pro-poor leasehold forestry. It identified a programming and policy gap, and financed a pilot and a follow-up project to demonstrate the potential role of leasehold forestry in rehabilitating land and creating institutions to represent the most marginalized. The projects' most innovative feature was the handing over of degraded forestland to the poor, together with the introduction of livelihood improvement planning. These steps helped raise people's incomes through commercial agricultural and livestock farming. Despite the 1996-2006 insurgency, which severely hindered programme implementation and policy engagement, the successive leasehold forestry projects supported by IFAD demonstrated the leasehold forestry concept, and showed that transferring land with degraded forests to the poor could both reduce poverty and reforest the hills. The projects also showed that this approach could empower women and reduce the time they spent collecting fuelwood and fodder.

The two leasehold forestry programmes also created platforms for dialogue at local and national levels, as well as institutions to facilitate poor people's representation and participation in forestry dialogue. These institutions included local farmer-based institutions, notably leasehold forestry user groups and cooperatives, and village financial institutions, which were subsequently used by other government and development partner projects to replicate and adapt the leasehold forestry models. The projects had a significant effect on land rehabilitation and poverty. They addressed the pro-poor deficit in the community forestry discourse dominant in the 1980s and 1990s, and the fact that within this dominant approach "the voice of the poor was not heard" (former district forestry officer). IFAD support for CLPE relating to leasehold forestry ceased after programme funding came to an end in 2014, despite the priority status it was given in the COSOP.



IFAD played a catalytic role in promoting leasehold forestry within Nepal. It established the concept of pro-poor leasehold forestry, which combined agriculture, forestry and livestock. The projects developed a model that later influenced legislation and government structure. Before the intervention, the concept of leasehold forestry was not widely accepted, and was poorly addressed in national forestry sector policy and legal instruments. A number of legal and technical hurdles delayed the process (including a lengthy process of handover of leasehold forestry to centralized authorities at the Ministry of Forests and Soil Conservation, and the long-standing prioritization of community over leasehold forestry). However, the amendment of the Forests Act (1992) in early 2017 finally resolved the legal barriers restraining leasehold forestry implementation. Under the amendment, leasehold forestry has technical parity with community forestry, the legal authority to issue lease certificates has been decentralized, and provisions integrating leasehold forestry into community forestry have been enacted, with leasehold forestry formally identified as a mechanism for implementing the national community-managed forestry system. As such, leasehold forestry has been institutionalized in the forestry sector, and the National Planning Commission has officially recognized the role of leasehold forestry by giving it Priority 1 programme status, which should mean that it will be mainstreamed by donors working in interventions related to forestry and poverty alleviation.

In addition, the leasehold forestry concept has been widely replicated in other parts of the country. It has influenced the design of subsequent IFAD-financed projects and informed the leasehold forestry components of a variety of interventions by other development partners (DPs). Support for leasehold forestry by the DP community largely occurred after 2007, when Australian support to the forestry sector came to an end. Before this, the position of most donors was in conflict with IFAD's leasehold forestry position, and it was only after a ten-year struggle with the donor community that leasehold forestry

was recognized as a successful model. As one key informant stated, before IFAD "there was nothing in the policy [about leasehold forestry], we did not know how to do it – we were starting from zero" (former district forestry officer).

Achieving these outcomes is particularly significant given that IFAD is not a major player in Nepal's donor context in terms of the size of its programme or its country representation. It had not participated in the development of community forestry programming in Nepal, but joined the forestry debate later, championing the concept of pro-poor leasehold forestry. Moreover, the leasehold forestry model initially met strong opposition from the forestry DPs, which were committed to promoting community forestry. The DPs and the government accepted leasehold forestry only after a decade of successful project implementation. Thus, IFAD was obliged to work alone in the initial decade of this initiative.

## India: Approaches to community-based resource management for scaling up

The North Eastern Region Community Resource Management Project for Upland Areas (NERCORMP) – a government project that was supported by IFAD – aims to transform the lives of poor and marginalized tribal families in selected districts of three states in the North Eastern Region of India. It seeks to do so through improved and environmentally sound management of their resource base. CLPE is not formally mentioned in the NERCORMP project design report or the associated logframes, and neither phase had explicit CLPE objectives or activities. In addition, the 2010-2015 COSOP contained no CLPE objectives relating to the NERCORMP intervention. However, the project offers some successes and lessons on CLPE.

IFAD had limited contact with government actors both nationally and regionally relating to NERCORMP. During annual loan reviews, there was limited space for CLPE with Delhi-based policymakers, given that NERCORMP was

only one of multiple projects under discussion. Annual IFAD supervision missions to the North Eastern Region provided a greater opportunity for policy-related contact, through government officials' participation in the missions and the debriefing process to the North Eastern Council, but neither was strategically used to promote CLPE. As such, IFAD was perceived by those involved as not advocating for the project, resulting in missed opportunities to celebrate achievements and share innovations arising from the project more widely within the North Eastern Region and beyond in other areas of the country where conventional project implementation modalities were not viable. IFAD instead allowed NERCORMP successes to "speak for themselves", an approach that was consistent with the COSOP statement that advocacy was not part of IFAD's role. This stance also reflected the fact that NERCORMP is a government programme, from which the government itself learns directly, arguably rendering IFAD's engagement in policy dialogue redundant. Nonetheless, the outcomes of the NERCORMP intervention, in terms of policy impact in its broadest sense, were fourfold:

- **Contributing new modalities for programme implementation:** NERCORMP had multiple influences in terms of community mobilization and participation processes, NGO participation, and the creation of community institutions. Subsequent IFAD-supported projects and other DP and government programmes adopted or replicated these approaches, as did national- and state-level government programmes implemented in the region. The project also mainstreamed women's participation in community decision-making, promoted natural resource management and community ownership of a livelihoods agenda, and engaged NGOs in offering alternative institutional options for programme delivery in addition to government departments. All these ideas were subsequently adopted in government programming in the region.
- **Promoting convergence:** Convergence involves harmonizing diverse government

development interventions to increase impact and promote efficiencies in delivery, an agenda that is central to the policy debate in the North Eastern Region. The IFAD innovations contributed directly to convergence by harmonizing programme delivery for key community institutions and processes. One example is the adoption of NERCORMP-created institutions and processes by the national employment guarantee scheme.

- **Promoting government buy-in, scaling up and sustainability:** The central government funded the NERCORMP Secretariat directly during the unfunded period between the first and second phases. It did so in order to prevent staff attrition and protect the investment made previously. The government used the second loan to expand the geographical coverage of NERCORMP, while a third phase exclusively funded by the North Eastern Council is currently being initiated, indicating programme sustainability.
- **Creating technical assistance capacity:** In recent years, the NERCORMP Secretariat has been taking on a role as a regional resource, providing technical assistance for project implementation. Formalization of this role is currently under discussion. The NERCORMP Secretariat is expected to become a government-financed regional resource centre to provide technical assistance for programme management and implementation, thereby capturing NERCORMP implementation experience as a resource for the region.

Thus, although CLPE was not part of the NERCORMP concept, the project successfully devised new ways of delivering "development" in a resource-poor and remote region. Because its success was recognized by key officials, it was replicated and expanded, and other states and donor programmes adopted key programme components. NERCORMP delivery models were also used in other government programmes. In the absence of a policy agenda, it was the spontaneous transmission of knowledge about the programme, derived from programme

experience (the programme “speaking for itself”) that led to these positive outcomes, and IFAD presents this as an indicator of successful CLPE. However, if IFAD had had a policy engagement agenda at the design stage and had actively mandated IFAD personnel to engage in CLPE in support of the programme, it is probable that the impact could have been greater in terms of policy influence, with impacts beyond the three states in which the programme was implemented.

## Indonesia: Informing the government’s approach to implementing the Village Law

From 2009 to 2014, IFAD piloted and cofinanced the agriculture component of the National Programme for Community Empowerment (PNPM) in Papua and West Papua. The objective of the larger PNPM was to reduce poverty and improve local-level governance and socio-economic conditions in rural Indonesia. The agriculture component aimed to improve agricultural livelihoods by developing new models of participatory community participation in development planning and resource allocation, and in this way influence PNPM implementation.

Following elections in 2014, the new government suspended the project, along with all similar programmes, as it sought to move away from the PNPM. In its place, the government focused on implementing the Village Law, a national policy that promotes the autonomy of villages and serves as a framework for village development and community empowerment. Villages are allocated resources, which they manage through participatory community development plans. In 2016, the government invited the agriculture component to restart programming in Papua and West Papua, and to advise on modalities for improving participatory planning in the national implementation of the Village Law. This represented an opportunity for the component to draw on its initial implementation experience to create a model for livelihood activities related to infrastructure and related economic activities, using participatory

community development and trained facilitators drawn from the local community. As of 2016, the objectives of the CLPE were to successfully implement the second phase of the agriculture component of the PNPM in Papua and West Papua, and to promote the nationwide adoption of innovations to help villages select appropriate economic infrastructure and ensure the provision of technical support, resulting in improved livelihoods. These are the aspirations against which future achievements should be appraised.

IFAD was able to be opportunistic, capitalize on successful institutional repositioning, and engage in responsive ad hoc CLPE. It built on the success of a programme that largely “spoke for itself”, and drew the government’s attention as a potential model for Village Law implementation. It is premature to assess the sustainability of the outcome of the CLPE initiative, as PNPM implementation in Papua and West Papua has only recently recommenced. Whether IFAD can capitalize on the invitation to influence national implementation will depend on its capacity to mobilize appropriate technical assistance. However, the invitation to provide inputs, which brought an IFAD pilot to the national agenda, may itself be taken as a CLPE success. Whether the IFAD-supported agriculture PNPM will have broader influence and affect Village Law outcomes in the medium or long term remains to be seen. Equally, it is not known whether the government will continue to fund the Village Law investment in infrastructure, which is at the heart of the IFAD model beyond elections in 2019.

This case study offers three main insights: (1) evidence of programme outcomes can be less important in driving CLPE than institutional relationships, project exposure and perceptions of programme performance; (2) effective processes for engagement can be as important for success as final programme outcomes; and (3) access to financial and human resources and programming flexibility are key to responsive programming and opportunistic engagement. These results reflect the non-linear relationship between policy and evidence that has been documented in Indonesia and elsewhere (see McCord, Yablonski and Winder Rossi, 2016).

## Viet Nam: Supporting the National Targeted Program on New Rural Development (NTP-NRD)

IFAD supports the market-oriented participatory socio-economic development planning (MOP-SEDP) component of Viet Nam's National Target Program on New Rural Development (NTP-NRD). The NTP-NRD is a national programme implemented in 9,071 communes to consolidate the multiple social, economic, cultural and political interventions taking place there. The New Rural Development (NRD) approach seeks to promote community ownership of key development processes at the commune level alongside government policy orientation and support.

In 2013, in preparation for the second phase of the NTP-NRD (2016-2020), the government approached key DPs, including IFAD, seeking support and financial assistance for expanding the NRD rollout. In response, the DPs proposed carrying out a review of NTP-NRD performance to date before making financial commitments. The partners' objective in this CLPE intervention was thus to contribute to the formulation of the second phase of the NTP-NRD, revising the conceptualization and design to accommodate a reduction in centralized control, with more market and community engagement and context-specific programming.

In late 2015, IFAD worked with the World Bank to conduct a detailed assessment of the NTP-NRD strategy, reviewing its performance and proposing recommendations for moving forward – drawn in part from IFAD programme experience. The assessment confirmed the NRD's contribution to socio-economic development in rural Viet Nam in terms of rural infrastructure and services, but concluded that it had done little to promote rural economic transformation. For the second phase of the NRD, it identified the need to invest in planning, investment modalities and monitoring, and it recommended using more flexible and context-specific performance criteria to assess performance. It also called for a greater role for

community-level planning and decentralization in place of the top-down socio-economic development planning process from the district to the commune level. The IFAD-supported MOP-SEDP was put forward as a model of participatory commune-level planning that could be adopted.

The recommendations from the IFAD/WB assessment were presented in March 2016 at a workshop co-hosted by IFAD and the National Office of the NTP-NRD. Workshop participants, including key representatives from government and DPs, agreed to the recommendations, and the government charged the National Office of the NTP-NRD to use those findings and recommendations as inputs into the design of the second phase of the NRD. Many of the recommendations were subsequently endorsed in the Prime Minister's Decision 1600/QD-TTg – notably, the implementation of agricultural restructuring to develop value chains for high added value and sustainable development, and the shift from 19 fixed performance criteria to a smaller number to be applied flexibly depending on local context. To advance the assessment report's recommendations on strengthening NRD monitoring and evaluation in phase two, IFAD provided a grant for technical assistance to the NRD National Office, starting in December 2016. In February 2017, the Ministry of Planning and Investment issued the Draft Circular on Manual for Participatory Planning at Commune Level under the Implementation of NTP-NRD, using evidence from the MOP-SEDP along with other DP interventions. The intervention served to further consolidate IFAD's relationship with the national NRD implementing agency, and to position IFAD for further engagement in developing future monitoring and evaluation aspects of the NTP-NRD. These are results that in themselves may be perceived as positive CLPE outcomes.

In terms of the overall impact of the CLPE activity, a view outside IFAD is that the changes outlined in the Prime Minister's Decision 1600/QD-TTg would have occurred regardless of the intervention because the government already recognized the need for policy revision. This may be true, but it is also the case that the evidence provided through

the study facilitated this process. It is also possible that the intervention could have had a greater impact if it had extended the existing discourse into new areas and provided an agenda for more progressive programming and policy change, based on a longer-term engagement in the policy debate and deeper engagement in the political discourse. However, the political feasibility of this approach is open to question.

Informants perceived several untapped opportunities for constructive CLPE, such as greater sectoral collaboration by donors, potentially under IFAD leadership. Informants also noted that IFAD could also play a larger role in central-level policy discussions related to promoting smallholder agriculture within the NTP-NRD, drawing on areas of IFAD expertise and experience. This is a critical area in which few DPs with access to significant resources are working and where informants identified important gaps. Closing these gaps would involve providing ongoing support to the working group on smallholder farming that IFAD had initiated, participating regularly in and supporting the donor policy forum, and creating strategic initiatives among like-minded agencies.

Overall, this review identifies CLPE in Viet Nam as an appropriate investment for IFAD at this juncture. Government policies are in flux, and the country is exploring market mechanisms. However, there is a lack of investment, technology and markets, and there is a need to support the use of markets by farmers. As Viet Nam undergoes significant economic change, becoming an increasingly important exporter, there is potential for IFAD to support Viet Nam given its comparative advantage in the area of smallholder farming. Viet Nam is currently open to the provision of counterparts, consultants and policy inputs in support of decentralization and market-based development, and support in this area may be more relevant now than project-based support. Referring to the current need for institutional reform at the grass-roots level and for policy change at the central level, one informant stated: “Now is not time for projects but for policy.”

## Conclusions and way forward

The variety of outcomes highlighted in the four case studies illustrates the different functions of CLPE. On the one hand, CLPE can create opportunities for increased IFAD engagement, in which case it is essentially instrumental – it positions the agency for future engagement, resulting in requests for technical assistance (as in Indonesia and Viet Nam). On the other hand, CLPE can lead governments and DPs to adopt innovative IFAD-financed policy or implementation models (as in India and Nepal). It is useful to divide the activities reviewed in this report into two distinct CLPE approaches. The first is direct and active engagement by IFAD staff, carried out to complement programme activity. The second is indirect CLPE, where programmes “speak for themselves” by demonstrating the success of implementation modalities or policy innovation (which may be described as indirect CLPE). The studies reviewed here include both approaches, although the majority of CLPE resulted from programme performance, and only a small number of CLPE activities were directly carried out by IFAD staff.

Analysis of the four case study interventions identified a number of common factors affecting CLPE performance. Above all, there are clear tensions between IFAD’s in-country staffing levels, financing modalities, operational instruments and historic mandate on the one hand, and increased CLPE activity, including the facilitation of domestic national policy discourse, on the other. In the case study countries, IFAD does not have the resource base needed to participate in ongoing policy discourses or to carry out significant direct CLPE requiring IFAD staff engagement. As a result, IFAD has focused on indirect policy engagement related to its implementation models, drawing on IFAD’s specific institutional competence and a key aspect of IFAD programming. Elsewhere, this approach might not be considered policy engagement, given that it is not directly linked to either engagement or policy. It might more typically be considered good development work and provision of good models for development



processes, which are recognized and then replicated and scaled up by governments and DPs, and in other IFAD programmes.

Despite these constraints, some direct CLPE did take place. In Viet Nam, the country programme manager (CPM) and a consultant reallocated staff time and used additional funds to overcome the resource constraints outlined above. They directly engaged in CLPE, and their focus on general institutional repositioning using existing CPM resources encouraged the government invitation to extend programming. Overall, however, IFAD's institutional structure limited the potential for active, explicit policy engagement in each of the case studies.

If IFAD seeks to play an increased role in CLPE, in line with an extended mandate that incorporates policy engagement alongside programme implementation, it will need to: make changes to its resource allocation modalities and country-level programming practices; increase both its financial and human resources at the country level; and provide additional support from IFAD headquarters in Rome. IFAD policy engagement is unlikely to yield significant results unless country offices, which are currently engaged primarily in managing loan and project portfolios, are provided with these additional resources and skills. As such, increased CLPE implies an associated realignment of human, financial and procedural resources within the institution. The key question is the extent to which this can be accommodated within IFAD's existing business model and funding modality.

## References

- McCord, A., Yablonski, J. and Winder Rossi, N. 2016. The political economy of cash transfer evaluations. In B. Davis, S. Handa, N. Hypher, N. Winder Rossi, P. Winters and J. Yablonski, eds., *From evidence to action: The story of cash transfers and impact evaluation in Sub Saharan Africa*. Oxford: Oxford University Press.
- McCord A., Heinemann E. and Phillips L. (2018). *Exploration of a methodology for assessing the impact of policy engagement: what impact and how to assess it?* IFAD Research Series 26. Rome: IFAD.



# The impact of adoption of CGIAR's improved varieties on poverty: a systematic review

by  
Alessandra Garbero  
Pierre Marion

It is widely acknowledged that agricultural research has played a key role in improving rural livelihoods in the developing world (Thirtle, Lin and Piesse, 2003). Donors and governments have invested heavily in agricultural research institutions, particularly the Consultative Group on International Research (CGIAR) and its network of research centres and partners. Specifically, IFAD funded many CGIAR improved-seed interventions from 2007 to 2014 through its grant-funding programme. However, at a time when some donors are increasing pressure on development institutions to show evidence-based results, the causal linkages between agricultural research, poverty reduction, and welfare, and other development outcomes more broadly, have not been sufficiently and convincingly demonstrated (Renkow and Byerlee, 2010). This has cast doubt on the effectiveness of CGIAR's investments and those of its donors.

A large literature has documented substantial pro-poor impacts resulting from international agricultural research and development generally, and from CGIAR-led research in particular (Thirtle, Lin and Piesse, 2003; Adato and Meinzen-Dick, 2007). However, this "impact" literature has focused only on aggregate returns and on the efficiency of research investments, neglecting a thorough examination of the

possible causal impacts of technology adoption on poverty reduction. To date, only two reviews – Fan et al. (2007) and Alene et al. (2009) – have sought to quantify impacts on poverty, and specifically movements out of poverty.

The first study examined the macroevidence of the impact of modern rice varieties developed by the International Rice Research Institute on poverty in China and India. The study found that, between 1981 and 1999, the institute's research contributed to moving more than 6.75 million Chinese out of poverty. In India, 14 million people exited poverty between 1991 and 1999. Alene et al. (2009) estimated that improved maize seed adoption in West and Central Africa moved 740,000 people out of poverty annually, with the rate of exit increasing over time.

Relative to global assessments, CGIAR system-level assessments date back to Anderson (1985). Nelson and Maredia (1999), Evenson and Gollin (2003), Maredia and Raitzer (2006), and Raitzer and Kelley (2008) have validated the perception that the CGIAR has had, over its lifetime, a sustainable impact on poor people by helping to develop technologies and agricultural management tools that have increased food security and dramatically lowered the cost of producing the world's major staple food crops. However, this perception has not been supported by a rigorous appraisal of the

“counterfactual”-based evidence available to date – that is, rigorous impact evaluations from the CGIAR centres.

This study aims to fill this gap. To this end, a systematic review was conducted and a quantitative synthesis was performed to assess the poverty and welfare impacts of the adoption of improved seed varieties developed and disseminated by CGIAR from 2007 to 2015. The study used meta-analysis to compute the global estimate of the impact of agricultural research on poverty reduction and intermediate outcomes such as income and expenditure. A meta-analysis is a powerful technique that allows one to summarize the quantitative evidence on intervention effects from different environments in a comprehensive and unbiased way. Compared with traditional ways of aggregating research results, such as vote counting, which do not remove the risk of purposively selecting studies based on subjective criteria, meta-analyses are scientific. They take into account precision, sample size, the magnitude of the effect, and the research design.

The rationale for this study of CGIAR interventions is IFAD's large investments in CGIAR's improved seed variety interventions over the period. Out of the 95 grants provided to CGIAR (equivalent to US\$96.4 million), 30 (amounting to US\$40.5 million, or 42 per cent of the total amount provided to CGIAR in grants) were allocated to improved seed variety interventions.

## Conceptual framework

When farmers adopt improved varieties, it can lead to poverty reduction through several mechanisms, both direct and indirect. Improved seed varieties can generate gains in crop productivity, raising farmers' incomes and subsequently reducing poverty (direct impacts). Improved varieties can also benefit both adopting and non-adopting households by increasing employment opportunities and wages, and by lowering food prices as a result of the rise in agricultural production (indirect impacts).

This systematic review appraises and quantitatively synthesizes the findings of studies assessing the direct impacts of improved seed varieties on the welfare and poverty of adopting households. While these direct impacts can be rigorously measured, evaluating indirect impacts is more challenging because they affect both adopting and non-adopting households, and they depend on local market conditions.

In terms of direct effects, improved varieties have characteristics that can lead to greater agricultural production, on average, than traditional seeds. The improved seeds have higher yield potential, are more responsive to fertilizer and irrigation, have shorter maturation periods, have longer storage capabilities, are more tolerant of environmental stresses, or have a higher nutrient content.

For households that produce and sell on the local market, higher agricultural yields at a constant cost level may be associated with greater income and greater profits. Similarly, for subsistence households – which purchase the food they need but cannot produce – higher yields benefit farmers by reducing their spending on food. Farmers may thus reallocate expenditures away from food to assets, which may further increase productivity. With higher production, farmers can also enter local markets to sell excess production (Irz et al., 2001; de Janvry and Sadoulet, 2002). Thus, improved varieties can reduce poverty through higher yields for adopting households if the income gain is large enough to allow them to exit poverty.

However, farmers' access to markets may be hindered by a rise in costs associated with higher production, such as storage and transportation costs. Moreover, as improved varieties are disseminated, prices and costs in the food market may change, leading to indirect impacts in other markets. With higher potential income gains, large landowners may have the incentive to increase rents or to expand their cropped area by cultivating land previously rented out, thereby eliminating income gains for tenants and increasing landlessness (Hazell and Haddad 2001). Increased income may not translate into poverty reduction if, as often happens, credit

is required to purchase improved varieties. This credit may impose a significant financial burden on poor households, and in the case of a negative shock, debt repayments may instead increase poverty (Diagne and Zeller, 2001). Numerous external factors, such as political instability or extreme climate shocks, may also eliminate the productivity improvements. Moreover, households may lack the education and experience to adequately cultivate these improved varieties.

## Methodology

This study methodology begins with a systematic review of studies that measured the poverty and welfare impacts of adoption of improved varieties developed and disseminated by CGIAR in the period 2007-2015, and it then employs a meta-analysis. In contrast with a standard literature review, a systematic review is a clear protocol for systematically searching defined databases over a defined period, with transparent criteria for including or excluding studies, and with an analysis and reporting of study findings (Hedges and Cooper, 1994). The three steps required to perform a rigorous systematic review are described below.

### Step 1: Study selection

First, a search for all relevant studies was conducted, following a strict protocol and search strategy. The selection of studies was governed by the so-called PICOS study selection criteria (participants, interventions, comparison, outcomes and study design). Studies were included in the review when they satisfied the following criteria:

- **Participants:** Participants were small farmers growing food crops and living in any country except in high-income economies. They owned less than 2 hectares of land, and agriculture was their primary source of income. They also allocated a significant proportion of their land to the growth of food crops.
- **Interventions/exposure:** The studies included were those that examined the impact of adoption of modern seed varieties on welfare outcomes. These modern seed variety interventions had to be supported by CGIAR institutes.
- **Comparison:** The impact needed to be evaluated through real or reconstructed control groups (the latter correspond to the sampled households that did not adopt improved varieties).
- **Outcomes:** Outcomes were poverty impacts and/or estimates on intermediate monetary development outcomes, such as income and expenditure for adopting households.
- **Study design:** The studies included used either a “microlevel” experimental study design (whereby improved varieties were randomly assigned to potential beneficiaries) or a quasi-experimental study design (whereby modern varieties were not randomly assigned but groups of adopting and non-adopting households could be identified). Such study designs reduce the risk of biased results.

The study search was conducted on the largest relevant databases (Science Direct, Google Scholar, the International Initiative for Impact Evaluation’s impact evaluation database, the CGIAR Standing Panel on Impact Assessment publications, and the CGIAR Library). This search strategy followed the methodology indicated by Waddington et al. (2014) and Stewart et al. (2015). For each of the above criteria, search terms were chosen. Each search term from the “interventions” criterion was inputted in the database search and combined with a search term of one or more criteria. For all databases, the search was repeated in order to combine all or most of the search terms from each criterion. The bibliographies of included studies and of existing systematic reviews on related topics were also screened for completeness. Finally, key researchers from the eligible studies and colleagues working on impact evaluation initiatives were contacted for additional published and unpublished studies. Two analysts independently performed this search. A third analyst repeated this search to ensure that all relevant studies were included.

## Step 2: Critical appraisal of selected studies

The second step entailed appraising the quality of each individual estimate presented in each study. The framework summarized in Waddington et al. (2014) was used to structure the analysis. Studies were evaluated based on the probable risks of bias (internal validity or causal identification) and external validity (generalizability of the study's results). Each paper was assigned a bias score, a generalizability score and a total score (the sum of the two previous scores). This step was highly important as it assessed the reliability of the studies' estimates and the extent to which the estimated impact of improved seed varieties could constitute a reliable measure of the actual causal impact.

## Step 3: Meta-analysis

To perform a meta-analysis, the research team computed standardized estimates across all included studies. The final estimates were thus expressed in terms of effect sizes. Response ratios were chosen as the appropriate metric of effect size. The response ratio is defined as the ratio of the mean outcome for the households adopting the improved varieties divided by the mean outcome for the households not adopting the improved varieties. It has the same interpretation as a risk ratio: 1 is the point of "no effect," and any movement above or below the "no effect" point represents a percentage change in the adopting households' outcome compared with the non-adopting households. For example, a response ratio of 1.3 translates into a 30 per cent increase in the outcome variable for the adopting households compared with the non-adopting households.

Many studies provided several estimates as they presented different methods and estimators. To avoid double counting studies in the meta-analysis, a single estimate was derived per study. Following the discussion in Waddington et al. (2014), the method with the lowest risk of bias was chosen. Some methods were considered unambiguously superior, and the choice of the best estimate was straightforward.

This methodology also guided the selection of the estimates when multiple studies existed (for example, a working paper and a journal article covering the same study by the same authors) or when multiple studies were based on the same dataset. However, other econometric methods were more difficult to rank. Thus, a "synthetic effect"<sup>22</sup> was computed when the choice of the best estimate was ambiguous. This synthetic effect is based on the sample weighted average, using the procedure described in Borenstein et al. (2009), which calculates the variance and the standard error of the estimate (these are both measures of the spread in the magnitude of the outcome variable across surveyed households in each study). For papers that reported results over several years of follow-up, the results were reported for the most recent years. In papers where subgroup analysis was conducted, estimates were combined into a single number as in Waddington et al. (2014).

The response ratios from each study can therefore be combined using two meta-analytic methods: (1) the fixed-effect model (where studies are weighted in the meta-analysis only according to the amount of information they contain); and (2) the random-effects model (where an estimate of between-study variation is incorporated in the weighting). The choice of model ultimately affects the distribution of weights given to studies in the meta-analysis. In the fixed-effect model, the main assumption is that the true effect is the same across studies. In a random-effects model, the true effect is assumed to differ across studies. Under the latter, each study presents new information that is equally important, and therefore the weights are more balanced across studies with varying effect sizes. Given the fact that adoption of improved varieties may have different impacts in different settings, a random-effects model was chosen to derive the final estimate.

22. Details on effect-size calculations for specific papers can be provided upon request.

## Results

### Step 1: Study selection

Based on the search strategy, about 25,000 titles in the selected databases were screened. The search strategy identified 21 studies for inclusion in the systematic review. Of these, 16 were found initially, and the other 5 were identified by screening the bibliographies of included studies and of existing systematic reviews. Out of these 21 studies, 7 study poverty, while 12 report the effects on income and 8 on expenditure outcomes over different crops (rice, wheat, maize, bananas, chickpea, pigeon pea and groundnut); some studies examine more than one type of impact.

### Step 2: Critical appraisal of selected studies

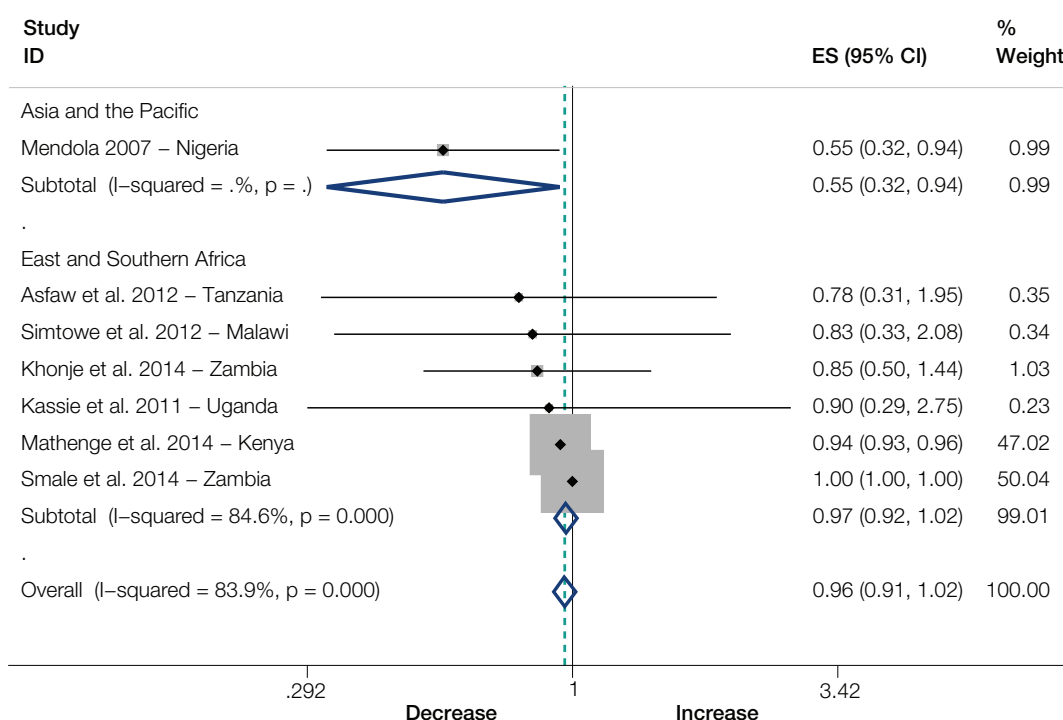
As described above, each study received three scores: bias, generalizability and a total score. None received the maximum score. For the bias score, most studies suffered from selection bias (e.g. selected households included in the sample

were not representative of the population). Many papers chose non-adopting households that were geographically close to adopting ones, which may have produced spillover bias. One subset of papers failed to report all outcomes and omitted some necessary statistics. For the generalizability score, many received lower scores on rigour of analysis, context description and data collection methods.

### Step 3: Meta-analysis

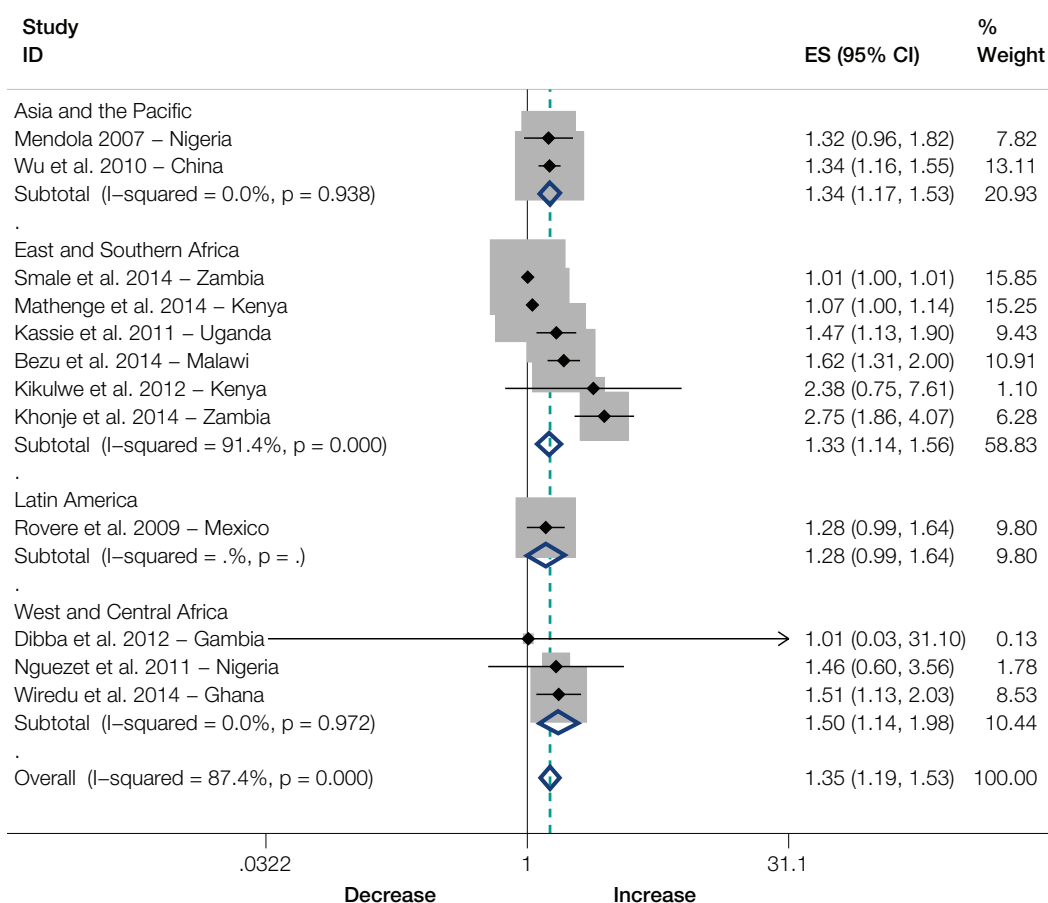
A final aggregate estimate was computed and provided a weighted average of all estimates (response ratios), where each study was weighted according to its variance (a measure of the spread in the magnitude of the outcome variable across surveyed households). Studies that reported a more precise estimate carried a larger weight than studies with lower precision. The precision of the study estimate reflected the sample size. However, it is important to note that the weight does not reflect the validity of methodology presented in the paper.

**Figure 12.1a** Results for poverty, disaggregated by region



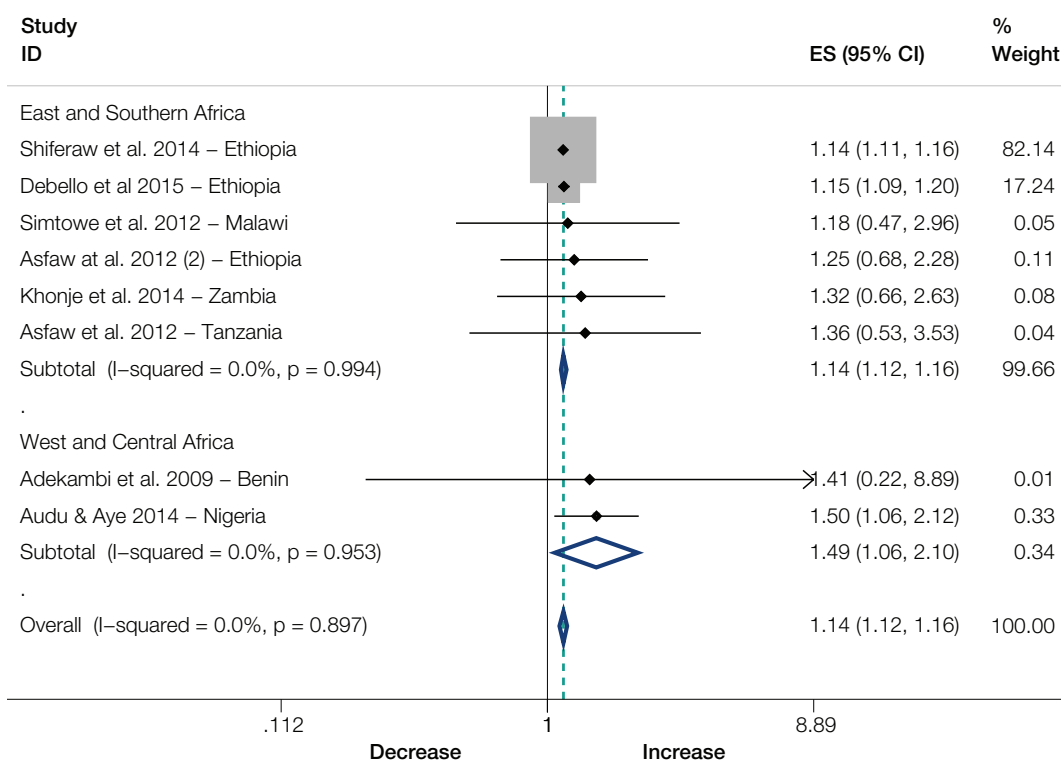
Note: Based on inverse variance weighting/dependent effect sizes removed.

**Figure 12.1b** Results for income, disaggregated by region



Note: Based on inverse variance weighting/dependent effect sizes removed.

**Figure 12.1c** Results for expenditures, disaggregated by region



Note: Based on inverse variance weighting/dependent effect sizes removed.

Source: Authors' analysis.



Figure 12.1 presents results by region. The reported coefficients under the effect-size column are the response ratios, representing the percentage change between adopting households and non-adopting households. Figure 12.1 also reports the probable range of the estimated impact (95 per cent confidence interval) and the individual study weight. The 95 per cent confidence interval of both the subtotal and overall effect size is represented by a diamond. Also reported is the *I*-squared statistic, which describes the percentage of variation across studies that is due to heterogeneity (this refers to the variation in study outcomes between studies). A higher *I*-squared suggests large differences in effect sizes between the studies. The *p* value provides an indication as to whether one can consider that all studies in the meta-analysis give a similar effect size. A *p* value below 0.05 indicates that it is very likely not the case. The numbers on the horizontal axis delineate the range within which the estimates are contained.

The forest plot shown in Figure 12.1a – a typical representation of meta-analysis results – shows that adoption of improved varieties resulted in a 4 per cent decrease in poverty. However, this estimate is not significant, owing both to the paucity of the studies and to the large imprecision of the reported study estimates. The effect size for income indicates instead a significant impact – about a 35 per cent increase for adopting households relative to non-adopting households, with the largest increase occurring in West and Central Africa (50 per cent) (Figure 12.1b). Finally, results for the expenditure outcome are also positive and significant (Figure 1c), with a 14 per cent increase on average, and the largest increase being found in West and Central Africa (49 per cent).

## Conclusion and policy recommendations

In this systematic review, the aggregate direct impact of CGIAR-related improved seed varieties on welfare was synthesized across all regions

of the world for adopting households relative to non-adopters. A systematic review protocol was followed in order to find relevant studies and appraise and quantify the direct aggregate impact. The methodology encompassed three steps: (1) a rigorous search of relevant studies; (2) a critical appraisal of the selected studies; and (3) a meta-analysis. A comprehensive search led to a final sample of 7 papers for poverty outcomes, 12 for income and 8 for expenditure outcomes over different crops, and included unpublished papers.

The meta-analysis findings showed that adoption of CGIAR's improved varieties has led to statistically significant increases in income and expenditures by 35 and 14 per cent, respectively, for adopting households relative to a valid comparison group. In addition, although improved varieties may have reduced poverty by 4 per cent, this finding is not statistically significant, and therefore one cannot rule out the possibility of no impact, given both the paucity of studies and the large imprecision of study estimates.

It is worth noting a number of limitations. First, owing to a high risk of bias for some studies, results may not be perfectly representative of causal impacts. In addition, results may be underestimated because of the period analysed in some of the included impact evaluations. The studies' timespan may be too short to fully capture the welfare impacts of improved varieties or agricultural research in general, given that such impacts may take several years to occur. Finally, this analysis may be subject to publication bias – that is, studies with negative or low impacts may be less likely to be published or available in the databases.

Nevertheless, some implications for policy can be derived from this study. Barriers to access to improved seeds may exist, preventing poorer farmers from fully benefiting from the potential of such technologies. The same structural and contextual constraints to adoption emerge across the included studies. These constraints are related to: human capital endowments (the education and experience of the household

head); access to knowledge and the technology itself; information asymmetries (such as proximity to the extension office and to markets, and information about the technology in general); financial and physical capital endowments (initial assets, farm size, livestock holdings, and off-farm income sources); social capital endowments (group membership); and behavioural aspects such as risk aversion. Given the potential for strong welfare benefits for smallholder farmers, policy interventions should aim at reducing the many constraints that households face in adopting improved varieties. More effort should be made to increase the scale and efficiency of agricultural extension services and input supply systems. The studies included in this analysis also point to the need for greater investments in developing local markets and road infrastructure in order to facilitate diffusion. In addition, economic incentives for more constrained farmers should be considered in order to encourage early adoption and the use of improved varieties; such incentives could be packaged with technology development as part of CGIAR research projects.

## References

- Adato, M. and Meinzen-Dick, R. 2007. *Agricultural research, livelihoods, and poverty: Studies of economic and social impacts in six countries*. Baltimore, USA: Johns Hopkins University Press.
- Alene, A. D., Menkir, A., Ajala, S. O., Badu-Apraku, B., Olanrewaju, A. S., Manyong, V. M. and Ndiaye, A. 2009. The economic and poverty impacts of maize research in West and Central Africa. *Agricultural Economics*, 40: 535-550.
- Anderson, J. R. 1985. Assessing the impact of farming systems research: Framework and problems. *Agricultural Administration*, 20(4): 225-235.
- Borenstein, M., Hedges, L. V., Higgins, J. P. T. and Rothstein, H. R. 2009. *Introduction to meta-analysis*. Chichester, UK: John Wiley & Sons.
- de Janvry, A. and Sadoulet, E. 2002. World poverty and the role of agricultural technology: Direct and indirect effects. *Journal of Development Studies*, 38(4): 1-26.
- Diagne, A. and Zeller, M. 2001. *Access to credit and its impact on welfare in Malawi*. Research Report 116. Washington, D.C.: International Food Policy Research Institute.
- Evenson, R. E. and Gollin, D. 2003. *Crop variety improvement and its effect on productivity: The impact of international agricultural research*. Wallingford, UK: CABI Publishing.
- Fan, S., Chan-Kang, C., Qian, K. and Krishnaiah, K. 2007. National and international research and rural poverty: The case of rice research in India and China. In M. Adato and R. Meinzen-Dick, eds. *Impacts of agricultural research on poverty reduction: Studies of economic and social impact in six countries*, 285-305. Baltimore, USA: Johns Hopkins University Press.
- Hazell, P. and Haddad, L. 2001. *Agricultural research and poverty reduction*. IFPRI 2020 Discussion Paper 34. Washington, D.C.: International Food Policy Research Institute.

Hedges, L. V. and Cooper, H. M., eds. 1994. *The handbook of research synthesis*. New York, USA: Russell Sage Foundation.

Irz, X., Lin, L., Thirtle, C. and Wiggins, S. 2001. Agricultural productivity growth and poverty alleviation. *Development Policy Review*, 19: 449-466.

Maredia, M. K. and Raitzer, D. A. 2006. *CGIAR and NARS partner research in sub-Saharan Africa: Evidence of impact to date*. Rome: Science Council Secretariat.

Nelson, M. and Maredia, M. 1999. *Environmental impacts of the CGIAR: An initial assessment*. Rome: Consultative Group on International Agricultural Research (CGIAR), Technical Advisory Committee Secretariat, Food and Agriculture Organization of the United Nations.

Raitzer, D. A. and Kelley, T. G. 2008. Benefit-cost meta-analysis of investment in the international agricultural research centers of the CGIAR. *Agricultural Systems*, 96(1-3): 108-123.

Renkow, M. and Byerlee, D. 2010. The impacts of CGIAR research: A review of recent evidence. *Food Policy*, 35: 391-402.





Stewart, R., Langer, L., Rebelo Da Silva, N., Muchiri, E., Zaranyika, H., Erasmus, Y., Randall, N., et al. 2015. *The effects of training, innovation and new technology on African smallholder farmers' economic outcomes and food security: A systematic review*. 3ie Grantee Final Review. London: International Initiative for Impact Evaluation (3ie).

Thirtle, C., Lin, L. and Piesse, J. 2003. The impact of research-led agricultural productivity growth on poverty reduction in Africa, Asia and Latin America. *World Development*, 31(12): 1959-1975.

Waddington, H., Snilstveit, B., Hombrados, J. G., Vojtkova, M., Anderson, J. and White, H. 2014. *Farmer field schools for improving farming practices and farmer outcomes in low-and middle-income countries: A systematic review*. London: International Initiative for Impact Evaluation (3ie).



International Fund for Agricultural Development  
Via Paolo di Dono, 44 - 00142 Rome, Italy  
Tel: +39 06 54591 - Fax: +39 06 5043463  
Email: [ifad@ifad.org](mailto:ifad@ifad.org)  
[www.ifad.org](http://www.ifad.org)

 [ifad-un.blogspot.com](mailto:ifad-un.blogspot.com)  
 [www.facebook.com/ifad](https://www.facebook.com/ifad)  
 [instagram.com/ifadnews](https://www.instagram.com/ifadnews)  
 [www.twitter.com/ifadnews](https://www.twitter.com/ifadnews)  
 [www.youtube.com/user/ifadTV](https://www.youtube.com/user/ifadTV)

