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Working Paper

Analyzing the Enabling Environment to Enhance the Scaling of Irrigation and Water Management Technologies: A Tool for Implementers

Thai Thi Minh, Sander Zwart, Richard Appoh and Petra Schmitter

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Project

This tool was developed as part of the *Agricultural Land and Water Management investment models for livelihood benefits* project, under the CGIAR Research Program on Water, Land and Ecosystems (WLE). It was tested through the Feed the Future Innovation Lab for Small-Scale Irrigation (ILSSI) and Technologies for African Agricultural Transformation – Water Enabler Compact (TAAT-WEC) projects.

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CGIAR Research Program on Water, Land and Ecosystems (WLE)

United States Agency for International Development (USAID)

Technologies for African Agricultural Transformation (TAAT) of the African Development Bank (AfDB)

Summary and Contents

Agricultural innovation scaling approaches tend to be empirical but do not sufficiently take into account the complex realities of 'softer elements' such as people, supply chains, markets, financing mechanisms, policies and regulations, professional knowledge, power relations, incentives and history. As a consequence, scaling initiatives often do not produce the desired impacts and, in some instances, may even produce undesirable impacts.

Designing scaling strategies that are adaptive to context and available resources requires an understanding of the enabling environment in which the scaling processes are embedded. This can be achieved by conducting an analysis to identify enablers and hinderers influencing farmers' adoption of irrigation and water management technologies and introducing measures to ensure success. This tool provides implementers with a structured guide to carrying out this analysis in a specific context.

Agricultural Innovation Scaling

For decades, efforts to develop and scale agricultural innovations have overemphasized linear innovation transfer via technology demonstration and dissemination. This was based on the assumption that innovations would be spontaneously and widely adopted as a result of the trickle-down effect. Actual scaling approaches tend to be empirical but do not sufficiently take into account the complex realities of 'softer elements' such as people, supply chains, markets, financing mechanisms, policies and regulations, professional knowledge, power relations, incentives, history, etc. As a consequence, scaling initiatives often do not produce the desired impacts. In some instances, they may produce undesirable impacts in the form of negative spillovers or unanticipated side effects such as environmental degradation, loss of access to resources and social inequality.

Therefore, in this working paper, we conceptualize **agricultural innovation scaling processes** as an integral part of a systemic approach to innovation, with due attention paid to the possible consequences of scaling efforts. We view scaling agricultural innovations as a looping/cycling process of systemically and repeatedly identifying what works, what fits and who is responsible (Wigboldus et al. 2016). The dissemination/adoption stage and the design and development of (bundled) technologies and practices are, therefore, intertwined in this scaling process to inform what works and what fits. Designing scaling strategies that are adaptive to context and available resources requires a systemic analysis to identify technology and service options, bundling interventions, and enabling and hindering factors for scaling (Figure 1). The **systemic analysis** can be carried out from different entry points and across levels, including the policy environment, scaling ecosystem and (irrigated) agricultural value chain. The analysis presented here aims to provide recommendations on policy and its implementation as well as related interventions. Hence, it is part of a wider systemic analysis tool to design adaptive scaling strategies (Minh et al. Forthcoming).

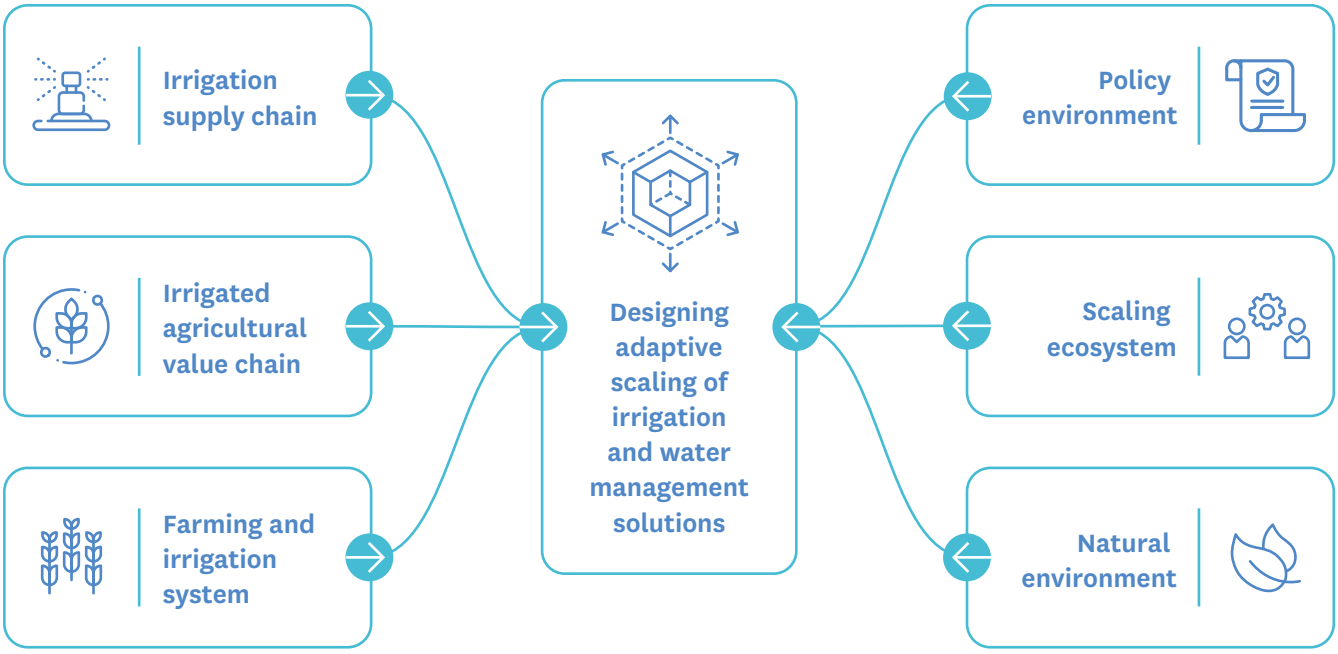

Figure 1. Systemic analysis facilitating the design of adaptive scaling strategies.
Source: Minh et al. Forthcoming.

Enabling Environment Analysis

In the subset of innovations in agricultural water management, agricultural value chains have been found to be the most typical operational setting in adaptive scaling approaches (Figure 2) (Devaux et al. 2018). It is essential to understand the enabling environment in which the scaling processes are embedded. This can be achieved by conducting an enabling environment analysis to identify enablers and hinderers influencing farmers' adoption of the technologies and introducing measures to ensure success. The enabling environment in an (irrigated) agricultural value chain is composed of the sets of policies, informal institutions, support services and other conditions that create or improve and maintain a general operational environment, bringing together value chain actors in a cooperative manner. Therefore, the enabling environment can be divided into the following three categories:

(1) A **policy environment** encompassing a set of policies and regulations that establish the basis for scaling irrigation and water management solutions as well as value chain actors' behaviors and power relations affecting irrigation development and value chain performance.

(2) **Interventions** encompassing government programs and projects as well as services and support provided by the private sector and other practitioners that enable the scaling of irrigation and water management solutions.

(3) An **embeddedness environment** encompassing both social and political embeddedness such as traditions, norms, religions, cultures, conventions, beliefs and sociopolitical imperatives that comprise an informal institutional context shaping value chain actors' behaviors regarding the adoption and facilitation of irrigation.

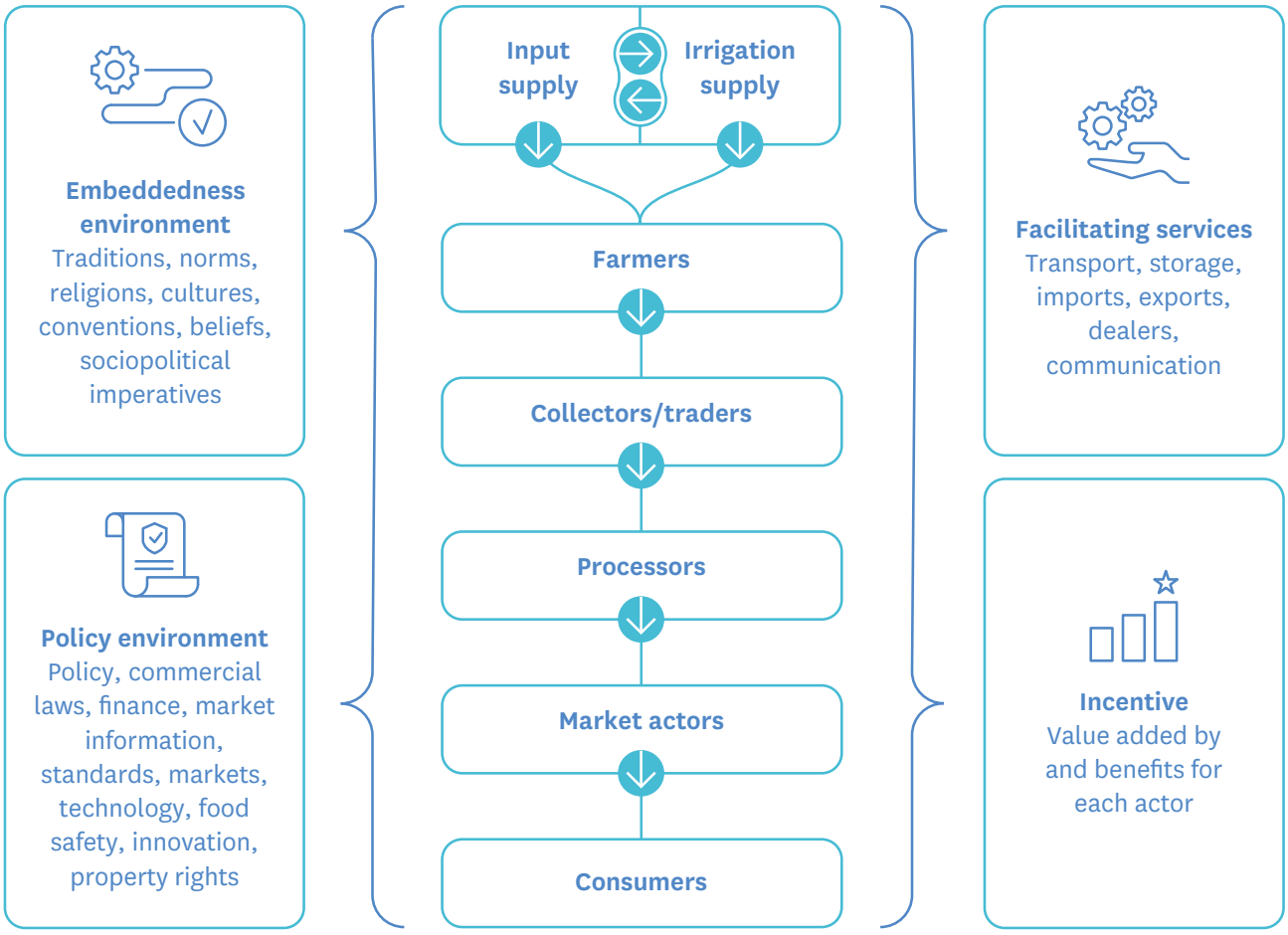

Figure 2. Irrigated agricultural value chain: An operational setting for irrigation innovation scaling.

Objectives and Questions

The enabling environment analysis aims to understand enabling and hindering factors for scaling suitable irrigation technology packages, identify constraints and opportunities for scaling technology, and develop recommendations for policy makers and practitioners to scale irrigation technology practices. The analysis seeks to provide insights using the questions below.

Expected Outputs

Based on these questions, the analysis is expected to result in a country-specific report containing the following:

- Narratives of the policy framework supporting irrigation development and the scaling of technologies.
- Narratives of public and private sector interventions supporting the scaling of irrigation technologies and services.
- Narratives of the informal institutional environment.
- Synthetic analysis as a basis for making recommendations for policy, successful scaling programs and alternative scenarios to scale irrigation and water management solutions.

Questions to consider when assessing the enabling environment across the three domains.

Policy environment

- What are the existing policies, programs and strategies (PPS) that promote the scaling of water management solutions?
- What are the objectives of these PPS and who are the target beneficiaries?
- How are these PPS being implemented and what are the dynamics/changes?
- What are the constraints and opportunities that the PPS present for scaling irrigation technologies?

Interventions

- What is the impact of existing PPS that promote the scaling of water management solutions on the ground?
- What other interventions exist beside the policy framework and what are their impacts?
- What are the gaps between the policy framework and its implementation, and what gaps exist in intervention implementation?
- What constraints and opportunities do policy and intervention implementation present for scaling irrigation technologies?
- What solutions/models/approaches could facilitate the scaling of technologies?

Embeddedness environment

- What informal rules, politics, traditions and cultures influence the development and implementation of the policy/regulatory framework?
- What customs, traditions, ethics, social norms and religious beliefs shape the practices of different actors (i.e., governments, businesses, irrigators) in scaling irrigation technologies (i.e., land ownership, gender norms, social structures, etc.)?
- How do the day-to-day operations of value chain actors (i.e., private sector, farmers) and markets influence actors' decision-making regarding promoting or not promoting the scaling of irrigation technologies (i.e., interests, prices, wages, costs, ability, network, etc.)?

Analytical Scope and Framework

To achieve the above objectives and expected outputs, the analysis covers four major areas (Figure 3):

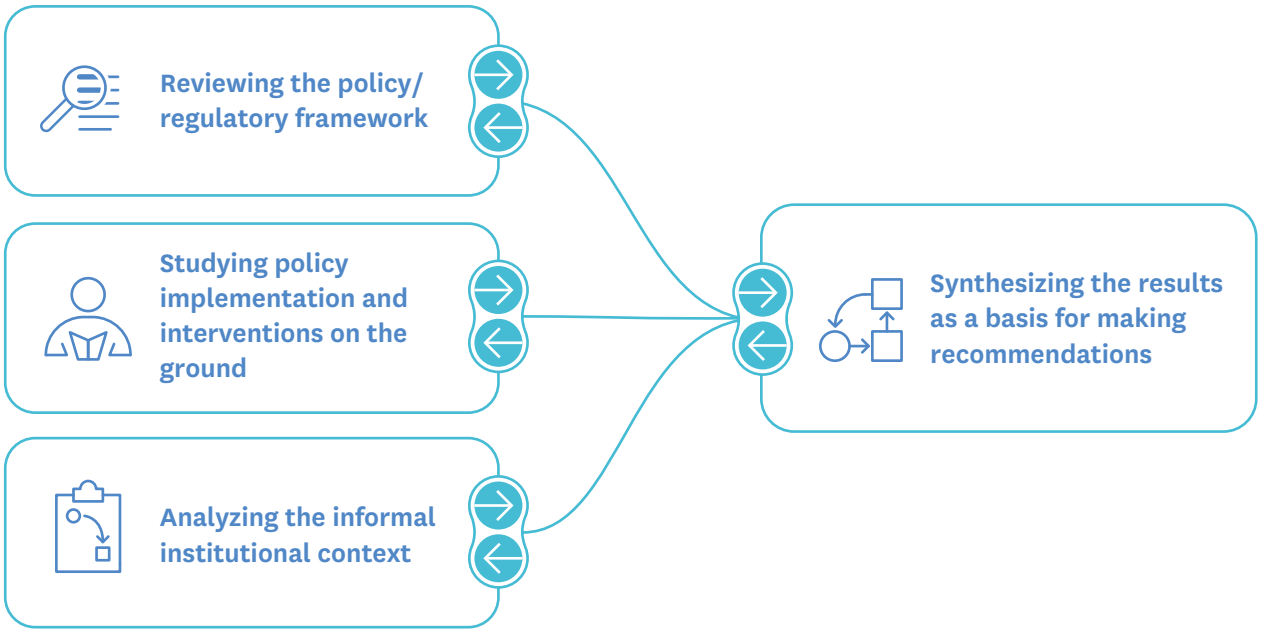

Figure 3. Enabling environment analysis to enhance the scaling of irrigation and water management technologies.

Reviewing the policy/ regulatory framework

Different policy clusters that influence the scaling of irrigation and water management technologies are reviewed to:

- provide an overview of the policy coverage for scaling;
- assess the objectives of the policy framework/coverage and its target populations;
- analyze dynamics and changes in the policy framework;
- identify problems and gaps in the policy framework; and
- identify constraints and opportunities that the policy framework presents for scaling technologies.

The different **policy clusters** include but are not limited to:

- general framework for development (e.g., food security, climate change adaptation, poverty reduction, rural development);
- regional and national water policies (e.g., development, supply, use, allocation, prioritization, management);
- irrigation development policies and strategies;
- environmental policies and strategies (storage, infrastructure, watershed management, green growth);
- land ownership and use policies;
- agricultural development policies and strategies (e.g., production, processing, marketing, consumption);
- agricultural research for development and extension (innovations) policies and strategies (e.g., technology transfer, innovation systems);
- agricultural credit policies;
- private sector participation and public-private partnership policies and strategies;
- agricultural input (irrigation) supply policies and strategies (e.g., tax exemptions, subsidies);
- gender and social inclusion policies;
- market/value chain policies; and
- institutional arrangements/coordination mechanisms.

The **policy analysis** has six steps:

Policy analysis: Analytical steps and content to analyze.

Developing an inventory of relevant and existing policy documents

- What to search for: establish sets of key words to search for policies, policy implementation documents, policy analysis reports, policy assessment reports, scientific publications and donor reports. Develop the initial sets of key words based on the different policy clusters listed above. These sets are continuously updated during the search and analysis process.
- Where to search: online; extension services; key informant interviews with government ministries, agencies and departments, and donors; and libraries of government ministries, agencies and departments as well as academic and research institutes.
- Where to store: develop a policy inventory database and a sharing platform.

Output: country-specific inventory/database of policies.

The **individual policy analysis** analyzes content in the policy documents to assess:

- objectives, goals and aims (anticipated outputs and outcomes);
- thematic focus and priority;
- rationale/context;
- frameworks;
- existing enabling environment within the policy documents (gaps);
- implementation strategies and mechanisms;
- target group (beneficiaries) and social inclusion;
- relation to irrigation technologies/solutions/scaling;
- conflicting issues within existing policy documents (e.g., unclear mandates among implementation institutions); and
- dynamics and changes in policy documents.

The **policy cluster analysis** looks for:

- overall objective of the cluster;
- policy changes;
- gaps, overlap and conflicts in cluster policy and implementation mechanisms; and
- relation to irrigation technologies/solutions/scaling.

The **cross-cluster analysis** identifies common and contradictory patterns between different policy documents and policy clusters, namely gaps, complementarities and conflicts between clusters in relation to irrigation technology and scaling approach.

The **overall analysis** reflects on the cluster analysis, and moves within and between different policy clusters to identify:

- target groups/beneficiaries/social inclusion;
- opportunities for scaling irrigation technologies;
- gaps, constraints, bottlenecks and challenges for scaling irrigation technologies;
- potential solutions/recommendations; and
- sustainability issues.

Output: country-specific policy analysis report.

Validation of results is carried out through:

- interactions with relevant stakeholders/individuals to gather more information; and
- multi-stakeholder (policy makers and influencers) meetings to discuss results (can be combined with validation of results from the intervention analysis [see page 6]).

Output: meeting report.

Studying policy implementation and interventions on the ground

In-country programs and interventions being implemented by the government, development partners and the private sector are assessed to:

- study the impacts of the policy framework and other services on the ground;
- identify existing interventions and pilot programs and their impact, and which interventions work, which do not work and why;
- identify gaps between the policy framework and its implementation as well as gaps in the existing interventions; and
- identify constraints, opportunities and lessons learned of the policy implementation and interventions for the scaling of technologies.

The various **interventions** can be categorized based on who implements them, including but not limited to policy implementation projects and programs; existing interventions and pilot studies by development actors; and existing interventions and services by the private sector.

Examples of government programs and projects include:

- agricultural development and mechanization programs;
- water and land development/planning programs;
- irrigation development programs (small- and large-scale);
- capacity building programs;
- climate change adaptation programs and strategies;
- food security programs;
- commodity-based value chain development programs;
- youth employment programs;
- microfinance programs;
- land tenure reforms; and
- seed money/business development/lease.

Examples of private sector interventions include:

- microfinance service providers;
- lease programs for agricultural equipment; and
- loans for procuring equipment.

Examples of development and nongovernmental organization (NGO) interventions consist of:

- climate change adaptation projects;
- capacity development;
- microfinance;
- land tenure reform (advocacy);
- agricultural/irrigation development projects; and
- social inclusion (gender, marginalized groups).

The **intervention analysis** has six steps:

Intervention analysis: Analytical steps and content to analyze.

Literature review to develop an inventory of current interventions

- What to search for: establish a set of key words to search for project/program implementation and strategy documents, final technical/assessment reports, donor reports, scientific articles.
- Where to search: online, extension services, key informant interviews (ministries, NGOs, donors).
- Where to store: develop an intervention database. Can be developed together with policy inventory database.
- Scope: ongoing projects/programs and those that ended at most five years ago.

Output: country-specific inventory/database of interventions.

Primary data collection is used to gather supplementary information that could not be found during the literature review as well as to validate initial findings from the literature review. Therefore, it is recommended to develop an information/data checklist based on the literature review to ensure that all supplementary information/data are collected. Primary data collection can be conducted using different methods such as:

- focus group discussions (beneficiaries/leaders);
- key informant interviews (technical staff, ministry representatives, local government representatives, NGOs, private sector, beneficiaries, donors); and
- case studies: current and individual projects/programs/interventions going back five years.

Output: country-specific report on primary data collection and creation of a database.

The **individual intervention analysis** analyzes content in the literature and primary data related to a single intervention. This analysis looks for:

- dynamics and changes in policy documents (see page 4);
- objectives;
- target beneficiaries;
- key pillars;
- start/end year (duration);
- mode of operation;
- project monitoring and evaluation structure;
- scaling model;
- irrigation technologies implemented;
- technical knowledge/expertise;
- stakeholder participation;
- progress towards the objectives/outputs/impacts;
- synergies between actors;
- bottlenecks for potential beneficiaries to participate/benefit; and
- technology adoption.

The **cross-cluster analysis** identifies common and contradictory patterns between different irrigation interventions such as (i) support for farmer-led irrigation, (ii) small-scale irrigation development, and (iii) large-scale irrigation development. The analysis looks for:

- approaches;
- effectiveness (success and failures);
- scaling mechanism;
- synergies;
- locations;
- target group/beneficiaries/social inclusion;
- technologies deployed;
- intervention gaps; and
- enabling conditions/bottlenecks for scaling irrigation technologies.

The **overall analysis** reflects on the individual intervention analysis, and moves within and between different types of interventions to identify:

- institutional arrangements and coordination on the ground;
- achieved outcomes and outputs;
- successful interventions and approaches to scaling irrigation;
- shortcomings, gaps and challenges associated with implementation; and
- political interference (changing mandates of ministries, agencies, departments, etc.).

Output: country-specific policy implementation and intervention analysis report.

Validation of results can be carried out through:

- stakeholder meetings (ministry representatives, local government representatives, NGOs, private sector, beneficiaries, donors).

Analyzing the informal institutional context

Different approaches used to analyze institutions include (i) role-based (organizations/actors determine their behavior), (ii) rule-based (formal and informal rules guide actors' behavior), and (iii) role-rule-based (rules guide actors' behavior and the actors can change the rules) approaches. In this enabling environment, informal institutions follow the role-rule-based approach. The different clusters of informal institutions include but are not limited to:

- informal rules, politics, traditions and cultures that influence the development and implementation of the policy/regulatory framework presented on page 4 and page 6 (i.e., corruption, tribal bias, etc.);
- customs, traditions, ethics, social norms and religious beliefs that shape the practices of different actors (i.e., governments, businesses and irrigators) in relation to scaling irrigation technologies (i.e., land ownership, gender norms, social structures, etc.);
- day-to-day operations of value chain actors (i.e., private sector, farmers) and markets that influence actors' decision-making regarding promoting or not promoting the scaling of irrigation technologies (i.e., interests, prices, wages, costs, ability, network, etc.).

Based on roles, actors in the enabling environment can be categorized as (i) users (farmers and farming communities); (ii) supporters (private sector, NGOs, donors, government agencies); and (iii) influencers (community leaders, farmer organizations, government at different levels, irrigation organizations, village chiefs).

Examples of informal rules that influence actors in the process of scaling irrigation technologies include:

Customs, beliefs and traditions

- Belief that irrigation is a man's activity while women process and market.
- Notion that women cannot be plot/landowners.
- Belief that the dry season is a period for social engagements rather than farming.
- Hierarchy between old and young.
- Hierarchy within community leadership structures.
- Male-female relations.
- Land ownership and access.
- Tradition of collective action.
- Belief that God is the provider of rain to nourish crops.
- Notion that interventions must be accepted first by community leaders before they trickle down.
- Beliefs based on interpretations of meteorological signs (production starts when weather observations are in line with these beliefs).

Political and development norms

- Bias toward large-scale or small-scale irrigation schemes.
- Notion that the cost of irrigation equipment is beyond the reach of smallholders.
- Mentality that the government should be the sole provider of irrigation facilities.
- Assumption that interventions must necessarily fit into existing farming systems.
- Notion that farmers do not pay back credit.
- Assumption that existing farming practices are backward/obsolete.
- Corruption (lobby, free holidays, commission, kickback, public relations).
- Informal setup of professional groups (groups of traders, groups of farmers, etc.).

Individual cognition

- Prior experience with new technologies.
- Mentality toward development projects.
- Lack of confidence in own abilities to innovate (indigenous knowledge).

Incentive structure

- Cooperative membership.
- Subsidies for technology acquisition/operation/maintenance.
- Access to inputs, equipment and markets.
- Market price for produce.
- Loans/credit/lease.

The **informal institutional context analysis** has three steps:

Informal institutional context analysis: Analytical steps and content to analyze.

Literature review (similar to the first step of the policy analysis)

- Search for, gather and file relevant literature.
- Identify and categorize informal institutions.

Output: country-specific overview of informal institutions.

Primary data collection is used to gather supplementary information that could not be found during the literature review as well as to validate initial findings from the literature review. Therefore, it is necessary to develop an information/data checklist based on the literature review to ensure that all supplementary information/data are collected. Primary data collection can be conducted using different methods such as:

- key informant, semi-structured interviews (practitioners – experiences from other scaling projects = issues to overcome); and
- group discussions (beneficiaries/leaders).

Output: country-specific report on primary data collection.

The **in-depth analysis** is conducted for both the literature and primary data. In this analysis, different clusters of informal institutions that shape and/or influence the scaling of irrigation and water management technologies are reviewed to:

- provide an overview of the informal institutional context that influences scaling;
- understand interconnections between different clusters of informal institutions; and
- identify problems/constraints and opportunities that the informal institutional context present for scaling.

Output: country-specific analysis report of informal institutions.

A farmer inspecting her sprinkler in a papaya field in Ghana.

Photo: Hamish John Appleby/IWMI

Synthesizing the results as a basis for making recommendations

A synthetic analysis is conducted to:

- identify interconnections and interactions between the policy framework, informal institutional context, and policy implementation and interventions;
- pinpoint achievements and shortcomings in the scaling of technologies as a result of the policy framework, informal institutional context, and policy implementation and interventions on the ground;
- identify alternative scenarios/solutions/models/approaches that could have addressed some or all of the shortcomings/constraints to make scaling effective while leveraging the opportunities and achievements; and
- produce specific policy and implementation recommendations.

Specifically, the synthetic analysis characterizes the enabling environment for scaling irrigation technologies by combining the results from the analyses of policies, interventions and the informal institutional context. The enabling environment can be characterized along three lines:

- Supporting environment (e.g., promoting policies, actors' strengths, success stories, complementarities, linkages).
- Hindering environment (e.g., gaps, bottlenecks, challenges, mismatch between policy and reality, actors' weaknesses).
- Drivers (e.g., new policy directions, technology, area of interest).

The synthetic analysis serves as a basis for making recommendations. It is important to identify which stakeholders (e.g., policy makers, beneficiaries) the recommendations are intended for. The recommendations can be:

- policy recommendations for irrigated agriculture;
- recommendations for successful scaling; and
- recommendations for alternative scenarios.

Conducting a strengths, weaknesses, opportunities and threats (SWOT) analysis is an effective means to establish a more holistic basis for making recommendations. The SWOT analysis can be carried out as follows:

- Using the results of the policy framework, intervention, embeddedness environment and synthetic analyses, identify:
  - internal attributes and resources that support and enable (strengths) as well as hinder (weaknesses) irrigated agriculture, and the scaling of irrigation and water management solutions; and
  - external factors that can reinforce (opportunities) and jeopardize (threats) the entity's successful support for and enabling of irrigated agriculture, and scaling of irrigation and water management solutions.
- Make recommendations using the following principles:
  - Build on existing strengths in order to seize opportunities.
  - Use opportunities to overcome weaknesses.
  - Use strengths to overcome threats.
  - Overcome weaknesses and threats through breakthrough solutions.

A farmer watering his crops at sunset in Sri Lanka.

Photo: Hamish John Appleby/IWMI

Methodology and Implementation Plan

The enabling environment analysis is a stepwise process. Depending on need, expertise and availability of human resources, the analysis can be carried out in three to six months:

Enabling environment analysis: Steps, methods and activities.

1 week

Step 1. Review and adapt/adjust tool to the country context:

- Study the tool and adapt/adjust it to the country context (if needed)
- Develop an analysis plan

Throughout the process, review and adapt/adjust the tool

1-2 months

Step 2. Conduct literature review/desk study:

- Review policy framework (page 4)
- Study interventions on the ground (page 6)
- Analyze informal institutional context (page 8)
- Conduct synthetic analysis (page 10)

1-2 months

Step 3. Validate findings and consult stakeholders:

- Validate the findings from the literature review
- Collect primary data to fill any information gaps from the literature review
- Consult different stakeholders, including policy makers, government implementing agencies and development partners

Method options:

- Field visits and observations
- Focus group discussions
- Semi-structured interviews
- Case studies
- Stakeholder consultation workshops at different levels

1-2 months

Step 4. Carry out primary data analysis, and write and finalize report:

- Share the findings with key stakeholders
- Finalize the report based on feedback received from key stakeholders

Throughout the process, analyze the data and draft the report

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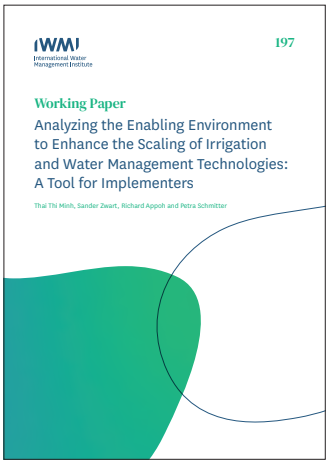

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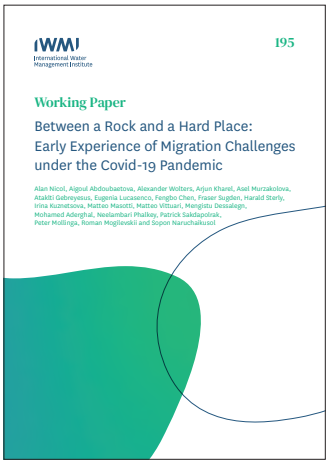

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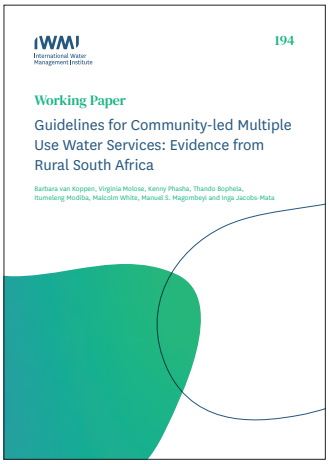

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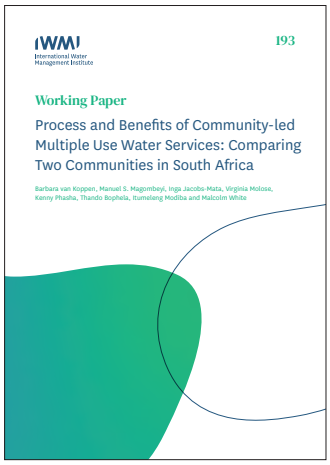

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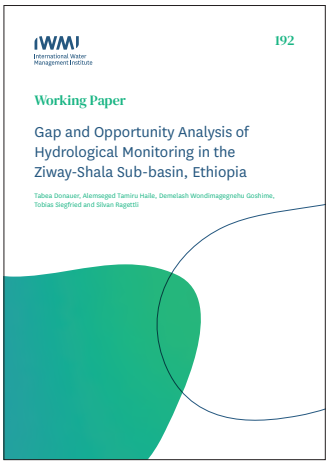

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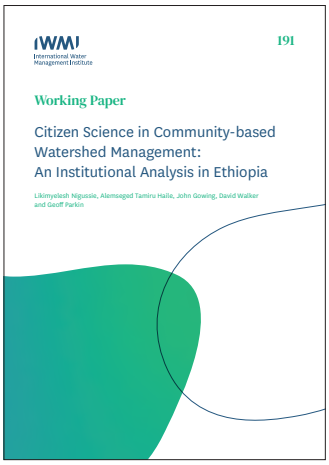

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