

IFAD Policy and  
Technical Advisory  
Division (PTA)  
Water and Rural  
Infrastructure

See  
[www.fao.org/nr/water/news/rural-poor.html](http://www.fao.org/nr/water/news/rural-poor.html) and [www.fao.org/nr/water/projects\\_rural.html](http://www.fao.org/nr/water/projects_rural.html)

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[www.awm-solutions.iwmi.org](http://www.awm-solutions.iwmi.org) and  
[www.fao.org/nr/water/projects\\_agwatermanagement.html](http://www.fao.org/nr/water/projects_agwatermanagement.html)

## Using livelihood to map best investments in water

### Introduction

In 2005, IFAD and the Food and Agriculture Organization of the United Nations (FAO) formed a partnership to promote a better understanding of the links between rural poverty, livelihoods and water access. Together they developed an approach to map information relating to poverty, livelihood activities and water availability across sub-Saharan Africa. By correlating this information, they have been able to substantiate context-specific proposals for water investments.

This methodology has provided the basis for subsequent livelihood mapping activities developed in collaboration with FAO and other partners with the financial support of the Bill & Melinda Gates Foundation. The resulting mapping tools and publications available online are a key resource, providing a range of easily accessible information on livelihoods, agro-ecological zones and appropriate context-specific water interventions. It is now possible to make rapid and accurate calculations related to water interventions within complex and highly variable contexts. The mapping tools help inform interventions at the national level, as well as regional-level policy dialogue and budgeting, and will continue to be developed and refined at the global, regional and country levels.

### The context

The interrelation between water availability and rural poverty and livelihoods is not always fully understood among the international development community. Water is an essential productive resource, and water access is a major factor in impeding or contributing to agricultural productivity and rural poverty reduction. The vulnerability of poor rural communities is intimately linked to:

- Highly variable and erratic rainfall
- Poor development and management of infrastructure (including simple, localized infrastructure) to access and control water resources (both surface and groundwater)
- Lack of effective land and water governance
- Limited access to water for domestic and other productive uses

When farmers do not have secure access to water, interventions addressing other constraints – such as soil fertility and access to markets and inputs – will not reach their full potential. Reliable access to water gives farmers the security and confidence to make investments in inputs such as infrastructure, fertilizers and improved seeds, and enables them to increase their productivity (and therefore also water-use efficiency) and eventually to grow higher-value crops. With good water management, farmers can often turn agriculture from a subsistence activity into a profitable enterprise.

Climate change represents an additional water challenge for poor rural communities, and a further argument for investment in water management. Enhanced control of water will become critical in building resilience to increased climate variability.

The mapping and analytical approaches that FAO has been developing since 2006, with the technical and financial support of IFAD and the Gates Foundation, gather and present a wealth of information and knowledge. They demonstrate the close links between water-sector interventions and benefits for agriculture and rural poverty reduction, and propose a series of appropriate solutions for water-related investments.

### **A new knowledge and reference tool: concept and methodology**

The first exercise in mapping livelihoods to target agricultural water investments, which ran from 2006 to 2009, was a grant programme initiated by IFAD's PTA-Water in partnership with FAO. It used FAO's global databases on agro-ecological zones and natural resources, in addition to its analysis and mapping capacity, and combined this expertise with IFAD's focus on rural poverty and livelihoods to create a new knowledge and reference tool. **This was the first step in an effort to identify optimal water investments that can be made in a given location for better development impact.**

The programme was designed to illustrate the linkages between water and rural poverty at the regional level, and to help decision makers make informed choices about where and how to make water investments. **Sub-Saharan Africa was selected for this first mapping exercise because it is the region with the highest incidence of rural poverty in the world.** The specific goals of the programme were to:

- Create a regional methodology and draft a national methodology (for Ethiopia) for the mapping tool

- Assess the contribution of agricultural water (rainfed and irrigated agriculture, water for livestock and fisheries) to rural development with a pro-poor rural livelihood focus
- Provide inputs for the development of IFAD's strategy for water and the rural poor
- Establish a more operational relationship between FAO and IFAD in the water sector
- Highlight within FAO and IFAD the link between water and the rural poor
- Strengthen the position of IFAD and FAO as innovators and learning institutions in water and rural poverty reduction

The methodology evolved through a consultative mapping process involving a range of stakeholders: IFAD staff, consultants, local institutions and others. One of the main challenges for FAO was finding a means of inserting the livelihoods approach – the human dimension – into their technical databases. The lengthy learning process for both partners paid off.

The resulting tools – a series of interactive and static maps available online – illustrate the extreme diversity of circumstances facing rural people across the region, and the many water-related challenges and opportunities for different categories of rural operators. The maps provide information on agro-ecological zones, rainfall and groundwater availability, and irrigation infrastructure; different farming typologies and main sources of income; the distribution of rural poverty; and other related issues.

The main findings of the mapping exercise are available in a joint publication titled *Water and the Rural Poor: Interventions for improving livelihoods in sub-Saharan Africa*. The report presents a qualitative dimension to the data processing that produced the maps, thanks to a team of experts who analysed 13 livelihood zones in sub-Saharan Africa. Using a simple and transparent criteria analysis that measured rural poverty, agriculture and water resources, the team assessed the potential for reducing poverty through water investments in each livelihood zone. The report argues that there are many opportunities for well-targeted, local interventions in water that can contribute to rapid improvements in the livelihoods of poor rural people. It discusses conditions for success and proposes water-based, context-specific and livelihood-centred approaches to poverty reduction in rural areas.

The report emphasizes that small-scale irrigation systems that are easy to operate and maintain can make a significant difference in improving water management in agriculture that is currently rainfed.

#### **Links**

FAO interactive maps  
[www.fao.org/nr/water/art/2008/flash/ruralmaps/gallery1.html](http://www.fao.org/nr/water/art/2008/flash/ruralmaps/gallery1.html)  
[www.fao.org/nr/water/projects\\_rural.html](http://www.fao.org/nr/water/projects_rural.html)

**Water and the Rural Poor: Interventions for improving livelihoods in sub-Saharan Africa**

<ftp://ftp.fao.org/docrep/fao/010/i0132e/i0132e.pdf>  
(English)

<ftp://ftp.fao.org/docrep/fao/011/i0132f/i0132f.pdf>  
(French)

It also highlights the need for investments in water management to be planned and implemented in the broader framework of agriculture and rural development, where production, markets, finance and infrastructure are all conceived in an integrated way. Clear policies need to be put in place to allow equitable access to water by poor farmers.

The published report was very well received: within six months all copies were exhausted and a reprint was needed. The publication has now been translated into French.

The IFAD-supported effort also resulted in the methodology being adapted and piloted across Ethiopia. This country-level methodology has been further developed through the FAO/Gates Foundation programme.

## Evolution from a regional to a national tool

Building on the tools created and experience accrued during the first grant programme, and with funding from the Gates Foundation, FAO worked in partnership with other institutions (including the International Water Management Institute, the International Food Policy Research Institute and the Stockholm Environment Institute) to develop an operational tool based on livelihood mapping for planning agricultural water investments at the national level. The project ran from 2009 to 2012 and was based on pilots in six countries: Burkina Faso, Ethiopia, Ghana, India (in the states of Madhya Pradesh and West Bengal), United Republic of Tanzania and Zambia.

The resulting series of mapping and information products (maps, charts, tables) for the six countries covers topics such as:

- Water availability
- Perception of water as a limiting factor for agricultural production
- Rural population density
- Poverty (prevalence of underweight children)
- Number of potential beneficiaries from agricultural water interventions
- Biophysical suitability for proposed solutions (small motor pumps, valley bottom irrigation, small reservoirs, etc.)
- Livelihood-based demand for proposed solutions

During the project, the mapping technology identified concrete, evidence-based knowledge and decision-making tools at the national level, which can in turn stimulate and support investment policy and implementation strategies. Investment briefs were prepared

## Solution 2: Water harvesting ponds

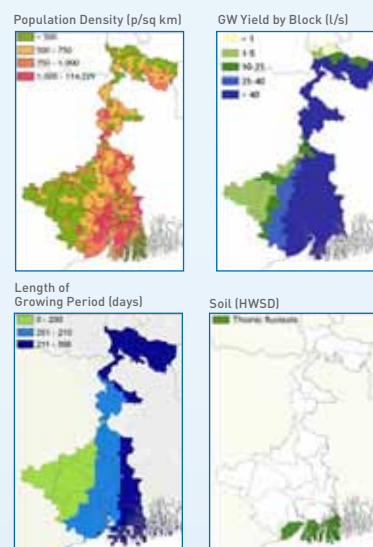
### Biophysical suitability



Highly suitable Moderately suitable

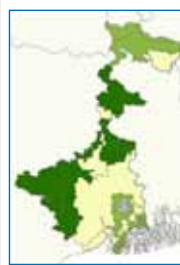
Physical suitability for water harvesting has been assessed on the basis of: low groundwater yield (block aggregated values), lower population density, length of growing period (shorter LGP area preferred), and occurrence of Thionic Fluvisols as an indication of seawater intrusion.

### Biophysical criteria and conditions



Biophysical criteria and conditions			
Population density	Groundwater yield	LGP	Soil
Required: < 500 p/sq km	Required: < 25 l/s	Highly suitable: < 200 days	Thionic Fluvisols (coast only)

### Livelihood-based demand



The livelihood-based demand is assessed through the analysis of the livelihood context of the zone. In particular, the context is assumed to be more favorable in zones with relatively higher prevalence of:

- **Marginal farmers** this technology would imply having sufficient land to construct the pond. Therefore, this typology of farmers is considered to be more in demand of this technology
- **Areas where groundwater resources are partially or totally depleted.** Farmers residing in these areas are considered to be more in demand of this technology as they cannot make use of groundwater.

High  
Medium-high  
Medium-low

for each country. These briefs mapped and assessed the potential for investments in agricultural water management. In-depth livelihood zones analyses were also prepared for the selected countries. These documents analysed solutions for agricultural water management, and identified technologies and the necessary supporting policies and institutions. They also proposed **business models** to make the solutions viable and available. The results of this mapping exercise are available online.

## Verifying the accuracy of the national level tool

From 2011 to 2013, in coordination with FAO, a second IFAD grant programme<sup>1</sup> revisited the livelihoods mapping methodology and adapted it to the **Asia and Pacific region** (South, South-East and East Asia) context. This region has the **second highest incidence of rural poverty in the world**. The grant funded the continuation of the successful study on *Water and the Rural Poor: Interventions for improving livelihoods in sub-Saharan Africa*. The

### Links

Agricultural water management solutions project  
[www.fao.org/nr/water/projects\\_agwatermanagement.html](http://www.fao.org/nr/water/projects_agwatermanagement.html)  
<http://awm-solutions.iwmi.org/home-page.aspx>

Assessing the potential for poverty reduction through investments in agricultural water management: A methodology for country level analysis  
[www.fao.org/docrep/016/i3056e/i3056e.pdf](http://www.fao.org/docrep/016/i3056e/i3056e.pdf)

<sup>1</sup> Study on Water Interventions for Improving Smallholder Farming and Rural Livelihoods in Asia and the Pacific. See [www.asia-water.org/index.php?option=com\\_content&view=article&id=215](http://www.asia-water.org/index.php?option=com_content&view=article&id=215)

aim was to adapt and improve the original regional model to determine whether the results of country analysis aligned with the results from the regional methodology, and how they could contribute to a more accurate regional assessment.

The programme sought to verify the accuracy and applicability of the national livelihood zoning methodology by focusing on five countries in the region: Bangladesh (north-east region), Cambodia, China (Hunan Province), India (Jarkhand State) and Sri Lanka. The countries were selected to tie in with the design of IFAD-funded projects.

The adapted country-level mapping methodology was to present the linkages between water management, poverty and rural livelihoods in Asia and the Pacific. This is a region that faces multiple water challenges, in particular as a result of the impact of climate change. The map of the distribution of chronically poor groups was to inform recommendations on appropriate water interventions for each of the livelihood zones. However, the complexity of the livelihood systems was such that the linkages could not be ascertained within the two years of the programme.

The tools that can be created from these livelihood maps and recommendations

would help provide demand-based and outcome-oriented policy and technical advice to decision makers, investment and financing institutions, and other practitioners at the regional, sub-regional and national levels, including municipalities and local communities within the region.

### Tools for widespread dissemination

The potential application of these mapping tools is immense. The information they present places emphasis first and foremost on the needs of rural communities. The tools save time and money by making water expertise more apparent and easily accessible to IFAD staff involved in designing and implementing development interventions. They provide a picture of water issues, water needs and water use patterns from across a region to a precise locality. This breadth of information has many applications such as:

- Policy dialogue and negotiation with donors at the regional and national levels
- Decisions about investments to be made
- Baseline surveys
- Project implementation

The methodology will be further developed and refined for broader global application.



### Sources

Agricultural water management solutions project  
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FAO Country investment briefs

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FAO Livelihood zones analysis

[www.fao.org/nr/water/docs/BFA\\_LZ\\_analysis.pdf](http://www.fao.org/nr/water/docs/BFA_LZ_analysis.pdf)

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