AGWATER SOLUTIONS
Improved livelihoods for smallholder farmers

NOVEMBER 2009

This briefing note synthesizes the presentations made by the AgWater Solutions Project team and discussions that followed with the workshop participants.

ETHIOPIA NATIONAL CONSULTATION

Introduction

The AgWater Solutions project is helping to unlock the potential of smallholder farming through agricultural water management (AWM) solutions. This includes technologies and approaches, such as soil moisture management, drip irrigation and water harvesting techniques, as well as the supporting policies, institutions and business models. Partnerships are key to the success of the project. As such, the project promotes collaboration at all levels with, and between, a range of stakeholder groups including researchers, policymakers, investors, farmers and implementers.

The National Consultation Workshop was an opportunity for such engagement and for participants to share their opinions on AWM solutions that would be appropriate for Ethiopia and could be out-scaled. This briefing note provides a short summary of the discussions held during the Workshop and the AWM solutions that were prioritized. For more information on the AWM solutions currently being used in Ethiopia the reader is referred to the Situation Analysis Briefing Note, which is also available on the website.

Ethiopia Situation Analysis

The project undertook a rigorous Situation Analysis in each project country. This analysis identified a wide variety of AWM solutions in various parts of the country.

AWM technologies reviewed

- Micro-dams.
- River/stream diversions – communal/smallholders; commercial/large scale.
- River/stream pump systems.
- Groundwater irrigation systems.
- Pond systems.
- Spate irrigation/flood diversion.
- In-situ water soil conservation: planting pits; trash lines; stone bunds; tied ridges.
- Tankers (underground storage).
- Watershed management.
- Gully reclamation.
- Lake pumping.
- Roof water harvesting.
- Recession irrigation/agriculture.
- Water management for waterlogging.

The Situation Analysis also identified a number of key organizations in AWM and policies and strategies that were designed to support agricultural production and water management.

Key Organizations

- Ministry of Water Resources (MoWR)
- Regional Water Resource Bureaus (RWRBs)
- Ministry of Agriculture and Rural Development (MoARD)
- Regional Bureaus of Agriculture and Rural Development (BoARD)
- Ministry of Finance and Economic Development (MoFED)
- Ethiopian Institute of Agricultural Research (EIAR)
- Higher Learning Institutions (e.g., Universities of Mekele, Hawasa, Arba Minch and Addis Ababa).
- Prolinnova Ethiopia and Agri-service (establish platforms to work with and learn from farmers).

Participants' Impressions of AWM in Ethiopia

The Situation Analysis found that there was high interest in AWM in the country, and that the government was proactive at implementing solutions. However, several of the workshop participants felt that not enough is being done and that there is still insufficient information about irrigation, problems and available solutions. Consequently, there needs to be integration of knowledge across sectors and a single institutional home for AWM interventions. Currently, there is a problem of overlapping mandates between MoWR and MoARD at federal level and between RWRBs and BoARD at regional level.

Potential of AWM Solutions for Scalability

Participants were asked to score the most promising AWM interventions by agroclimatic zone (Figure 1), and this was combined with other key informant opinions to determine the potential for scaling the AWM solutions identified. Technical feasibility, financial affordability and practicability for smallholder farmers were all taken into account. Those ranked highest in each zone were:

- National (overall) - river/stream diversion; groundwater irrigation; river/lake pumping.
- Hyper-arid - tanks (storage); groundwater irrigation; watershed management (gulley reclamation).
- Arid – groundwater irrigation; in-situ water soil conservation; river diversion; small reservoirs.
- Semi-arid - small reservoirs; groundwater irrigation; river diversion; pond systems; spate irrigation.
- Moist-humid - river/stream diversion; river pumping; watershed management (gulley reclamation).

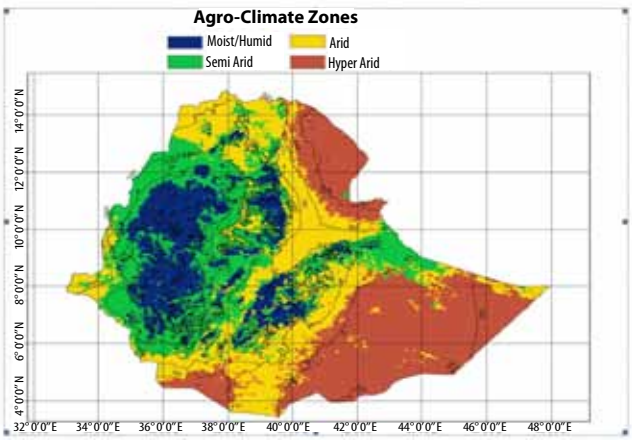

Figure 1. Agroclimatic zones of Ethiopia

River and Stream Diversions

The preferred form of irrigation along many perennial rivers and streams is gravity diversion. Diversions fall into two categories:

- In traditional schemes the construction, water allocation, operation and maintenance (O&M) activities are managed and coordinated by the farmers through their water user associations (WUAs). There are, however, problems with organization and conflict.
- Modern diversion schemes are said to be the most successful AWM systems in the country. They are often developed by the government or with the financial support of NGOs but community members are responsible for the management. A drawback is that they have high construction costs but once established they have low operational requirements and costs.

River and stream diversions are considered technically simple, financially affordable and reliable. Diversions are also a scalable option given the water resources of Ethiopia. Factors for success include a strong community organization to maintain structures, efficient use of water and avoiding conflicts. Environmental impacts should be considered if such schemes are to be dramatically up- or out-scaled.

Groundwater Irrigation

Groundwater irrigation is highly successful in the humid areas of the midlands and highlands of Ethiopia. Hand-dug shallow wells are not expensive and are commonly constructed by households wherever the water table is no deeper than 10 m. In contrast, deep wells need higher investments and are usually drilled by a coalition of farmers who pool their resources, or are supported financially by the government or NGOs.

The challenge with utilization of most groundwater is the lack of water-lifting technologies. Treadle pumps, suction pumps and "rope and washer" are some of the technologies recommended for shallow wells but they are often criticized for their high labor requirements. Poor households with sufficient family labor may be willing to accept this, whereas wealthier farmers have been found to adopt motorized pumps.

In agroecologies where sufficient groundwater resources are available, the out-scaling of hand-dug wells seems to be environmentally and economically feasible if complemented by appropriate water-lifting devices. They have a relatively limited adverse effect on downstream biodiversity and economic activities, unless there is a dramatic increase in the use of motorized pumps, particularly in locations where recharge is slow. The main threat to this AWM solution is, however, that water tables drop during droughts, which occur at 4-5 year intervals in Ethiopia. This results in major agricultural and livelihood impacts and high costs for water-lifting which may not be viable.

River and Lake Pumping

River and lake pumping is done where diversion by gravity may not be feasible but it is often capital-intensive. Such schemes are rarely suitable for poor farmers but can be rewarding if collectively implemented and managed. They are particularly successful in areas with good access to markets.

Despite the costs there are many examples of lake and river pumping in Ethiopia, and there is support from the government to out-scale this AWM solution. There are, however, concerns over sustainability and conflicts with downstream users. Thus it is suggested that it is only suitable for scaling up or out if water saving techniques are introduced and adequate management plans are put in place. A detailed study should be conducted to determine where scaling is feasible and to what extent.

The Workshop Discussions

The participants discussed the AWM technologies reviewed in the Situation Analysis and related them to their particular experiences in certain regions. They commented that construction of water harvesting structures, river diversions and micro-dams is going well in Tigray but WUAs are weak and handover is a problem. In general, the use of drip and

treadle pumps is increasing but management structures are absent. Rope pumps are being used in certain areas but funding is an issue. Large rivers are being diverted for irrigation, and participants felt that the implications needed to be reviewed.

Major Challenges

Considering the wealth of AWM solutions already being employed in Ethiopia, the support from the government and the natural resources that Ethiopia possesses, there is considerable potential to up- and out-scale various AWM solutions but there are some serious challenges. These include:

Knowledge gaps and lack of improved irrigation technologies - The extension services provided by the government with respect to irrigation are at present negligible. Consequently, many farmers lack skills and guidance in community-level water management, distribution, and O&M of infrastructure, leading to serious mismanagement problems in small-scale irrigation schemes. That said, farmers are very resourceful and skilled at innovation, as demonstrated by the variety of AWM solutions in use across the country. This tends to be of more benefit in individually-managed AWM solutions as opposed to communally-managed solutions.

Water conflict - With the increasing problem of water scarcity, conflicts between upstream and downstream users have become more serious than ever before. Careful planning and management are required to avoid exacerbating this problem.

Water availability - According to MoARD (2009), the potential irrigable land in Ethiopia is between 3.7 and 4.3 million hectares but the actual irrigated area is estimated at just 7-10% of this. The plan is to increase this irrigated area but the water many not be available at the time and place required.

Participants' Perspectives on Areas for Research

The participants wanted the full range of solutions covering extension, agronomy, supplemental irrigation, inputs, capacity-building, management systems, financing and institutional arrangements for AWM to be considered. Conservation of resources and rehabilitation of existing schemes were seen to be as important as new irrigation solutions.

The participants felt strongly that the project should draw on the wealth of existing farmer knowledge and experience. In addition, women play an important role in aspects of the farming systems, such as crop choice, and their opinions must not be overlooked.

Next Steps

The choice and design of the in-depth case studies have taken account of the scoring and suggestions made in the workshop. The participants suggested that the project engage with: the multi-stakeholder platform of the Sustainable Land Management program (supported by World Bank and MoARD); Prolinnova Ethiopia; the National Irrigation Steering Committee which holds a Forum every 2 years; and the IMAWESA network.

For more information on what has been achieved since this workshop please see the Ethiopia Country Update on the project website.

Contributors:

Dr. Seleshi Bekele, Dr. Deborah Bossio, Dr. Charlotte de Fraiture, Dr. Regassa Namara, Ms. Nadia Manning, International Water Management Institute (IWMI); Dr. Worku Tessema, Dr. Gebrehaweria Gebregziabher and Dr. Gezahegn Ayele (Consultants); Dr. Beyene Tadesse, Development Economics Consultant; Mr. Guido Santini, Food and Agriculture Organization of the United Nations (FAO).

Attended by representatives from:

Concern Engineering; WVE; SG2000; IDE; Oromia Agricultural Research Institute; GTZ; MoARD; Ethiopian Development Research Institute (EDRI); Amio Engineering; Oromia Land and Environmental Protection Bureau; Adama University School of Agriculture; SNNPR Water Resource Development Bureau; Hawassa University; ORDA; Oromia Water Works Construction Enterprise; Gambella BoARD; Leasita Irrigation Users Coop.; Kobo Girana Valley Development Program Office; Bruh Tesfa Irrigation & Water Technology; Tigray Water Bureau; Mekelle University; Tigray Bureau of Agriculture & Rural Development; Tigray Water Resources, Mines & Energy Bureau; Relief Society of Tigray (REST).

References

MoARD (the Ministry of Agriculture and Rural Development). 2009. Small scale irrigation capacity building strategy for Ethiopia: Output of a tripartite cooperation between the Federal Republic of Germany, the State of Israel and the Federal Democratic Republic of Ethiopia.

Stay informed. Join the mailing list to receive briefs and other project outputs by writing to us at AWMSolutions@cgiar.org.
Find out more on the AgWater Solutions website http://awm-solutions.iwmi.org