

# HOW CAN RAINWATER MANAGEMENT HELP SUPPORT FOOD PRODUCTION AND SMALLHOLDER FARMERS' ABILITY TO ADAPT TO CLIMATE VARIABILITY AND CHANGE?

Rainwater management strategies represent a key climate smart agriculture approach centered on capturing, storing, managing and increasing productivity of water for climate change adaptation. It ensures rehabilitation of landscapes and sustains crop and livestock production during prolonged dry periods, as well as mitigating flood events. This is a smart strategy since it is decentralized, adaptable, inexpensive, relevant to large areas of lands currently being used for rainfed agriculture, and capable of managing under scenarios of increasing or decreasing rainfall.

Climate predictions indicate both increases and decreases in rainfall in various African basins, where 90% of smallholders rely on rainfed agriculture. Although there is a debate on the increase or decrease of rainfall in Africa, there is an agreement among climate scientists that there will be an increase in temperature. Increasing temperature will increase unproductive water loss thereby reduce soil water availability, decrease productivity and aggravate food insecurity. Adapting to these conditions in rainfed systems requires a continuum of interventions to suit a variety of landscapes and climate scenarios. This session will provide a framework for rainwater management approaches and illustrate how they contribute to climate adaptation, livelihood improvement and sustainable natural resource management. It will examine the mix of technical, institutional and process innovations needed in order for rainwater management to be successfully implemented at scale.

This session will explore five climate smart technologies:

1. Zai pits for in situ water management
2. Groundwater utilization
3. Small reservoirs
4. Landscape water management
5. In-field rainwater harvesting



## Headline Messages

**1. Global climate change will affect river basins in different ways. The most difficult changes to handle are likely to be increases in seasonal and inter-annual variability of rainfall in many of the basins, which is particularly challenging in sub-Saharan Africa where primarily smallholder rainfed agriculture supports 95% of production.**

The Volta basin is classified as 'highly seasonal' with low precipitation and high temperatures coinciding to make crop production particularly vulnerable to water constraints. In the Limpopo seasonality and low rainfall conspire to create vulnerability, and in the Nile basin rainfall variability is considered the major water related vulnerability. Predictions, which still have a great deal of uncertainty, indicate that rainfall variability, which is already a major problem, will increase in all these basins, total precipitation will increase in Nile and Volta, but decrease in Limpopo, and temperatures will increase significantly across all three. Thus climate change will increase water related vulnerability in all three basins, but in different ways.

**2. Because of variability in climate, landscapes and livelihood strategies a continuum of water management approaches and methods are needed which are decentralized, adaptable, inexpensive and applicable under scenarios of increasing or decreasing rainfall.**

It is well accepted that water storage, in its various forms, provides a mechanism for dealing with rainfall and climate variability that, if planned and managed correctly, increases water security, agricultural productivity and adaptive capacity. As such, water storage can make an important contribution to safeguarding livelihoods and reducing rural poverty. Systems that combine complementary storage options are likely to be more adaptable and acceptable than those based on a single storage type. Livelihood strategies and landscapes vary across sub-Saharan Africa. Scoping studies indicate that while 4.6 million people on 9.4 million ha of land could benefit from water storage leading to full irrigation, more than 27 million people on 64 million ha of land could benefit immediately from soil moisture management.



### 3. Rainwater management applied at multiple scales in a coordinated, inclusive manner is an important contributor to climate change adaptation.

Evidence shows rainwater management can regulate water budgets and buffer during dry-spells, enabling food production and productivity during abnormal periods that are predicted to increase due to climate change. By reducing unproductive evaporation it can also contribute to mitigation through increased carbon sequestration, increased biomass and vegetation cover in African landscapes.

### 4. Water management for adaptation would have greater impact if a shift in emphasis is made towards coordinated multi-sectoral small-scale, adaptable technologies

In many countries, water policies (national, regional, public and private) tend to focus on large scale infrastructure and are fragmented across scales and sectors. The government of Ethiopia has shown its commitment, and has plans for 1.8 M ha of land to be irrigated by 2015, with approximately even distribution among medium, large and small scale irrigation, and rainwater harvesting. They also have complementary plans for land management through the 'Investment Framework for Sustainable Land Management'. The newly constituted Agricultural Transformation Agency may help Ethiopia accelerate realization of these plans. Review suggests that development of a specific 'green water' policy integrating land and water management based on integrated water resources, agricultural and rural development and environmental sustainability policies, may provide positive incentives for long-term investments.

## What is needed for the Rainwater Management have impact at scale?

Common across the adoption of the range of these technologies is:

1. Commitment from national government and regional institutions, translated into policy, budgets and implementation;
2. Institutional support – encouraging uptake from a range of adaptable technologies, facilitating collective action and ensuring inter-sectoral coordination;
3. Government investment in small-scale infrastructure (often contrary to development assistance and foreign investors' agendas);

4. Investment in market infrastructure;
5. Decision making based on participatory planning and inclusive land use policy.

## What can we do now?

Action needs to take place now to bring the full range of water management strategies to the forefront of climate smart agricultural development. Combined and coordinated initiatives at local, national and regional levels need to take place in order to ensure today's opportunities are maximized.

At the international and regional level the Africa Climate Policy Center of the UNECA has an important role in coordinating consensus on adaptation priorities for sub-Saharan Africa. In addition, regional bodies such as basin authorities (e.g. the Nile Basin Initiative and the Volta Basin Authority) and regional eco-political bodies (e.g. ECOWAS, SADC and COMESA as well as regional development banks such as the ADB) have a role in setting policy, investment priorities and negotiating amongst countries in transboundary basins.

At national level, rapid diagnosis in any given country can flag the needed entry points, ensuring that the science informs analysis and response. In Ethiopia, for example, capacity for implementation of good policy is a weakness that needs investment now and is a recognized priority by government. Similarly, genuine participation of water users and food producers to both identify problems and seek solutions will ensure the appropriate water management adaptation strategies are put in place.

To be climate smart, agricultural water management needs to be considered in all rural development initiatives by international and national investors. Necessity driven innovation by farmers and farmer to farmer learning may constitute some of the biggest sources of transformation of rural communities and landscapes. To bring long-term sustainable adaptive capacity benefiting the rural poor, farmer driven innovation needs support and encouragement that respect local land tenure and water rights and adapt to their evolutions, equity in access to resources and markets, finance, information and insurance.