

ADAPTS: Adaptive Water Management at a Local Scale

Ethiopia case study

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R. Lasage¹, A. Seifu², M. Hoogland³, A. de Vries⁴

1) IVM, 2) Afd, 3) BothENDS, 4) Acaciawater

GOAL OF ADAPTS

Climate change is expected to result in gradual changes in temperature, rainfall patterns and sea level rise, but also increased climate variability and extreme events, threatening water availability and food security for millions of poor people. Adaptation strategies to deal with these impacts are urgently needed from the level of communities to national governments.

In 2008, the Institute for Environmental Studies, ACACIA Water and Both ENDS started the ADAPTS project. The overall aim of ADAPTS is to increase developing countries' adaptive capacities by achieving the inclusion of climate change and adaptation considerations in water policies, local planning and investment decisions.



Fig. 1 The six case study areas.

To achieve this goal, ADAPTS focuses on:

- **1. Knowledge development:** developing climate change information and studying how local water management can be made climate-proof.
- **2. Local Action:** the identification, support, documentation, analysis and dissemination of innovative, locally-based interventions to ensure that local knowledge and visions are included in basin and national policy dialogues.
- **3. Dialogue:** establishing policy dialogues between local and national stakeholders on the issues of sustainable water management and adaptation to climate change.

ADAPTS sets out to show that adaptation is already taking place at local level, and aims to provide practical experiences from various contexts to feed discussions on climate-proofing of water management both at local and (inter)national level.

The project is being implemented in six river basins around the world. Project with a three year duration are being carried out in Ethiopia, Ghana and Peru. Studies with a one year duration are being carried out Botswana, Brazil and Vietnam. This fact sheet provides an overview of the main challenges and activities in the Genale-Dawa basin in Ethiopia, with a focus on the Borana Zone.

ETHIOPIA CASE STUDY

The Borana zone in southern Ethiopia has a semi arid savannah landscape. Most of the 960.000 inhabitants depend upon livestock herding following traditional pastoralist systems. Especially during the dry seasons they lack easy access to safe water and women and children have to walk up to 10 to 20km to water sources. The poor quality of drinking water results in serious health problems. Water-related diseases, such as cholera and diarrhea, are among the major causes of child mortality, which is 142 per 1000.



Fig. 2 Borana Girls fetching water

ADAPTS aims to increase resilience of these pastoralist communities to climate change by introducing sand dams and other rain water harvesting systems; to bring sand dams under the attention of policy makers; to assess sustainability of sand dams under future scenarios; and to show how local actions contribute to a regional solution with respect to water availability.

CLIMATE CHANGE AND VULNERABILITY

For this century climate projections for the Borana zone show a rise in temperature of circa 3 °C, and rain is expected to become more variable. During droughts small scale agriculture will fail, livestock mortality will sharply increase and the productivity of livestock will decrease. Women and children left in the sedentary villages need to travel large distances to fetch drinking water.



Fig. 3 A sand dam in Borana.

LOCAL ADAPTATION

ADAPTS will assess the effectiveness and sustainability of sand dams in improving local water availability under current and future circumstances, and how it can be included within Borana community traditions. Also how costs and benefits of sand dams compare to techniques like cisterns and boreholes. This information will promote the inclusion of water harvesting/sand dams in zonal planning, and will be used in replication of sand dams throughout the country.

LOCAL PARTNERS

Action For Development (AfD) implements a variety of integrated development projects in Borana and South Omo zones in Ethiopia. The main focus is on rural/pastoral livelihoods diversification, water resource development and community managed disaster reduction. AfD is active in improving water availability for communities in Borana area for the past ten years. In 2007 they were trained in the construction and management of sand dams by the Kenyan NGO SASOL.

The Borana Water Resource Office is a governmental institution at zonal level which implements policies, laws and regulations related to provision of potable water and sanitation services to communities. It also coordinates the development and implementation of 5 year plans for water resources.

SUCCESES

Since the start of the ADAPTS project in Borana in 2008 we achieved the following:

- Two sand dams have been constructed, making water available to the communities.
- A basin approach is introduced in the Genale-Dawa basin, and this line of thought is taken up by the water resource office and AfD.
- Increased the awareness of stakeholders at local and national level on the impacts of climate change on livelihoods of local communities by organizing workshops and field visits.
- Local government, an Ethiopian university and AfD started to cooperate, leading to insights from different perspectives (implementers, policy makers and researchers).
- Showing the sustainability sand dams in the region under current and future circumstances.
- Dissemination of the sand dam technology by training various implementers which are active in other parts of Ethiopia. In the field and in workshops.
- Action for Development has increased capacity to reach its goals, through the participation in local research, and international workshops and field visits.

IMPLEMENTED WORK

Assessment of water resources in the area and demands of local communities

The project assessed the community based water needs in the region by Participatory Rural Appraisal and by studying governmental development plans of the zone. We used evaluations of historic meteorological data and downscaled climate change data, making information from global models available for more regional use. The hydrologic catchment model that was developed for evaluating the impacts of climate change on the Genale-Dawa basin, is also used to assess the effect of sand dam construction on the water resources. This will support the activities on replication and up-scaling.

IMPLEMENTED WORK

Organisation of workshops and meetings

During workshops at national and local level, issues of climate change and local adaptation strategies were discussed with participants from different government levels, communities and universities.

Sand dam construction and management

Two sand dams have been constructed to supply potable water to communities. The local communities participate in the construction of the dams. The design has been improved on the basis of experiences with earlier constructed dams. A water resources committee is established from members of the community and they are trained in effective operation and management of the system. It appeared that people need better information on the amount of water stored in the dams. We introduced a simple tool to measure water levels in the well.

Due to the simplicity of the technology the sand dams operate with low running costs. Only small funds are necessary for the maintenance of the pump. Attention needs to be given to the introduction of paying for water from the sand dam. The communities are not used to pay for water from this source.

Assessment of impacts of sand dams

At the sites of the sand dams a hydrological network has been installed to gain insight in the functioning and water supply of sand dams. Piezometers were installed to measure variations in groundwater level with recharge and discharge. On the basis of this information a simple tool will be developed to easily predict the capacity of planned sand dams. To get insights in the socio-economic effects of sand dams on the communities and their vulnerability to droughts, we conducted a household survey.



Fig. 4 A sand dam constructed under the ADAPTS project

1ST RESULTS

Effects of local action(s)

More water becomes available after the construction of a sand dam. The first assessments indicate 600 to 1900 m³ of water is stored behind the different dams.

Field research

The first results of the hydrologic field research show the replenishment of the sand dam at every rain event, and the use of the stored water during dry conditions.

Dry season water use (L/week/household)	total	drinking	cooking	washing
Sand dam	599	228	185	196
No sand dam	471	190	138	152

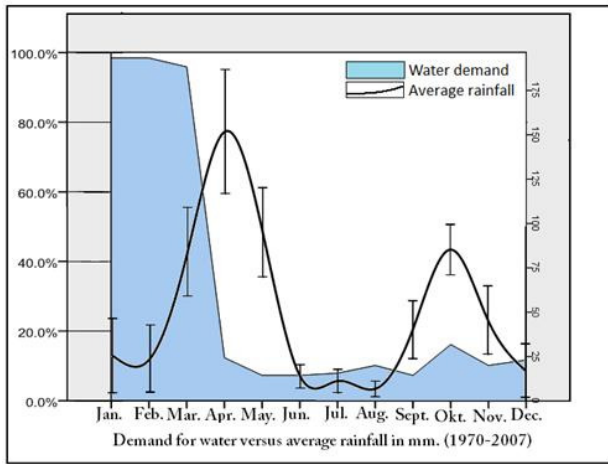
A survey to the impacts of sand dams shows that communities with sand dams daily spend 1.20 hours on fetching domestic water, compared to 1.43 hours for communities without a sand dam. For livestock these numbers are 1.23 and 1.39 hours. The sand dams are used between 7 and 8 months per year.

Catchment model

The catchment model shows that under the most extreme climate change scenarios (SRES scenario A1b) 1000 dams, with a capacity of 2000m³ each, can be built in the region, and that a maximum of 1% of rain water in the rainy season is stored. So 99% of the water will still be available for downstream uses. The effect of sand dams on the downstream area is very limited. Under less extreme climate scenario's the downstream impact is even less.

Up scaling/dialogue

The awareness of different stakeholders at the local and national level on the topic of climate change and small scale measures has been raised. This has lead to active involvement of high level officials at several events. Skill development training in the used approach and tools have empowered stakeholders involved in the project. There will be continuous dialogues with the local and national government to influence on policy issues.



LESSONS LEARNED

The main lessons learned in this case are:

- The communities at the grass root level are aware of climate change even though they can not express it in scientific terms. They relate the climate change with the short cycle of occurrence of drought and fast depletion of existing water sources that used to stay for longer times in the past.
- Sand dams are one of the feasible solutions for climate change adaptation in the dry land areas as these can store water during the rainy season so that water will be available during the dry seasons, without having a large impact on downstream water availability. As the water is stored in the sand, evaporation rate, which will increase because of the rise in temperature, will be minimized.



- Continues dialogues are necessary at different levels with the relevant governmental and non-governmental organizations, forums, networks, researchers and community representatives to promote up-scaling and influence on policy matters.

PLANNED ACTIVITIES

The project will continue to produce information and insights on:

- The effect and use of sand dams under current circumstances, by Participatory Rural Appraisals and field surveys;
- The impact of sand dams on water availability in the basin, taking into account up-, and downstream effects;
- Whether sand dams are a measure fit to cope with the negative effects of climate change.

The findings of the project will be discussed the coming year at meetings with local stakeholders; at meetings with national stakeholders, and at international meetings.

Actions are being taken to promote the inclusion of rain water harvesting systems in national water policy in the country. Different guidelines will be developed to make reference material available for implementers and this will help continuation of the activities after the end of the ADAPTS project.

Together with the communities, local government and other NGOs, the potential role of sand dams in supplying water during normal years and for drought relief will be explored. With national actors we will discuss how small scale projects may contribute in reaching MDG no.7 on safe drinking water, and how they may contribute in adapting to climate change in Ethiopia. When the sand dams prove to be successful we envisage replication in other areas.

PARTICIPATING INSTITUTES

Action for Development (AfD), Ministry of water resources,, IVM VU-University,
Both ENDS and Acacia Water.

CONTACT

Alemu Seifu, afd@ethionet.et

Ralph Lasage, ralph.lasage@ivm.vu.nl

For more information visit: www.adapts.nl