

# Why some watersheds perform better than others

## Lessons from an assessment of six community watershed management projects in Ethiopia

### SUMMARY

Sustainable watershed management is an approach promoted by the Ethiopian government towards farming communities living in the 3,000 watersheds across the country. It aims to improve their farm productivity and livelihoods, as 3% of agricultural gross domestic product (GDP) is lost annually through widespread land degradation. A comparative study between six watershed programs shows that this approach increases farmers' food security and incomes (around 50% on average), as well as their resilience to drought and other climate shocks. However, the nature and scale of impact can vary significantly between watershed programs. The success of watershed management depends on multiple factors from agroecology to social and economic environment. This brief provides key recommendations on which best practices should be scaled up to ensure optimum and sustainable impact of watershed management across the country.

### Context of watershed development efforts in Ethiopia

Four out of five Ethiopians depend on agriculture for their livelihoods, a sector that frequently suffers from drought and other climate shocks. Farmers' resilience and productivity is largely reduced by severe land degradation. Since the 1970s, the Ethiopian government has tried to combat land degradation through various soil and water conservation programs.

A first phase (1975-2000) focused on combatting land erosion via infrastructure investment. From the late 1990s, watershed management became more participatory and integrated, promoting for instance more sustainable farming practices and systems (Table 1). Under the Bonn Challenge, the Ethiopian government pledged to restore 15 million hectares of degraded lands by 2020, in particular, through sustainable watershed management. It is important to know if the current watershed management programs work and which best practices to promote for optimum and sustainable impact.

### Methodology: Assessing watershed management programs for better results

Six watershed programs were selected across three regions (Oromia, Tigray and Amhara), one successful and one less successful per region, for a thorough impact assessment on natural resources conservation and farmers' livelihoods (Figure 1). This study aimed at better understanding the factors which make one watershed management program perform better

### RECOMMENDATIONS

- Ensure watershed restoration programs are participatory, integrated and tailored to the local context to have a significant impact on land and water conservation and rural livelihoods.
- Link conservation activities with poverty alleviation activities.
- Improve market access to ensure farmers benefit from watershed management outcomes such as increased yield.
- Ensure better financial support and the right expertise within watershed committees to be able to tailor technologies and approaches to the local context.
- Improve coordination of interventions between ministries, bureaus and *woreda*-level institutions.
- Strengthen institutional mechanisms to foster partnership among stakeholders. Special attention is needed to ensure fair and equitable sharing of the costs and benefits between upstream and downstream communities.
- Develop new guidelines for baseline data collection, and monitoring and evaluation (M&E) of water management interventions.

than another, and provide recommendations to scale up the best practices.

Livelihood and farm productivity data were collected through household interviews with farmers sampled across age and gender. Researchers interviewed key informants and collected field data on natural resources rehabilitation indicators such as forest cover, water sources and erosion rate. Analysis also covered the watershed program governance, looking at the level of expertise, presence of M&E mechanisms, roles and coordination.

### Community watershed management works, but some watersheds perform better than others

The study confirms that watershed management has had a significant impact on water and soil resources and farmers' livelihoods in Ethiopia. Investments such as area enclosures, gully rehabilitation, and soil and water conservation measures are worthwhile as previous studies found. Performance of on-site and off-site benefits was found to be positive in all watersheds.

However, the scale of impact varies a lot from one watershed to another (Figure 2). For instance, reduction in soil erosion ranged from 30 to 90%, a threefold difference; and vegetation cover increase was estimated from +40 to +85% according to the key informants.

Better ecosystem services led to better livelihoods, but three watersheds (Abraha-Atsbaha, Goho-Cheri and Kereba) showed much more significant performance in terms of on-site, socioeconomic, biophysical and off-site benefits.

**TABLE 1. WATERSHED MANAGEMENT: SHIFTING FROM TOP-DOWN SOIL EROSION CONTROL TO AN INTEGRATED AND PARTICIPATORY APPROACH.**

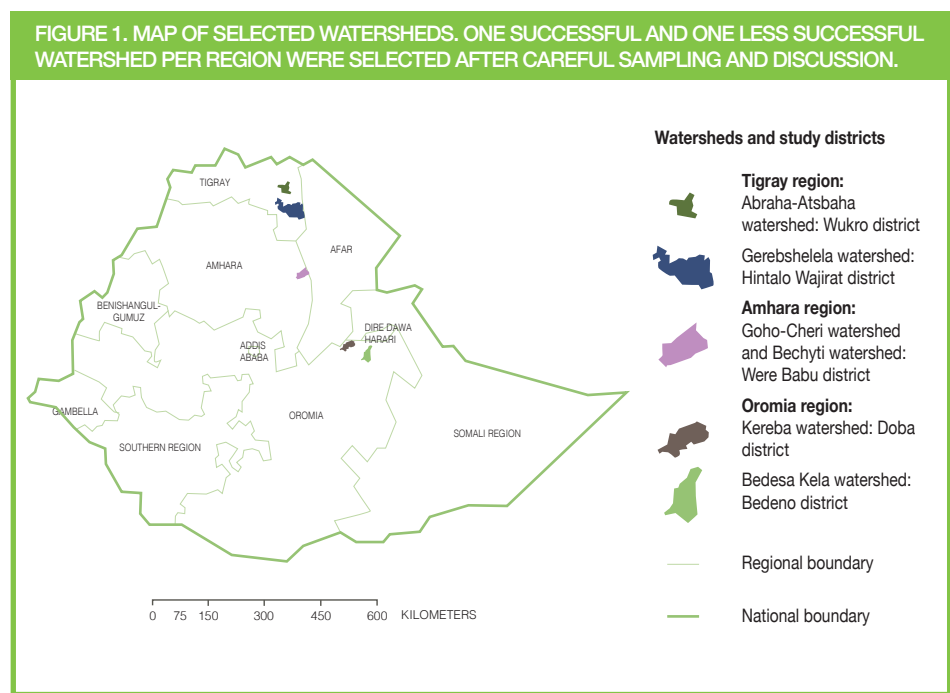
	1970-1999	2000 ONWARDS
<b>Management</b>	Top-down	Community-based integrated watershed development
<b>Community participation</b>	Incentive-driven/forced	Full participation at various levels (planning – implementation – M&E)
<b>Scale</b>	Large scale 30 to 40,000 ha	Small scale (micro-watershed) around 500-750 ha
<b>Policy support</b>	Limited	Important
<b>Technology</b>	Dominated by physically engineered structures	Physical and biological measures + agricultural intensification + income-generating activities
<b>Investment costs</b>	High	Moderate
<b>Monitoring and follow-up</b>	Poor implementation and follow-up of maintenance by beneficiaries	Improved monitoring and evaluation mechanism
<b>Outcome</b>	Low survival of plants and revegetation; low ecological and livelihood benefits	Natural resources conservation; increased ecological benefits and farmers' incomes

In some watersheds, the soil and water conservation measures have dramatically improved water availability for farmers. In Abraha-Atsbaha, the water table rose from 50 meters deep to less than 5 meters and effects were visible in under 3 years. Farmers invested in more than 600 new shallow wells, significantly changing their farm productivity and resilience (Figure 3).

Crop yields and fodder resources improved in all watersheds, but the best performing watersheds Abraha-Atsbaha, Goho-Cheri and Kereba doubled or tripled the farm production while Gerebshelala and Bedesa Kela increased by less than 20%.

Most people interviewed felt their socioeconomic conditions had improved thanks to better conservation of land and water, and the program's livelihood support. They estimated a farm income increase of around 50%, resulting in better farm household food security (+20% to 90%). Farm resilience was reported to be better too: crop failure risks decreased by 10 to 50%.

Community watershed management projects led to a more diversified local economy with new activities such as apiculture, livestock fattening and irrigated horticulture. Some watershed initiatives specifically target women. In Goho-Cheri, for instance, women were trained to produce locally-made, clean cooking stoves, which generated additional



incomes and reduced their time spent in collecting firewood and water (Figure 4).

### Key factors related to the performance of watershed programs

**Time dimension** – Restoration of natural resources in very degraded landscapes requires time. Meanwhile, farmers are still

vulnerable to climate shocks. In Bedesa Kela, two consecutive drought years hindered favorable perceptions of the watershed project which started 4 years ago. The introduction of quick impact farm and off-farm activities, e.g., improved crop cultivars, animal breeds and income diversification, facilitates a community's mobilization during the crucial first years.

**Taking local reality into account** – Implementing sustainable practices, e.g., zero grazing and cut and carry feeding systems, requires tailored strategies according to the local context. Common governance rules differ from one watershed to another. In Goho-Cheri and Bechyti in the Amhara region, grazing land is privately owned, while in Tigray and Oromia regions, grazing rights are controlled by community leaders.

**Hydrology linkages** – The speed of groundwater table recharge depends on the permeability of geological formation. Abraha-Atsbaha watershed, one of the most successful watersheds in the country, is concave in shape with very permeable lithology (sandstone and colluvial deposit) and predominantly sandy soil. Effects on groundwater table were visible downstream in less than 3 years, which may explain the motivation of the community to implement further measures.

### Upstream and downstream linkages

– Any watershed management program should have a fair cost- and benefit-sharing approach between upstream and downstream communities. Indeed, upstream farmers tend to invest more in land and water conservation efforts than the downstream communities, yet groundwater recharge is greater in lower parts of the watershed, sometimes located in another administrative region. For example, Goho-Cheri watershed management program increased water resources in the valley bottom of the adjacent Afar region. As watershed and administrative boundaries are not the same, it may complicate community mobilization and the implementation of some initiatives.

**Local capacity building** – There is a need to build expertise at local level in the watershed committee and invest in extension. In Gerebshelala, despite 30 years of efforts, inappropriate soil and water conservation practices have meant that poor soil fertility remained un-addressed. Even in the successful

FIGURE 2. LARGE IMPACT RANGE ON NATURAL RESOURCES AND LIVELIHOODS.

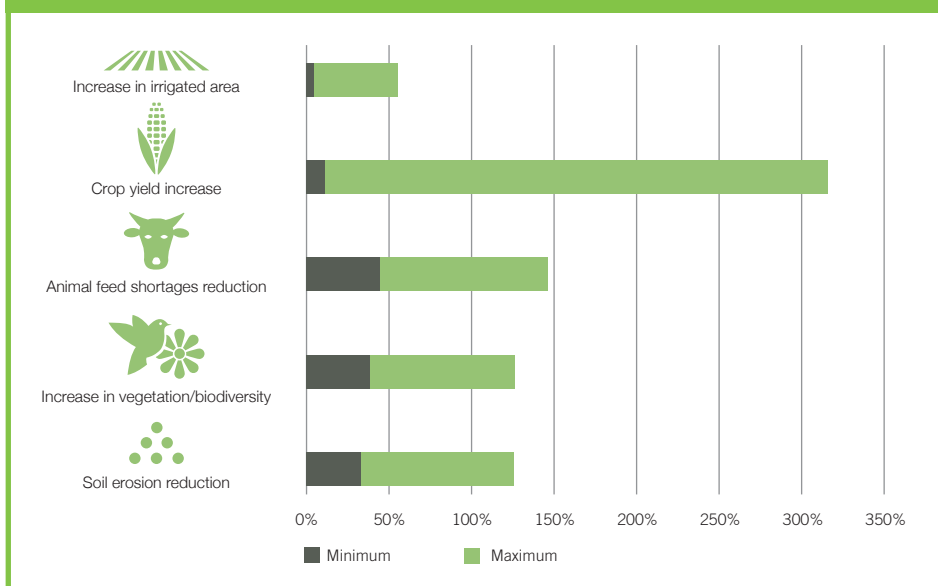


FIGURE 3. WATERSHED MANAGEMENT CAN QUICKLY IMPROVE WATER RESOURCES: A SHALLOW HAND DUG WELL IN ABRAHA-ATSBABA.



Source: Gebrehaweria Gebregziabher

FIGURE 4. WOMEN COLLECTING WATER. TO HAVE A GREATER IMPACT, WATERSHED MANAGEMENT PROJECTS SHOULD BE GENDER SENSITIVE.



Source: Gebrehaweria Gebregziabher



Abraha-Atsbaha watershed, inefficient water use continues with uncontrolled pumping and excess irrigation beyond crop needs, implying the need for improved extension services and water productivity.

**Virtuous cycle** – In successful watersheds, farmers tend to invest more, which then widens the gap with underperforming watersheds. In Abraha-Atsbaha, more than 600 households have invested in wells, 340 in motor pumps and 500 in treadle pumps. These investments in irrigation can lead to higher yields and climate resilience.

## Conclusion and recommendations

In Ethiopia, integrated watershed management has led to better natural resources conservation, better livelihoods and stronger communities, with fewer conflicts over land and water. However,

to realize the full benefits of integrated watershed management, interventions need to be tailored to suit the different contexts, with their specific biophysical, institutional and socioeconomic factors.

Strong community participation and a demand-driven approach are among the driving forces of successful watershed management. Significant impact is seen when the watershed project coordination office, watershed committee and community groups work together, taking community priorities and knowledge into account, and providing solutions adapted to the local environment and farming systems.

Community mobilization is stronger when a watershed restoration program has a strong livelihoods component, e.g., improving market access, diversification of income-generating activities, etc. While aiming at long-term, sustainable soil and

water conservation, interventions should also provide short-term benefits for the local population to ensure continuous community participation.

Better coordination of interventions and institutions within the watershed is required as there are overlapping tasks between ministries, bureaus or *woreda*-level offices.

Small watersheds of around 500 ha are flexible and adequate to integrate sustainable land management and livelihoods activities. However, upstream communities tend to support most of the costs and efforts for land and water conservation compared to downstream communities without gaining off-site benefits such as groundwater recharge or sediment loss reduction. This has to be addressed through a cost- or benefit-sharing mechanism between upstream and downstream communities to ensure sustainable collective action.

This policy brief is based on the following report, which is an output of the AgWater Solutions project.

Gebregziabher, G.; Abera, D. A.; Gebresamuel, G.; Giordano, M.; Langan, S. 2016. *An assessment of integrated watershed management in Ethiopia*. Colombo, Sri Lanka: International Water Management Institute (IWMI). 28p. (IWMI Working Paper 170).

The AgWater Solutions project aims to unlock the potential of smallholder farming by identifying, evaluating and recommending a variety of agricultural water management solutions - from appropriate technologies to supporting policies, institutions, financing arrangements and associated business models (<http://awm-solutions.iwmi.org>).

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The CGIAR Research Program on Water, Land and Ecosystems (WLE) combines the resources of 11 CGIAR centers, the Food and Agriculture Organization of the United Nations (FAO) and numerous national, regional and international partners to provide an integrated approach to natural resource management research. WLE promotes a new approach to sustainable intensification in which a healthy functioning ecosystem is seen as a prerequisite to agricultural development, resilience of food systems and human well-being. This program is led by the International Water Management Institute (IWMI), and is supported by the CGIAR System Organization, a global research partnership for a food-secure future.

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