

# 1 INTEGRATED WATERSHED MANAGEMENT

**BACK IN THE EARLY 1990s TIGRAY WAS BARREN, WITHOUT THE LUSH GREEN GRASSES AND VEGETATION VISIBLE TODAY. OVER THE LAST 20 YEARS, FARM AFRICA HAS DEPLOYED ITS EXPERTISE IN WATERSHED MANAGEMENT TO HELP THE LOCAL COMMUNITY REHABILITATE THE ECOSYSTEM THAT UNDERPINS LOCAL COMMUNITIES' LIVELIHOODS.**

Integrated Watershed Management (IWM) is an approach that uses collective action by a group of people reliant on a watershed area to proactively manage the resources and natural community assets within the area. This includes actions to carefully manage the surface water (rivers, streams, lakes and ponds) and groundwater (shallow and deep wells) within the watershed, as well as mutual agreements on resource use, including the use of surrounding land for agriculture and livestock grazing.

IWM aims to ensure provision of goods and services from a watershed in ways that contribute to the conservation of soil, water and other natural resources. The approach combines long-term natural resource conservation initiatives and short-term livelihood activities to help communities meet their needs.

Drawing upon Farm Africa's experience in Tigray, inclusive processes are key to successful IWM interventions, so community members feel ownership over the process and responsibility to abide to the agreements. Technical expertise on how to practically manage the watershed responsibly is also vital.



**"We started water management work in 2015 by treating the hillsides of the watershed including gullies to reduce soil erosion. We built physical soil and water harvesting structures, called 'bunds', along the contours and stabilised them by planting useful trees and grasses. We all agreed to control the movement of our grazing animals by using 'cut and carry' of forage from the protected hillsides and keeping animals tethered in specific areas when taken out for grazing. We have benefited a lot from the elephant grass in feeding our animals. Since there is limited pasture, we sell to selected members who have dairy cattle, which generates ETB 3,000 (about £100) per season and is shared among 140 households." Ato May Shewit**

## SUSTAINABLE AGRICULTURE FOR IMPROVED FOOD SECURITY IN TIGRAY, ETHIOPIA

Land in Tigray's rugged mountains is scarce, and many farm sizes are very small. Many women, especially widows, and young people who have little access to land struggle to produce enough to feed their families. With funding from Irish Aid and the UK Department for International Development, Farm Africa worked directly with nearly 6,400 women and landless young people in Tigray's Ahferom woreda, providing them with the knowledge and skills to successfully bolster their food security and incomes through farming and rearing livestock.

This booklet is one of a series of six focusing on each of the project's key components:

1. Integrated watershed management
2. Fruit and vegetable production
3. Poultry production
4. Goat and sheep rearing
5. Honey production and marketing
6. Small-scale irrigation



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Gabions were introduced to restore gullies, which boosted the size and nutritional content of grazing pastures.

## PROJECT ACTIVITIES

Decisions about where to implement IWM were informed by discussions with the Ahferom woreda government, to ensure the programme complemented wider government efforts. Throughout the programme, we facilitated six IWM processes in the woreda, one in each kebele, covering an area of 949 hectares.


One of the IWM project sites was Maysuru Tabia, where Farm Africa helped to establish and train a watershed management committee. This watershed area is located at an elevation of 1800 – 2200m above sea level and covers a total area of 178 hectares. The committee carried out the initial screening of the watershed through a combination of landscape delineation, resource assessments and by mapping activities occurring within the project area. Technical experts supported the committee to prepare byelaws, govern the implementation of agreed actions and inform critical resource use decisions, such as how much cut and carry to extract. Clear sanctions were put in place for community members who did not abide to the byelaws.

These agreements formed the basis for a series of investments in the watershed, such as the introduction of mechanical and biological infrastructure for environmental protection. This included construction of different soil and water conservation structures including gabions, to plug

gullies at regular intervals, check dams, and terraces on hillsides at the top of water catchment areas. These technologies served to reduce water flow from runoff and minimise siltation of the water. The structures were stabilised by planting them with robust trees and grasses. By including the local community in every stage of the project, from design to delivery, it helped secure a sense of ownership; the community's labour and time investment created important buy-in to project goals and objectives.

Effective community involvement is vital to ensuring that the local population see tangible benefits from IWM activities, and so community youth nurseries were established to simultaneously improve the watershed and provide business opportunities.

Community members engaged in goat rearing were also provided with training and support on how to manage grazing, discouraging free grazing in favour of cut and carry methods to reduce pressure on vegetation. One woman, Tekia Tekley, explained to us how important it was for her to reseed fodder crops regularly in the enclosed area, as she recognised the need for a sustainable feed supply for her nine goats.



Watershed management is now firmly established in Maysuru, as well as in the three other IWM sites we supported. This means the sites are under enclosure; protected against human and livestock interference as well as unsustainable resource extraction. As a result, the natural resource base in the hillside is regenerating and there is a clear improvement in vegetation cover.

Improved watershed management has also enabled the creation of small-scale irrigation projects for farmers working in supporter watersheds as well as downstream farmers who are also benefiting from improved water availability. Better water availability has helped create the conditions necessary for longer growing seasons and the cultivation of a variety of fruit and vegetables including tomatoes, cabbage and guava.

While some households are benefiting from increased grazing for their animals, others with fewer livestock have the right to rent out grazing rights to others, generating a valuable and steady source of income. To date, farmers have managed to generate around £10,000 a year by charging their neighbours for bringing their livestock into the area.

Honey production is largely dependent on flora, and thanks to the IWM initiatives long grass and flowers are now growing in the area, increasing the yields of honey producers active in the local area.

Downstream farmers are also benefiting from improved water availability, which has improved farm irrigation systems and subsequently improved downstream farmers' ability to grow vegetables.

Now that the scheme is fully operational, the kebele government is actively involved in monitoring project goals, tracking both levels of community engagement and the health of the watershed. This provides a self-sustaining mechanism for ensuring threats are addressed quickly, and that the economic and environmental impact of the programme continues long into the future.

Three members of one young people's group have benefits from the IWM scheme. Shishan Hadus, Gideg Hadush and Medhin Gebrekristos were supported to establish a tree nursery, receiving training, physical inputs and administration support. They identified tree species that the community needed most, including: Papaya, Gesho, Neem tree, Diredawa taf and Eucalyptus. In 2016, the trio managed to produce 100,000 seedlings for sale. This enabled them to save ETB 10,000 (around £3,300) in a Rural Savings and Credit Cooperative, which the group plans to use their savings to further invest in their seedlings business.

"We love our job and are motivated to work harder because it is better to earn money close to home than migrating to other areas. Through your support [Farm Africa and government] we hope to generate more income to sustain us in our daily needs, such as food and school fees for our children."



## RECOMMENDATIONS

### KEY ELEMENTS OF SUCCESS

In Farm Africa's experience in Tigray, key to a successful IWM intervention is the right combination of inclusive processes, so community members feel ownership of the process and responsibility to abide by the agreements, and the right combination of technical advice about how to manage it. Key elements of success are:

- 】 A meaningful participatory and partnership-based process that builds ownership, and focuses on the long-term aims, while also explicitly addressing the short-term needs of people, particularly vital in chronically food-insecure communities.
- 】 A focus on a tangible, easily delineated territory, with priority given to the most environmentally degraded areas
- 】 A multi-dimensional approach, looking at a range of entry points to build ownership, but also a range of programmes to leverage resources. Links to national food security programmes are especially important, and in our programme the time spent by communities on IWM activities was counted as day labour for the Productive Safety Net Programme. However, this also applies to vocational training initiatives, environmental awareness in education and so on.
- 】 Flexibility, ensuring activities can be adjusted to changing circumstances.

### FACTORS TO CONSIDER IN REINFORCING SUCCESS

- 】 Long-term sources of investment in vital infrastructure or key value chains that rely on the watershed
- 】 Local technical and leadership capacity
- 】 Political will, especially by local government officials
- 】 Clear national guidelines
- 】 Combination of scientific methods and indigenous knowledge
- 】 Ensuring women's voices can be heard as much as men's

### LENGTH OF PROGRAMME

On average, Farm Africa's IWM schemes lasted two years. Our experience shows this is not long enough: in many of the watersheds Farm Africa has supported there are still some community members who don't fully understand the importance of the intervention, and subsequently don't manage their animals according to the byelaws. Building and maintaining full community commitment is a long-term process. Lessons from similar programmes in the region suggests that community-wide commitment could be achieved through inter-community exchanges.

### LOCAL CAPACITY

In some cases, skills gaps among local development agents (agricultural extension workers) have posed a problem. For example, when the community tree nurseries faced a disease outbreak, the local team didn't have the required skill set to tackle the issue. The situation required careful coordination with the local Farmer Training Centre, and additional investment in technical support was deemed necessary.

### COST-BENEFIT SHARING

Differing levels of community engagement in IWM project activities result in an uneven distribution of costs within communities, with some stakeholders contributing more to watershed management than others. This dynamic impedes progress and may slow down the achievement of IWM's environmental and socio-economic goals.





## FIVE KEY STEPS IN IWM

1. Community engagement and awareness creation
2. Area selection and assessment
3. Participatory planning
4. Implementation of watershed management plans
5. Monitoring, learning and adapting

## FIELD LEVEL GUIDELINES TO IWM

### 1. COMMUNITY ENGAGEMENT AND AWARENESS CREATION

Creating an awareness and sense of ownership amongst different stakeholders during the initial stages of the programme is key to success.

- ▶ Early engagement should emphasise the principles and key elements of watershed management and clearly explain implementation modalities in practical terms, including interventions such as terraces and tree planting. A key message to reiterate is the importance of the approach in alleviating poverty.
- ▶ A watershed management committee (usually around 16 members) should next be selected by the community. The committee should draw from a range of interest groups in the community, including the landless, female-headed households, male-headed households, livestock and crop farmers and young people, as well as local government representatives and extension agents.
- ▶ Next, the committee members should be trained by local government experts in conjunction, if appropriate, with NGO facilitators. The training should cover how to map resources; prioritising conservation activities and how to build consensus and coordination of activities.

### 2. AREA SELECTION AND MAPPING OF AVAILABLE RESOURCES

At this stage, it is important to work closely with the local community to thoroughly map the biophysical, socio-economic infrastructure, as well as institutional and cultural resources that influence the IWM process.

- ▶ Ideally coordinated by local government experts, the watershed area needs to be clearly delineated.
- ▶ Then a study should be undertaken to provide a comprehensive report on the watershed area to be rehabilitated. The process should closely involve the local community, and cover socio-economic activities undertaken, major physical threats to the watershed, agro-ecological zones within the watershed and any areas of the watershed that hold any cultural or religious significance.
- ▶ The mapping then needs to be carefully validated with the community, and any additional observations reflected.





### 3. PARTICIPATORY PLANNING

This vital step forms the bridge between the intention to collaborate and producing a participatory, workable plan.

- ▶ Based on the assessments in the previous step, the Watershed Management Committee should identify intervention measures and discuss them with the wider community. Ranking is done to prioritise the different range of activities.
- ▶ Once activities are agreed, the Watershed Management Committee should prepare a plan and encourage pooling of resources from different stakeholders. Resources include safety net investment, labour contribution by able-bodied members of the community (in Tigray, people are expected to contribute 40 days per year to community initiatives), funds from other existing development initiatives and technical expertise, as well as other resources from local government.

### 4. IMPLEMENTATION OF WATERSHED MANAGEMENT PLANS

Involving community members in this stage of the process is especially crucial.

- ▶ Implementation should be undertaken in clear collaboration with the Watershed Management Committee, local government officials, including extension agents as well as other development organisations operating in the area.
- ▶ Tangible work that needs to be done should be done collectively.

- ▶ Where possible, engage young people in the running and setting up of tree nursery enterprises, where proceeds from seedling sales simultaneously generate income for the local community and improve the watershed. This is likely to require training and some equipment from local external organisations.
- ▶ The Watershed Management Committee should prepare byelaws to guide the management of investments, and resource use. The committee should carefully consult with the wider community and ensure there is full understanding of consequences of non-compliance.

### 5. MONITORING, LEARNING AND ADAPTING

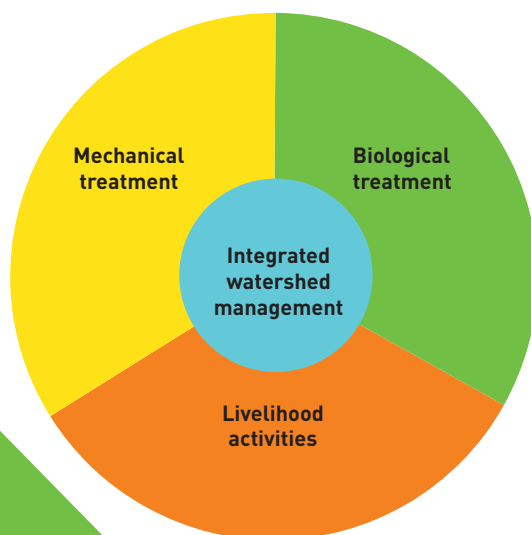
Engage with the community to agree on a shared vision, what to monitor and the frequency of reviews.

- ▶ All stakeholders should be involved in routine monitoring of progress with implementation and adherence to pre-established byelaws. Learning from the process should be emphasised throughout.
- ▶ The monitoring plan is a useful way to maintain commitment and momentum with protecting and managing the watershed, especially if there are external stakeholders whose awareness needs reinforcing.
- ▶ The monitoring plan is also a useful way to continue to maintain momentum on coordination with wider programmes and initiatives, ensuring that extra funding can be leveraged into its management and protection, as well as the livelihoods of the community that relies on it.



Farm Africa / Nichole Sobocki

## MAJOR FEATURES OF AN IWM IMPLEMENTATION PLAN



### BIOLOGICAL TREATMENT: WHAT, WHY, WHERE, WHEN

Biological treatment refers to the planting of multi-purpose plant and tree species to stabilise and reinforce physical conservation of soil and water structures. These species include elephant grass, eucalyptus salugna, sesabania, rhodes grass and various fruit trees.

The grass and trees are planted on the bunds (soil and water conservation structures) and gully sides to stabilise them. Area enclosures within the watershed are also planted with elephant and rhodes grass which provide valuable pasture for livestock. Trees are planted at farmers' homesteads for fuel and construction. Fruit trees can be incorporated into crop farming systems as a livelihood and environmental conservation measure. Expert support is needed by the farmers on the appropriate planting and management of the vegetation cover.

### MECHANICAL TREATMENT: WHAT, WHY, WHERE, WHEN

Mechanical treatments are community-run physical infrastructure measures that address erosion and channel surface water. Structures include:

- 】 bunds along the contours of the watershed (soil or stone)
- 】 hillside terraces
- 】 deep trenches
- 】 check dams
- 】 gabions
- 】 diversion ditches
- 】 sediment storage dams.

This combination of investments is intended to slow down watershed runoff, reducing erosion and enabling water to be stored in the bunds.

Gully control is an important tool for IWM mechanical treatment. Gullies resemble large ditches or small valleys that can be several metres in depth and width, and are caused by water running through hillsides. If left untreated, gullies can expand causing further land erosion. The process of gully rehabilitation includes slope stabilisation, diversion of surface water at a higher level than the gully area and stabilisation of gullies by structural measures (gabions) and accompanying vegetation. Eventually, the gullies can be filled up with soil and the land is restored. Gabions are particularly effective as gully control structures as they prevent further soil movement and gully expansion.

Check dams are constructed across river channels to hold water and sand in place, thereby recharging the underground water aquifer. Sunken pits can be constructed some metres away from the river banks to support groundwater recharge and for use in irrigation.





## CHALLENGES OF IWM TO FACTOR IN TO IMPLEMENTATION

- Local perceptions on land use and watershed management best practice may conflict with top-line programme aims: careful facilitation and negotiation is needed to ensure that a lack of clear consensus doesn't derail efforts.
- Inaccurate and inappropriate land classification within a watershed could guide implementation plans towards the wrong interventions.
- Failure to take into account people's livelihood strategies, and how they relate to IWM, may result in relevant communities lacking the necessary financial incentive to engage in the project.
- Without careful attention to the participatory process, underlying social or political dynamics at local level could derail the scope for collective activity.
- Watershed Management Committees must have sufficient levels of organisational and technical capacity to properly manage risks from third parties encroaching into protected areas.

## CONCLUSION

Farm Africa has long believed in the power of IWM both as a means of community mobilisation around natural resource management and as an entry point for collaboration around generating revenues. Critical to its success is community ownership; this is especially important for ensuring the scheme can eventually become self-sustaining, helping communities to charge others for the services their watersheds supply. We believe that the experience we have had in Tigray can help to form a template for more sophisticated community-led landscape management countrywide.

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