Global Water Partnership Eastern Africa

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Building resilience to drought: Learning from experience in the Horn of Africa

Integrated Drought Management Programme in the Horn of Africa

Global Water Partnership Eastern Africa

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World Meteorological Organization

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Intergovernmental Authority on Development

IGAD is the regional economic community for the Horn of Africa region with a membership of eight countries: Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda.
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Front cover photo: Cattle drinking water in constructed valley tank (Photo: KALIP)

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Integrated Drought Management Programme in the Horn of Africa

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Disclaimer:
The views expressed in this report cannot be taken to reflect the official opinions of Global Water Partnership or its financial partners.

Acronyms

CBO	Community-based organization
GWP	Global Water Partnership
GWPEA	Global Water Partnership Eastern Africa
IDMP HOA	Integrated Drought Management Programme in the Horn of Africa
IGAD	Intergovernmetal Authority on Development
IUCN	International Union for Conservation of Nature
WMO	World Meteorological Organization

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- Joseph Mutemi Ngondi: Water harvesting for economic empowerment in Kitui County
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- Moses Egaru: Building drought resilience in Aswa-Agago sub-catchment
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Contents

Acronyms iii

Acknowledgements iv

Summary and lessons learned 2

ETHIOPIA 4

Case study 1: Improving food and water security in the Abreha we-Atsebeha watershed 4

Case study 2: Sustainable water resources and livelihoods in the Lake Haramaya watershed 6

Case study 3: Sustainable water management in the Lake Ziway watershed 8

KENYA 10

Case study 4: Managing drought and development in Makueni County 10

Case study 5: Water harvesting for economic empowerment in Kitui County 12

UGANDA 14

Case study 6: Building drought resilience in Aswa-Agago sub-catchment 14

Case study 7: Improving livelihoods in Karamoja 16

Case study 8: Climate-smart agriculture in Namutumba 18

Case study 9: Restoring water quality in Lake Kako 20

Case study 10: Low-cost water management in Rakai 22

Bibliography 24

Summary and key lessons learned

Summary

This publication was compiled by the Integrated Drought Management Programme in the Horn of Africa (IDMP HOA). The aim is to share lessons learned from innovative drought and water security demonstration projects conducted by communities and partners in Ethiopia, Kenya and Uganda. The case studies also contribute to the global IDMP programme, a joint undertaking between the Global Water Partnership (GWP) and the World Meteorological Organization (WMO).

In preparing this document, the country facilitators reviewed 10 documented case studies of interventions in drought and water security with a view to consolidating general lessons and examples of good practice that could be replicated elsewhere in the region. In each case, the facilitators assessed the background and extent of the problem and its related effects, and described the interventions and coping strategies undertaken to address the issue. They then reviewed the outcomes and drew out the lessons learned. It is hoped that these lessons will help stakeholders to deal with water scarcity in their own situations throughout the Horn of Africa.

Ethiopia

In Ethiopia, the cases are based on the watersheds of Abreha we-Atsebeha, Lake Hamaraya and Lake Ziway, all of which are susceptible to drought. The people living in these areas are poor and face the daily challenge of food and water insecurity. Their land is severely degraded as a result of soil erosion, deforestation, overgrazing and loss of biodiversity. However, with the support of donors and public–private partnerships, they have been able to adopt integrated and participatory watershed management tools, and this has restored hope to their communities. The tools include enacting natural resource management by-laws, controlling soil erosion, and adopting water harvesting and drip irrigation. In addition to improving water security, these interventions have increased food production and regenerated the biodiversity of the areas.

Kenya

In Kenya, the Makueni County community took action to address worsening water security problems, becoming mobilized through a social media platform. Using simple water harvesting technologies, the people improved their food security, livelihoods and social structure, while preventing further environmental degradation. A water harvesting fund enabled local farmers to access finance in support of their activities. Partnerships with banks and the private sector were formed in the area as a result of the community initiative. In Kitui County, the 'Water harvesting for economic empowerment' project enabled the construction of sand dams on the Mutweii River, helping to improve water security for agriculture and creating alternative livelihoods in the production of construction materials.

Uganda

The five case studies from Uganda focus on the semi-arid 'cattle corridor' where recurrent drought causes severe water and food insecurity. Community participation and effective partnerships among communities and governments (local and national) combined with financial and technical support aided the successful implementation of the projects and led to improved food and water security.

The key achievements included building water harvesting structures and forming a loan development scheme in Aswa-Agago sub-catchment; constructing infrastructure to augment water supply for domestic use and livestock production as well as initiating village savings and loan schemes for immediate

income in Karamoja; introducing climate-smart agriculture to improve soil water retention and extend the growing season in Numutumba; restoring water quality in Lake Kako and promoting solar energy; and providing knowledge and skills for drought-coping mechanisms in Rakai, where communities constructed simple water catchments using locally available resources. All the communities involved have increased their resilience to drought, learning to be innovative in the face of climate change.

Key lessons learned

- Initiatives driven by communities themselves create a sense of ownership and are more effective and sustainable. This often means changing mind-sets and putting in place external support to 'kick-start' activities. At the same time, communities need to be armed with the knowledge they need to implement new ideas.
- While 'bottom up' action is more sustainable, there is also a need for high-level political support to create an enabling environment for broad stakeholder participation (that includes women and the private sector).
- Taking a landscape approach ensures all aspects of a problem are considered but requires effective implementation of appropriate regulatory frameworks governing natural resource use.
- An integrated and participatory approach to water management will drive equitable and sustainable benefits and requires strong community governance structures.
- Organizing farmers and other stakeholders into groups creates an entry point for information, training and action and gives people encouragement to adopt new ideas. Teamwork yields better results than working individually.
- Active participation and coordination among different stakeholder groups promotes learning and strengthens decision-making, helping to integrate development programmes into local government structures and ensuring appropriate support is provided to communities. This also requires strong community institutions to ensure accountability.
- Linking project interventions to specific livelihoods, activities, needs and interests enhances understanding of the importance of natural resources and the benefits of sustainable development. Simple, cost-effective and practical solutions to local challenges encourage rapid adoption.
- Sustainability strategies need to be introduced at the identification stage of all project appraisals. For infrastructure projects, this includes agreeing a management strategy and funding for ongoing maintenance. Any undertaking by the community must be reinforced by local government offices.
- Demonstration sites and appointing 'champions' or recruiting opinion leaders encourages adoption of new technologies. Schools can be highly effective in hosting demonstrations, raising awareness and promoting adoption.

Dried up water source (Photo: MostPhotos)

ETHIOPIA

Case study 1: Improving food and water security in the Abreha we-Atsebeha watershed

Background

The Abreha we-Atsebeha watershed is one of 21 kebeles (small districts) within Kilte Awlaelo District in the Eastern Zone of Tigray, northern Ethiopia. The area has one rainy season per year with a mean annual rainfall of 350–600 mm between June and September, and an annual average temperature ranging from 16 to 27°C. Two-thirds of the land area is classified as forest area enclosure, with around 15 percent classed as cultivated land and 3 percent as grazing land. The remaining area is occupied mainly by houses, roads and waterways.

This was once one of the most drought-prone, food-insecure and poverty-stricken areas in the country. The land was severely degraded as a result of soil erosion, deforestation, overgrazing and loss of biodiversity. Furthermore, regular periods of drought had diminished vegetation cover and rendered many areas uncultivable. The unpredictable nature of the annual rainfall, coupled with high rates of evaporation and depleted groundwater reserves, had made it difficult to grow any crops. Meanwhile, the loss of vegetation cover allowed heavy rain to become flash floods, washing away the fertile topsoil and forming gullies. Population growth had reduced the size of landholdings and forced a general trend towards low input and output farming practices. This combination of factors caused recurrent crop failures, with famine and hunger becoming common. As a result, Abreha we-Atsebeha village had become totally dependent on relief aid, to the extent that the government was recommending resettlement as a coping strategy.

Crops struggle to grow in dry soil (Photo: GWP)

Interventions

In 1998, the government proposed that the community should be relocated to a more water-secure and fertile area, and this gave the people the impetus they needed to begin addressing their deep-rooted problems. Aba Hawi, the community leader, played an instrumental role in galvanizing his people to find solutions for themselves and 'heal their land'. Faced with relocation, which was considered as a betrayal of their country, culture and religion, they reached a turning point and began the long journey towards adopting an integrated participatory watershed management approach.

By 2003, the community had secured the support of the government and the United Nations World Food Programme to launch the 'Managing environmental resources to enable transition' project. This basically encompassed a sustainable, participatory and integrated watershed management approach. They began to adopt participatory community soil and water conservation, with interventions to deal with soil erosion and introduce water harvesting

Technologies used to mitigate drought and improve water security

- Soil and stone bunds, trenches and percolation pits
- Small storage dams, water harvesting ponds and hand dug wells
- Erosion gullies converted into water-harvesting sites
- Springs developed as sources of drinking water
- Fruit trees and naturally occurring species planted.

technologies. The interventions included building soil and stone bunds and digging trenches and percolation pits to slow the downhill flow of water and channel it into groundwater recharge. The community also built small storage dams, water harvesting ponds and hand dug wells to improve water storage. In addition, they converted gullies into water-harvesting sites, developed springs for human and animal use, constructed terraces and ditches, planted fruit trees and restored biodiversity by planting naturally occurring species. Support to the communities to help them diversify their incomes included training and equipment for bee-keeping using traditional beehives constructed from local materials. Women received additional training in documentation and other aspects of building resilience to climate change.

Outcomes

As a result of these interventions, the Abreha we-Atsebeha community has become food self-sufficient, transforming their land and turning degraded hillsides into productive farmland. Other significant outcomes include diversified income sources and increased household incomes, production of crops and vegetables – with several harvests per year – using rainfall and irrigation, improved vegetation and forest cover resulting in better soil quality, higher crop yields, enhanced groundwater resources and flood prevention. The community is now well known for producing fruit and vegetables and most households are food-secure. In June 2012, the Abreha we-Atsebeha village received the Equator Prize at the Rio+20 World Summit on Sustainable Development for their outstanding performance in integrated participatory watershed management.

Lessons learned

- Donor- and government-supported interventions are more successful if they focus on community-initiated and driven programmes. When people have a part in designing the intervention, they will adopt new ideas more easily and develop a strong sense of ownership.
- Integrated participatory watershed management is a driving force for sustainable and inclusive drought management that can be achieved through active community participation.
- Women are key stakeholders in community development initiatives and should have an equal voice in decision-making.
- Aba Hawi, the community leader, pinpointed the key lesson of adopting a positive attitude, saying: "If you only focus on landscape restoration you will fail. If you focus on changing mindsets you will succeed."

"If you only focus on landscape restoration you will fail. If you focus on changing mindsets you will succeed."

ETHIOPIA

Case study 2: Sustainable water resources and livelihoods in the Lake Haramaya watershed

Background

The watershed of Lake Haramaya is located in Haramaya and Kombolcha districts in the Eastern Hararghe Zone in Oromia Regional State. It has a total area of 14,000 ha and a population of 117,000. Thirteen peasant associations, three kebeles of Haramaya town and the Haramaya University campuses are located inside the watershed. Of the total land area, around a third is arable, with around 3.5 percent pasture and forest and the remaining 60 percent classified as built-up, degraded or otherwise unusable. The area receives a mean annual rainfall of 800 mm, with a daily temperature range of 10–25°C. Apart from seasonal run off, no streams or rivers flow in or out of the lake.

Over the past 20 years, the lake and other groundwater sources have been shrinking due to excessive abstraction of water for domestic use and irrigation of food and cash crops, the latter grown mainly for foreign markets. Further degradation of the watershed has been caused by poor traditional farming practices, deforestation and overgrazing, which have caused erosion of the land and silting of the lake. Efforts by the local administration and the Haramaya University to control water abstraction by farmers have been ineffective due to persistent drought and a lack of regulations, prompting fierce competition for water. In 2006 the situation became acute when the lake dried up completely.

Dry cracked earth (Photo: GWP)

Interventions

The disappearance of the lake water gave the community a wake-up call and prompted immediate action. The first recovery initiative was led by the university, Oromia Regional Administration, Eastern Hararghe Zone and other concerned organizations and individuals. With the involvement of the Office of the Prime Minister, they established a task force led by the university. This resulted in formation of the 'Participatory integrated development of Lake Haramaya watershed initiative', which introduced a range of community-based participatory natural resource and socioeconomic development interventions.

The catchment was divided into three parts, with different interventions in each. Actions in the upper catchment focused on water harvesting and introduced bee-keeping. In the middle section, the focus was on agroforestry, composting and improving animal production. In the lower catchment, artificial closed pools were constructed for fish farming. A number of the interventions also aimed to halt or reverse land degradation. These included closing off the worst affected areas to prevent further degradation, introducing soil and water conservation, creating a buffer zone around the lake

Technologies used to mitigate drought and improve water security

- Soil and water conservation measures
- Water user regulations, allocation and pricing
- Diversified livelihood options, including bee-keeping and fish farming
- Enhanced agricultural productivity through better seeds, fertilizers and efficient irrigation
- Capacity building in agricultural technologies and integrated management of water resources.

and rehabilitating the hillsides of the watershed by planting trees and developing agroforestry.

Water use issues were addressed by introducing user regulations and pricing. Meanwhile, better land management helped to conserve surface water and recharge groundwater resources. Improving feed resources and introducing other technologies helped to raise livestock productivity, while crop production was enhanced by planting new varieties of cereals and vegetables. Farmers were able to access improved seeds, organic fertilizers and modern storage facilities, while also benefiting from training in technical aspects of production. At the same time, community members, government officials and other partners benefited from training in catchment-based integrated management of water resources.

Outcomes

The interventions successfully revived the lake, which is full of water once again. Water by-laws now regulate water use through an efficient and transparent water allocation system that reduces the potential for conflict among users. The artificial ponds have created livelihoods based on aquaculture, while crop and livestock productivity has improved. Drip irrigation has enhanced the water use efficiency of the existing irrigation systems, while the composting initiative provides a plentiful source of organic fertilizer for the fields. The community is now less vulnerable to the potential impacts of climate change, particularly drought.

Lessons learned

- Successful programme implementation requires all stakeholders to be involved in the planning and decision-making process.
- By-laws to guide use of scarce resources, agreed by government representatives in consultation with the affected stakeholders, are an essential ingredient in sustainable natural resources management and use.
- Unwavering political support is critical to ensure the participation of all stakeholders.
- A regulatory framework for natural resource use is essential to avoid over-use and competition.
- There is a need to go beyond simple community participation and to adopt an incentive-driven participatory approach with incentives like farm inputs, capacity building and opportunities for livelihood diversification.

The community is now less vulnerable to the potential impacts of climate change, particularly drought.

ETHIOPIA

Case study 3: Sustainable water management in the Lake Ziway watershed

Background

Lake Ziway sits in the East African Rift Valley in Oromia Regional State. The lake basin covers Dugda, Adami Tulu, Jido, Kombolcha and Ziway Dugda districts. Two main rivers (Meki and Katar) flow into the lake with the Bulbula flowing out. The lake is believed to be the most productive of the rift valley lakes, providing livelihoods for numerous communities as well as having ecological significance.

However, recent decades have seen increased and unregulated use of the lake water by the surrounding smallholders and commercial flower farms. Coupled with deforestation, overfishing, urbanization and over-use of fertilizers, this has badly affected the local ecosystems and biodiversity. Water quantity and quality has declined, soil erosion and siltation of the lake have increased and, as a result, there has been a decline in agricultural productivity and resource availability. Not surprisingly, there have been incidences of conflict over water resources and productive land among investors, farmers, fishing families and the government, with food insecurity and chronic poverty becoming commonplace.

The walkway built between the lake and the town (Photo: Wondwosen Michago Seide)

Interventions

These pressing issues led the Horn of Africa Regional Environment Centre and Network to implement the 'Water allocation plan development project' in the Lake Ziway watershed. The project aimed to develop and pilot a socially equitable and economically viable water allocation plan that would also recognize ecosystem needs. The Centre worked closely with the Ministry of Water, Irrigation and Energy; the Rift Valley Lakes Basin Authority; Oromia Regional State; local communities (including farmers' associations, fishing cooperatives and women's groups) and the private sector (e.g. horticulture and tourism).

The project employed a landscape approach to ensure its outcomes were inclusive and sustainable. The interventions included development of a water allocation plan and a land use plan. Establishment of a 'constructed wetland' created a buffer zone between the commercial flower farm and the lake, which prevented the run off of fertilizers and other pollutants. Another innovative solution was to build a walkway between the lake and Ziway town to prevent urban encroachment onto the lakeshore. Water resource management was enhanced by introducing standardized and regular monitoring of the lake together with regulations and a participatory approach to govern water use. Management and administration are overseen by a platform that has representation from the public and private sectors and this has been informed by a socio-economic study. Meanwhile, the many small-scale farmers have benefited from access to technical support in, for example, sustainable

Technologies used to mitigate drought and improve water security

- Participatory development of water and land use plans
- Buffer zones
- Water monitoring and regulation
- Environmental education
- Climate-smart agriculture.

management and use of water resources and how to use motorized water pumps.

Outcomes

One of the most notable successes is a public–private–community partnership set up to make, sell and use organic fertilizers. The Soil and More International Company, based in Ziway town, takes waste cuttings from the flower farm and combines them with crop residues supplied by local farmers. This organic matter is composted and made into a rich organic fertilizer, which is then sold to the flower farm. Availability of good fertilizer has reduced erosion and increased the water-holding capacity and fertility of the topsoil in the area. In addition, farming and fishing cooperatives, unions and associations have undertaken environmental education and awareness programmes to encourage their members to restrict the amount of water they take from the lake. Farmers have been encouraged to adopt climate-smart agriculture with a focus on dealing with water scarcity and drought. They are also adopting integrated pest management to improve vegetable productivity while reducing the application of agrochemicals. Farmer training centres have also become a useful link to improve extension services in the area.

Lessons learned

- The public–private partnership approach had its initial challenges but has slowly and systematically enhanced the sustainability of the interventions.
- Capacity building through farmer training centres aids the adoption of interventions and increases the scale of impacts. It also enhances the capacity of communities, hence ensuring the sustainability of interventions after phasing out the project.
- Understanding local communities' livelihoods and vulnerabilities and establishing a multi-stakeholder platform helps to create a supportive policy environment.
- Use of a landscape approach can enhance the effectiveness and efficiency of project implementation.

The project employed a landscape approach to ensure its outcomes were inclusive and sustainable.

Case study 4: Managing drought and development in Makueni County

Background

Makueni County is a semi-arid region located around 60 km south of Nairobi. The area has relatively fertile soils but very little rainfall (300–600 mm per year) and this creates challenges for the majority of its people who rely on agriculture for their livelihoods. In recent decades, water scarcity has become acute with severe droughts occurring every two to three years. The resultant crop failures have led to widespread food insecurity and poverty, with many people relying on government aid to survive. Lack of cash to pay fees has caused many children to drop out of school, with many of the youth and men migrating to the towns to look for work. Lack of employment opportunities have encouraged others to adopt sand mining and charcoal burning as a source of income. The overall effects have been a breakdown in the area's social fabric and increased environmental degradation.

Land affected by drought (Photo: GWP)

Interventions

In March 2015, faced with growing water scarcity, the community decided to mobilize itself to address these challenges, using a social media platform to gather support. To address the problem of water security, they decided to harvest water during the rainy season by digging ponds and storing water in tanks. The water can then be used to supply drip irrigation throughout the dry season. The initiative attracted political support from the area governor, who is now acting as a champion by creating broad awareness of the project.

The idea has already sparked the formation of a farmers' cooperative, which provides loans to farmers to help them with the cost of construction. Once they have built their pond, tank and irrigation system and paid back the loan (from the sale of farm produce grown using drip irrigation), each farmer pays 20 percent of their proceeds after harvest back to the fund. The fund then supports its members to adopt additional income-generating activities.

Outcomes

The initiative has had a visible impact on food production within a short time. The households that have adopted the water harvesting technology are more resilient to drought, have more food and better incomes, and their farms are green with trees. If the technology is adopted more widely, most Makueni residents should have enough food to eat and a surplus to sell within the next three years. This means they will be able to afford healthcare and education for their children, laying the foundations for a strong community and a successful future. Following training, women and the youth now feel more confident to

Technologies used to mitigate drought and improve water security

- Water harvesting and storage
- Drip irrigation
- Access to finance.

engage in the management of water resources to drive the sustainable development of the community.

In addition to addressing the issues of food and water insecurity, the initiative has improved livelihood opportunities and several small businesses have been set up. There are also signs that the trend towards out-migration and pressure on the environment are reducing. The people are no longer totally reliant on government aid; instead they have access to a local source of finance through the water harvesting fund.

Organization of the community through the 'Makueni County Sharing Forum' (which now includes more than 3,000 villages) has created an entry point for additional support from the Kenya Water Partnership and a number of banks and other sources of finance. The manufacturer of the drip irrigation kits has also offered training to the members. In addition, farmers have received training in improved farming practices, entrepreneurship and market access. The local county government has provided a conducive enabling environment through making available a legal framework that supports improvements in food security.

Lessons learned

- Solutions to challenges in society lie within the community when they own the interventions. Integrated community initiatives are an important and effective tool for transforming communities and enhancing their resilience to drought.
- Access to credit services enhances the adoption and implementation of drought-resilience activities and enables community members to diversify their income sources.
- The solution has led to a wide partnership that includes local government, Kenya Water Partnership, credit facilities and banks, and the private sector.

Most Makueni residents should have enough food to eat and a surplus to sell within the next three years.

Case study 5: Water harvesting for economic empowerment in Kitui County

Background

Most people living in Miambani ward of Kitui County rely on rain-fed mixed farming and small-scale trade for their livelihoods. Levels of poverty are high and rainfall is erratic. The past ten years have seen more frequent episodes of drought, which have caused surface and groundwater sources to dry up and led to crop failure and diminishing livestock numbers. This has had a major impact on the social fabric of the agro-pastoralist societies, with people moving to the cities to find jobs or looking for alternative but environmentally damaging livelihoods such as charcoal burning.

Interventions

The 'Water harvesting for economic empowerment' project aimed to address the problem of water scarcity for agriculture. It brought local community groups together with other organizations (including the Kitui County Forest, Water and Sand Conservation Association and the Climate Change Network of Kenya) and local and national government. Beginning in June 2014, the first phase focused on harvesting sand and creating small-scale irrigation systems along the river Mutweii, as well as community capacity building and construction of a water reservoir. The next phase will include the establishment of a cottage industry producing sand-based construction materials.

Constructing sunken sand dams (Photo: Joseph Ngodi)

In addition to harvesting sand, the initiative helped to construct sunken sand dams to enhance water collection and storage. Water is now pumped from a reservoir into a 200,000 litre storage tank, which then distributes the water by gravity directly to households and gardens. There is sufficient water to support small-scale agriculture, including growing cash crops such as fruit and vegetables.

Outcomes

The regular supply of clean water has benefited peoples' health as well as their livelihoods in crop and livestock production, thereby contributing to poverty alleviation and sustainable development. There are social benefits too, such as eliminating the burden on women to collect water. They can now spend more time on productive activities and girls have a greater chance of attending school. The sunken sand dams contribute to groundwater recharge and combat desertification. The project has also triggered biodiversity conservation along the river. Their improved water security has made the community more resilient to climate change by creating a buffer against severe and prolonged droughts. The potential for conflict over water resources has also been reduced. Furthermore, the initiative has enabled local government and communities to build the networks

Technologies used to mitigate drought and improve water security

- Harvesting sand
- Small-scale irrigation
- Sunken sand dams
- Water storage and distribution structures.

and partnerships needed to ensure sustainable water resources management in the future.

Lessons learned

- Stakeholder involvement and collaboration with local government is crucial for the success of a development project.
- Organized stakeholder groups play a vital role in promoting integrated water resources management interventions.

Their improved water security has made the community more resilient to climate change by creating a buffer against severe and prolonged droughts.

UGANDA

Case study 6: Building drought resilience in Aswa-Agago sub-catchment

Background

The Aswa-Agago sub-catchment lies in Uganda's 'cattle corridor' – a semi-arid area subject to variable rainfall and recurrent droughts. Historically, the people living here were nomadic pastoralists, moving their herds to maximize resource availability. However, climate change is causing more frequent and intense droughts and the legacy of insurgency has left many people struggling with poverty. To support their livelihoods, some communities have resorted to indiscriminate tree-cutting, drained wetlands and burned large areas of bushland, causing widespread environmental degradation. Weak governance systems and lack of enforcement of environmental regulations have failed to safeguard natural resources and communities have become highly vulnerable to climatic shocks.

Interventions

These issues led to the 'Building drought resilience through land and water management' project, a participatory action initiative begun in 2012. The aim was to halt natural resource mismanagement by improving ecosystem health, boosting livelihoods, building the capacity of institutions to manage natural resources, improving the knowledge and skills of communities to adapt, improving coordination among institutions and influencing policy. The International Union for Conservation of Nature (IUCN) implemented the three-year project in three districts encompassing 98 villages with a population of nearly 28,000 people.

Local water point maintained by water user committee (Photo: IUCN-Uganda)

The first step was to establish village, parish and sub-catchment management committees to ensure a participatory approach. The project promoted community dialogues and training sessions with the aim to empower the people to make decisions on how to manage their resources and landscapes sustainably and improve their resilience to drought.

The project undertook cohesive approaches to diversify livelihoods and markets through establishing a community environment conservation fund. Managed by village committees, the fund provides loans to members of the community in the event of an emergency and supports innovative enterprises, such as bee-keeping and the production of handicrafts. The project also improved natural infrastructure around water points by constructing drainage channels and waterways to connect neighbouring farms. At the same time, steps were taken to strengthen natural resource governance processes, which included improving water resource management and sharing experiences across different sectors and governance levels. Water harvesting structures including ponds, wells, pans and hand pumps were also installed.

Technologies used to mitigate drought and improve water security

- Improved water point infrastructure
- Water harvesting structures
- Environmental conservation e.g. planting multi-purpose trees
- Emergency revolving fund and water user committees.

Outcomes

Some areas of rangeland have been restored and many pastures and wetland resources within the project sites have begun to recover. Communities have noticed increased water volumes, particularly during dry seasons, with some streams no longer drying up. Most water points have been protected and the user committees ensure everyone has access to clean water. This has greatly benefited health by reducing the incidence of water-borne disease. Links between different sectors at district and national levels have led to implementation of policies relating to natural resource management and governance. By-laws for environment committees in the project parishes have been drafted and translated into local languages. Neighbouring communities have seen the advantages of having a revolving fund and are starting to demand similar interventions. Finally, the communities now have better knowledge of environmental conservation measures such as planting multipurpose trees.

Lessons learned

- Active participation of stakeholders promotes learning and strengthens decision-making, helping to integrate development programmes into local government structures. Capacity development of both community members and local government officers is required to enable greater participation.
- Strong community institutions are prerequisites for long-term sustainability and promote the resilience of natural resources.
- Linking project interventions to specific livelihoods, activities, needs and interests enhances community understanding of the importance of natural resources and their responsibility towards conservation.

Communities have noticed increased water volumes, particularly during dry seasons, with some streams no longer drying up.

UGANDA

Case study 7: Improving livelihoods in Karamoja

Background

The Karamoja sub-region is located in the 'cattle corridor' of northeast Uganda. It includes seven districts and has a total area of around 27,500 km^2 and a population of almost one million. The area is semi-arid and has limited and unpredictable rainfall, with climate change increasing the incidence of severe drought and water insecurity. Farming is relatively unproductive with many households unable to meet their food requirements. Animal productivity is hampered by poor nutrition, lack of mineral supplements, livestock diseases, overgrazing and insufficient pasture and this has reduced incomes for livestock keepers in recent years.

The five-year Karamoja Livelihoods Programme (2010–2015) aimed to enhance community resilience to drought and mitigate the effects of drought on livelihoods. The programme was implemented by the Government of Uganda through the Office of the Prime Minister and supported by the European Development Fund.

Valley tank (Photo: KALIP)

Interventions

Stakeholders in the programme developed and built productive and robust water infrastructure, such as valley tanks, sub-surface dams, boreholes, rainwater jars and drip irrigation systems, across the seven districts of the sub-region. The programme paid the farmers for their labour and helped restore their productive capacity through training to develop their agricultural skills. It also provided access to finance through village savings and loan associations. Another aspect of the programme was to develop the services and infrastructure needed for smallholder farming, including feeder roads, water storage facilities (e.g. ponds and micro dams) and capacity building for the community and local government personnel.

Soil conservation measures were also introduced, including semi-circular catchments, trapezoidal bunds (used for vegetable production) and gabion cages (to address the problem of gully erosion). Other significant outcomes include diversification of sources of income and increased household incomes, production of crops and vegetables throughout the year using irrigation, improved vegetation and forest cover that have resulted in improved soil quality, higher crop yields, and better groundwater functioning and flood prevention.

Outcomes

The built infrastructure has been effective in protecting water catchments and has increased water availability, particularly during the dry season. Communities have acquired the knowledge and skills

Technologies used to mitigate drought and improve water security

- Water catchment and soil protection measures
- Water ponds, micro dams, sub-surface dams, rainwater jars, drip irrigation systems
- Capacity building in agriculture
- Access to finance.

they need to implement a wide range of measures to conserve their natural resources. Now livestock keepers can water their animals much closer to their grazing areas and this has increased the number of livestock kept as well as their productivity. At the same time, having clean water has reduced the incidence of livestock diseases. While children formerly spent most of the day taking the livestock to water, they can now accomplish their chores as well as attending school.

The 'cash for work' activities and village savings and loan schemes provided immediate income and enabled communities to buy food during the lean season and pay for school fees and health services, resulting in improved health. Rainwater jars located close to peoples' homes reduced the burden on women of fetching water, allowing them to spend more time looking after their families. Valley tanks increased availability of water for livestock and domestic use, and, due to their closeness and assured supply, it saved time and reduced distance to fetch water – this meant that children could go to school and adults get involved in other productive activities such as farming. Another important outcome was the social aspects of sharing in a resource and the opportunity this brings for building peace between user groups. Many people have benefited from the new water infrastructure and all profit from the better water availability during the dry season. The next steps will be to make financial and human resources available through local government sources to support operation and maintenance and ensure the sustainability of the water infrastructure. Water user committees have been established and trained in operation and maintenance. More training will be required in watershed management.

Lessons learned

- The involvement and participation of communities and other stakeholders significantly contributed to building a sense of ownership, which will build in sustainability for the future.
- Sustainability strategies need to be introduced at the identification stage of all project appraisals.
- For any productive infrastructure, the community and the local government need to agree in advance the management of ongoing maintenance and repairs, with any undertaking by the community reinforced by local government officials.
- Any programme dealing with infrastructure requires the collaboration of key stakeholders (beneficiaries and local government), training in operations and maintenance and an adequate budget to ensure regular maintenance of assets and to develop a sense of ownership.

The built infrastructure has been effective in protecting water catchments and has increased water availability, particularly during the dry season.

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Case study 8: Climate-smart agriculture in Namutumba

Background

Farmers in Namutumba district in eastern Uganda are experiencing more unreliable rainfall and longer periods of drought. Crop pests and diseases are also on the rise. As a result, their harvests and livelihoods are suffering and they are becoming increasingly vulnerable to the impacts of climate change.

In an attempt to improve their resilience and build a better future, farmers in Magada, Bulange and Kibaale sub-counties have engaged in a project to introduce climate-smart agriculture. This encompasses various technologies with the aim of increasing productivity in a sustainable manner, enhancing resilience through adaptation, and reducing or removing greenhouse gases. The ultimate goal is to achieve national food security and development goals.

The project was funded by a consortium of donors including the European Union, UK Department for International Development and the Government of Norway, with input from the Uganda Ministry of Agriculture, Animal Industries and Fisheries; Ministry of Water and Environment; Ministry of Education; and Ministry of Trade, Industry and Cooperatives.

Ridge and furrow cultivation to conserve soil and water (Photo: GWP)

Interventions

The project ran for 18 months, starting in 2014. The farmers were encouraged to adopt a variety of climate-smart agriculture technologies, which included minimal or zero tilling, use of appropriate planting materials, growing the crops in the right soil medium and at an appropriate plant spacing, managing the crops to reduce competition, and monitoring and managing pests and diseases. They also adopted a range of measures to conserve and improve their soils, including constructing contour bunds, cutting and using foliage to mulch and feed livestock, applying manure, and integrating agroforestry.

The farmers worked closely with Uganda's extension services to learn new techniques of soil and water conservation, as well as post-harvest handling and marketing. Some farmers, including many women, became 'champions' and later worked as extension agents. Teachers and pupils from local schools also received training and planted climate-smart school gardens. The project set up a grant scheme to help farmers meet the initial costs of adopting climate-smart agriculture, with a district-level committee in charge of assessing, verifying and approving funding proposals from farmer groups.

Outcomes

After attending training, many farmers adopted climate-smart agriculture. The grants helped them

Technologies used to mitigate drought and improve water security

- Minimum or zero tilling
- Use of appropriate planting materials, growing the crops in the right soil medium and at an appropriate plant spacing, managing the crops to reduce competition
- Monitoring and managing pests and diseases
- Integrating soil conservation measures, construction of contour bunds
- Cutting and using foliage to mulch and feed livestock, accessing and applying manure, integrating agroforestry.

to buy equipment like rippers and oxen so they could make permanent planting basins. They could also buy fertilizers and herbicides and this encouraged them to adopt the new technologies.

The climate-smart technologies have improved soil fertility and increased the water-holding capacity of soils, enhancing farmers' resilience to drought. In addition, some farmers have been able to plant and harvest three crops per year instead of the normal two. Many farmers have diversified their livelihood options by keeping livestock fed on home-grown fodder. In addition to giving a source of income, livestock provide manure for the fields, reducing the need for expensive inorganic fertilizer. The minimum or zero tillage system greatly reduces the workload for women. With increased incomes from enhanced crop and livestock productivity, families have become more food-secure and poverty has diminished. Incidences of domestic violence have also decreased. Furthermore, many families have improved their nutrition and become less susceptible to disease. The school gardens have raised awareness of the technologies and farmers in neighbouring districts have seen the benefits and are starting to ask for training for themselves.

While the project has generated many successes, some challenges remain. There is a high demand for labour and inputs in the initial stage and a continuing problem with pests and parasitic weeds. Counterfeit seeds and agrochemicals are widespread, and farmers still lack access to markets and sources of finance. Finally, the national extension service remains underfunded and struggles to reach across the country.

Lessons learned

- Farmers need adequate training in new knowledge and skills as well as demonstration of the benefits to accelerate adoption.
- 'Champions' or opinion-leaders from the communities are the most effective voices in promoting adoption.
- Introduction of new technologies works well through farmer groups.
- Using schools to demonstrate new technologies is cost effective.
- Availability of grants is important to offset the cost of adopting new technologies.

The climate-smart technologies have improved soil fertility and increased the water-holding capacity of soils, enhancing farmers' resilience to drought.

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Case study 9: Restoring water quality in Lake Kako

Background

The people living in Mushumba in Rubirizi district of western Uganda depend on Lake Kako for domestic drinking water, watering livestock, irrigating crops and fishing. However, the lake has become heavily silted due to degradation of the surrounding slopes. Locals have cut down most of the trees and other vegetation to meet their domestic energy needs and so, when it rains, the soil is washed from the steep slopes into the lake. The deteriorating water quality has led to an increasing incidence of water-borne diseases, including bilharzia, typhoid, cholera and diarrhoea. Mushumba is located at a high altitude and so is unable to access clean water via the nearest gravity flow scheme. Furthermore, the underlying permeable rocks make it impractical to drill boreholes.

Interventions

In 2012, the community-based organization (CBO) Mushumba Community Initiatives for Development, which had been leading various development projects in the area, received financial support from the Government of Japan to provide clean and safe water. The fund was bolstered in 2013 with US$ 6,000 received from the United Nations Development Programme. The funds allowed the CBO to introduce various interventions designed to address the problem of silting and restore the water quality of the lake.

Stakeholders established a management committee and raised awareness of the potential solutions and benefits through meetings and other sensitization events. A memorandum of understanding was signed between community members and the Mushumba CBO to establish a framework for community participation and cooperation. This included selecting three pilot sites.

The first step was to prevent further removal of vegetation and slow the rate of run off from the surrounding slopes. This meant promoting alternative and sustainable sources of energy and training

Farmers planting vetiver grass and tree seedlings along the lakeshore (Photo: Mushumba Community Initiative)

Making a solar cooker
(Photo: Mushumba Community Initiative)

Technologies used to mitigate drought and improve water security

- Catchment management
- Planting trees and other vegetation
- Adopting solar cooking technology.

local artisans in the design, use, installation and maintenance of solar cookers. To aid land restoration, the project provided tree seedlings and ground cover plants as well as planting equipment including hoes, wheelbarrows, rakes and gum boots. These were distributed on a cost-sharing basis in which the beneficiary farmers contributed up to 20 percent of the total cost. Trees were planted on approximately 34,000 m^2 of slopes surrounding Lake Kako and vetiver grass on another nine acres of land around the lakeshore.

Outcomes

The farmers acquired skills in catchment management and there was increased partner participation and interest in conserving the landscape. The committee had representation from both genders to enhance equitable decision-making and ensure access to resources for both men and women.

Community members acquired skills and interest in solar cooking technology. In addition to conserving the environment, this improves health by eliminating the smoke that is generated by burning wood. The communities learned to use local materials and tools to make and assemble their solar cookers. Three demonstration solar cookers were constructed, installed, tested and remain in good working condition.

Lessons learned

- Teamwork yields better results than working as individuals. This ensures that the participants are moving at the same pace and leads to replicability and sustainability.
- Practical solutions to local challenges are attractive and adopted easily in a community setting.
- Local committees formed in a participatory manner are well accepted.

The farmers acquired skills in catchment management and there was increased partner participation and interest in conserving the landscape.

UGANDA

Case study 10: Low-cost water management in Rakai

Background

Rakai district is located in the semi-arid 'cattle corridor' in southwest Uganda. The mainly pastoral and agro-pastoral communities are suffering frequent and severe droughts, which cause shortages of pasture and water for livestock. The southern part of Rakai is subject to the influx of livestock from pastoral communities in Tanzania, who come in search of water and grazing, and this leads to conflict over land use. Biganda and Kakuuto parishes are most affected by water stress and these areas are also experiencing falling water levels due to having soils with low water retention and insufficient groundwater recharge.

Interventions

To alleviate these water challenges, a CBO called Youth Initiative for Development Association engaged in a project to build low-cost innovative water infrastructure and enhance the capacity of communities through developing their knowledge and skills in drought management. The project aimed to provide sustainable water solutions and improve community livelihoods and resilience to drought.

Water storage ponds (Photo: Youth Initiative for Development Association)

The community first held a stakeholder meeting, inviting farmers, community leaders and the district technical team to discuss potential solutions to the persistent water scarcity and come up with effective strategies to build drought preparedness and mitigation. As a result, stakeholders developed a drought management framework and agreed on their roles and responsibilities. They focused on building capacity and putting communities in charge of improving their own water supplies. They also agreed to enhance the capacity of district leaders in developing contingency plans for drought preparedness and mitigation, and to advocate for an augmented budget to fund water resource development.

Another aspect of the project focused on constructing low-cost technologies. These consisted of polythene underground water tanks, run off catchments with filters, rope pump wells, water jars and ferro-cement tanks. The communities also identified local groups and institutions that could take the lead in monitoring and sustaining the project in the future.

Outcomes

The interventions increased awareness and acceptance of low-cost water infrastructure in the area. The community built a water collection unit joined to a filtration chamber containing local materials such as clay and charcoal. The water is treated with chlorine and communities can use it for drinking (after boiling),

Technologies used to mitigate drought and improve water security

- Low-cost water harvesting and storage
- Water treatment using mainly local materials
- Education and awareness activities.

irrigating their vegetable gardens and watering their livestock. Community members put pressure on the district decision-makers to increase the budget for drought response. Meanwhile, the piloted technologies are being replicated in another district in the cattle corridor.

Lessons learned

- Involving stakeholders actively in project implementation leads to effective use of financial resources.
- Significant impacts can be realized with community ownership and this can lead to improved community livelihoods.
- Communities can be prompted to act when they have a greater appreciation of the holistic nature of sustainable water management.

The interventions increased awareness and acceptance of low-cost water infrastructure in the area.

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About the Integrated Drought Management Programme in the Horn of Africa

The Integrated Drought Management Programme in the Horn of Africa (IDMP HOA) is part of the global IDMP launched by the Global Water Partnership and World Meteorological Organization at the High-level Meeting on National Drought Policy held in Geneva in March 2013. IDMP HOA collaborates with several partners and has the overall aim to increase the drought resilience of communities, countries and ecosystems in the Horn of Africa. The programme works to strengthen partnerships, build capacity, enhance knowledge development, and influence policy and practice towards more integrated management of drought in the Horn of Africa following an integrated water resource management approach.

http://www.droughtmanagement.info/idmp-activities/idmp_hoa/

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