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# Scaling and Replicating Sustainable Watershed Management: Malawi Case Studies

Prepared for Catholic Relief Services
by the Keough School of Global Affairs Integration Lab
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KEOUGH SCHOOL OF GLOBAL AFFAIRS

Integration Lab

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## About the Authors

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# Acronyms

| | | |
|---|---|---|
| **ADC** | | Agricultural Development Committee |
| **CRS** | | Catholic Relief Services |
| **EU** | | European Union |
| **FFW** | | Food for Work |
| **FGD** | | Focus Group Discussion |
| **GIZ** | | The Deutsche Gesellschaft für Internationale Zusammenarbeit |
| **GRC** | | Grievance Resolution Committee |
| **i-Lab** | | University of Notre Dame Integration Lab |
| **KII** | | Key Informant Interview |
| **LACRO** | | Latin America and Caribbean Regional Office |
| **NGO** | | Non Government Organization |
| **NRM** | | Natural Resource Management |
| **PRIDE** | | Programme for Rural Irrigation Development |
| **Save** | | Save the Children |
| **SSA** | | Sub-Saharan Africa |
| **TLC** | | Total Land Care |
| **USAID** | | United States Agency for International Development |
| **VDC** | | Village Development Committee |
| **VSL** | | Village Savings and Loans |
| **WALA** | | Wellness and Agriculture for Life Advancement |
| **WAT** | | Water Absorption Trench |
| **WMC** | | Watershed Management Committee |

# Preface

In 2009, Catholic Relief Services (CRS) led a consortium of seven NGOs to launch the Wellness and Agriculture for Life Advancement (WALA) project in Southern Malawi. The five-year project involved a suite of watershed, livelihoods, and capacity-building interventions designed to reduce food insecurity and increase the resilience of 215,000 vulnerable households to climate shocks and stresses. Though CRS and USAID, the primary funder of WALA, have conducted evaluations of the project, these did not identify the factors driving long-term sustainability, scalability and replicability of watershed interventions. Thus CRS Malawi commissioned a team of graduate students from the University of Notre Dame (henceforth referred to as “the Team”) to conduct additional qualitative research in 2021, including fieldwork in Malawi between June and July, 2021.

This research culminated in the following deliverables: 14 case studies, a photo album, and a synthesis report. The synthesis report summarizes the Team’s findings and key learnings. The following 14 case studies supplement the synthesis report by detailing specific insights from each sample community. Each case study provides an overview of data collection, key insights, notes on the treatment visit, and key lessons learned.

The CRS Malawi Leadership Team is the primary audience for these case studies, namely Julie Ideh, Owen Sopo, and Juma Masumba. These case studies will provide insights into how specific communities received the WALA watershed treatments and the impact of these interventions in each community. The CRS leadership team can use learnings from these case studies to inform scaling and replication efforts. Additionally, these case studies can be used to aid future program design and justify funding for watershed interventions.

Other Malawi partners, including the consortium of WALA implementing NGOs, the Government of Malawi and funders (USAID, GIZ and EU), can use these case studies as evidence of the success of watershed treatment interventions and as a tool to aid in the design of future initiatives. This target audience will benefit from the success stories and lessons learned in each case study.

Other stakeholders interested in watershed and NRM interventions outside the context of Malawi, such as CRS Baltimore Staff, CRS Technical Advisors in the SSA region, and CRS LACRO, will also be able to draw from the success stories and lessons learned in these case studies to inform the design of their own interventions.

# Executive Summary

Smallholder farming communities across southern Malawi are growing increasingly vulnerable to food insecurity due to climate change. Community engagement in natural resource management is necessary to protect natural resources from the droughts and floods that threaten farmers' livelihoods, but is not yet widespread. Catholic Relief Services' five-year *Wellness and Agriculture for Life Advancement* project aimed to address this challenge and increase farmer resilience to climate change through the installation of watershed infrastructure ("treatments") in 32 beneficiary communities. Evaluating the success of WALA has proven difficult, however, as each community received a different suite of watershed treatments and nine different NGOs were tasked with implementation. Moreover, the 32 communities differ in terms of social and environmental characteristics, which affected the uptake and impacts of the intervention in each location. For all these reasons, barriers and drivers to long-term sustainability vary at both the district and community level. Examining local conditions and outcomes in each community can reveal how communities received and, in many cases, *scaled* WALA watershed treatments.

To draw these insights, a team of graduate students from the University of Notre Dame visited 14 WALA beneficiary communities in June and July of 2021, seven years after WALA close-out. Most visits took place over two days and consisted of several interviews and discussions, first with community members, then key informants. Community members participated in focus group discussions, led by the Team's interview facilitators in the local language, Chichewa. Key informants included Watershed Committee Members, local leaders, district agriculture and resource officers, and extension officers. These interviews took place in English when possible and otherwise, Chichewa. At the conclusion of the interviews, local representatives led the research team on a tour of their watershed treatments.

From these interviews and tours, it is clear that **communities understand the importance of watersheds and WALA treatments.** Many communities are still actively engaged in watershed management activities and have benefitted as a result. However, both the benefits and motivations for ongoing engagement in WALA varied. In Mbangu, community members explained that they were motivated to improve their watersheds due to the frequency and severity of droughts in the district. In Makande, interview participants explained that their watershed treatments have not only reduced soil erosion, but also increased their crop yields. Additionally, the organization of watershed management activities varied, but proved critical to many communities' success. For example, leaders from Makande and Mbeluwa described the importance of developing watershed management systems with rules and enforcement mechanisms in order to prevent treatment destruction.

The following compilation of two-page case studies for each watershed visited by the research team provides nuanced details about the successes and challenges faced in each area and a list of the primary drivers and barriers to long-term sustainability. These findings are then summarized in a tabular form for comparison across both districts and watersheds. Although there are many similar successes, challenges, drivers, and barriers noted by the study communities, the variation across cases suggests a need for individual consideration of community characteristics and conditions during program design and implementation.

# Muluma , Chiradzulu

Visit Date(s): **June 22-23, 2021**

Implementing NGO: **Save the Children**

### Focus Groups

| 11 Women | | 12 Men | |
|---|---|---|---|
| 20-35: | **3** | 20-35: | **7** |
| 36-55: | **7** | 36-55: | **3** |
| 56+: | **1** | 56+: | **2** |

### Key Informant Interviews

Extension Officer
Combined WMC and Local Leaders
District Officials

*Figure 1: A series of check dams run perpendicular to a well-traveled path and have been successful in filling the gulley in with sediment.*

## Success Story

*Before WALA, streams and wells in the Muluma watershed would run dry by August. Now, the community has water flowing all year due to effectiveness of the water infiltration treatments that recharged the diminished water table.*

## Notes from Treatment Visit

Community leaders first took the Team down a well-traveled pathway in the community that featured a series of 12 check dams running perpendicular to the path. The check dams have allowed the community to reclaim a gully that once ran parallel to the path due to excess water flow during major rain events. Since the dams were built, the gully has been filled in with silt caught by the check dams and is now very shallow.

The leaders then took the Team to see newly planted tree seedlings on top of a high slope on the outskirts of the community. Community members planted the trees to reforest the slope and increase the soil stability; they would prefer to plant fruit trees but fruit seedlings are too expensive. Additionally, the Team observed that there were many non-native eucalyptus trees planted throughout Muluma, which are known to be a major strain on the water table.

## Quote

***"Good leadership by our group village headman was one of the key factors. He leads with love; he doesn't scare away his people and so this encourages everyone to take part. The other factors were we knew what challenges we were facing at that time and so we worked hard to make our lives better."***

***-Focus Group Participant***

## Overview

### Successes

- Improved soil fertility
- Better crop yields
- Reduced soil erosion
- Community ownership of natural resources

### Challenges

- Farmers lack inputs necessary to scale treatments
- Heavy rainfall erodes soil, destroys crops
- Labor shortages

## Key Insights

Since the completion of WALA, community members in Muluma have benefitted from improved soil fertility, a river that flows for two additional months, and, consequently, increased crop yields. From the answers provided during interviews, it is clear that community members understand that they are responsible for establishing new watershed infrastructure. They also demonstrated an understanding of the purpose of watershed treatments, noting that the infrastructure built during WALA has prevented soil erosion and increased soil moisture. Still, respondents noted that heavy rainfall continues to threaten their crop yields as they often have their soil washed away and tree seedlings destroyed during floods. Additionally, they noted that a lack of inputs such as fertilizers and tools and a lack of capital make it difficult to scale their success. Finally, community members stated they would like more capacity-building and empowerment activities in order to refresh their knowledge of watershed treatments and learn new skills.

Additionally, extension officers noted that the geographical context of the Muluma watershed contributes to its success; the hilly terrain in the watershed allows for few competing interests on land due to the inability of agriculture to be sustained in many areas. As a result, watershed structures can be placed in these areas without resistance from community members who feel the land would be better used for farming.

In regards to challenges faced by the Muluma community, group work and labor demands emerged as important themes in the interviews. During the women's focus group, participants shared that they would rather work together to complete communal work such as tree nursery creation, tree planting, or bush-clearing (for fire prevention) in order to make the work easier. On the other hand, men shared that they would rather pay an individual to complete all tree-related work in the community. Though they asserted that it is everyone's responsibility to protect the community's natural resources, they expressed a need for hired help due to the amount of work required to build and maintain the watershed treatments. Though the community has been able to provide this labor since WALA, the local extension officers noted that the high labor demand associated with the watershed treatments poses a threat to their long-term sustainability.

*Figure 2: Non-native eucalyptus trees, which deplete the water table, are growing tall near native tree seedlings recently planted in Muluma Watershed.*

Next, while the local leaders suggested that the success of the community's watershed implementation can be attributed to the high level of motivation in the community, they shared concerns regarding the sustainability of this motivation. They noted that there were no learning visits to reinforce or increase knowledge after Save left and reiterated that community members lack sufficient tools to continue building interventions. Additionally, they explained that younger community members (who were too young to participate in training during the WALA implementation) do not have a good grasp on natural resource management. When asked why they did not have extension officers or other informed community members teach this younger generation, the leaders said that they prefer to work with NGOs rather than government staff because they find the government staff to be dishonest.

Finally, the legacy of Food for Work was noted as a persistent challenge in nearly every interview. Though community mindsets have certainly changed since community members have seen benefits from the interventions, FGD respondents noted that many of their peers stopped working after FFW ended. Moreover, when extension officers were asked what they would change from the WALA project, they stated that FFW should be eliminated because it only incentivized short-term work. There should be larger education efforts, they explained, about the importance of the structures to foster an understanding of why these interventions are necessary for the community's long-term success in order to motivate long-term work.

## Drivers & Barriers to Sustainability in Muluma

### Drivers

- Community members' perceived self-efficacy
- Understanding of positive consequences of treatments
- Strong local leadership

### Barriers

- Lack of watershed tools
- Lack of refresher trainings
- High labor demand of treatment expansion and maintenance

# Natama, Chiradzulu

Visit Date(s): **June 24-25, 2021**

Implementing NGO: **Save the Children**

### Focus Groups

| 13 Women | | 13 Men | |
|---|---|---|---|
| 20-35: | **2** | 20-35: | **2** |
| 36-55: | **11** | 36-55: | **6** |
| 56+: | **0** | 56+: | **5** |

### Key Informant Interviews

Extension Officer
Combined WMC & Local Leaders
District Officials

*Figure 1: Marker ridge farming technique introduced by WALA that helps to retain water in the soil.*

## Success Story

*After WALA ended, local leaders worked with the district extension officer to mobilize community members to expand the WALA treatments, conduct peer to peer learnings, and track the positive changes in their community, thus further restoring the watershed.*

## Notes from Treatment Visit

Community leaders showed the Team an area of a local hill that was previously bare and explained that, because of WALA, it is now covered by trees. During the tour of the treatments, the Team also observed river banks that are now protected by trees planted during WALA and previously impassable gullies are now filled thanks to erosion management activities such as check dams. Additionally, the Team saw technologies being implemented including conservation tillage, crop intensification, and pit planting. Check dams are still in place and are well maintained. The members work on them communally at the beginning of the planting season.

The small dam constructed by WALA, however, collapsed during the heavy rains. The government of Malawi offered some funds for construction of another dam which is now used to irrigate community gardens.

## Quote

***"Before WALA, we could harvest one bag of maize from a plot but now we harvest about 3 bags of maize. Also before WALA, most houses were thatched with grass but when people started harvesting a lot of produce from the irrigation scheme most people bought iron sheets for their houses."***

***-A Local Leader***

## Overview

### Successes

- Increased crop yield
- Reduced soil erosion
- Can afford basic needs
- Able to pay school fees

### Challenges

- Small dam for irrigation
- Lack of transportation for farm produce
- Conflicts between mulch planting and livestock

## Key Insights

WMC members and the district officers acknowledged that WALA was well-launched in Natama by all involved in its implementation, including district representatives, the area development committee, the village development committee, extension officers, and local Lead Farmers. Together, these actors led the training and construction of various watershed treatments including contour ridges and check dams. These treatments were generally well-received by community members. Community members also appreciated the activities related to conservation agriculture that were introduced during WALA. Further, community members expressed understanding of the benefits of WALA-related agroforestry.

Local leadership has played a key role in the continued maintenance and success of WALA watershed treatments since the implementation period ended. The village headman in Natama has actively taken part in the intervention and the rest of the community has followed his example. Moreover, local leaders have ensured that community members remain engaged in watershed management by developing guidance policies for watershed management and establishing a system for monitoring and enforcing these policies. For example, community members are fined for cutting trees and, if community members come into conflict, they can request the support of the Grievance Resolution Committee (GRC). The work of the local leaders is complemented by that of the local extension officers. During the construction of check dams, local leaders monitored the work while extension workers provided guidance to the community members. Additionally, Natama has a good agroforestry system where the extension officer works with the people on the committee tasked with tree management.

However, both leaders and extension officers faced the challenge of motivating community members after FFW ended since they did not have any more fiscal incentives. Even community members noted during the FGDs that when FFW ended, some felt they were being made to work for free like in the colonial times. These concerns are likely why district officers discouraged the sole use of FFW as an incentive during their interview. They recommended that if it is to be used, it ought to be integrated with livestock. By doing so, they explained, the benefits do not stop when the FFW ends, so people will continue to be motivated to engage in watershed management.

*Figure 2: The irrigation system that was built during WALA and rehabilitated using funds from the government after WALA ended.*

The success of the Natama watershed suggests that long-term sustainability of watershed treatments is possible. After understanding the benefit of the watershed interventions constructed during WALA, most community members kept doing the work even after the funding had stopped. People had the confidence that they had acquired the skills to continue with the work. Moreover, for this community, sustainability has been achieved by passing on skills between peers and neighboring communities, expanding the watershed treatments that were installed during WALA, and tracking the positive changes that have occurred since these treatments were constructed.

For the improvement of future interventions, community members recommend having more training from extension workers, more learning visits from neighboring communities and having incentives directly given to the people, not through a third party.

### Drivers & Barriers to Sustainability in Natama

#### Drivers

- Strong local leadership
- Unity of the community
- Collaboration with the neighboring community

#### Barriers

- Lack of tools for the activities
- Market failure
- Low levels of literacy that caused low adoption rates of new technologies

# Chigwirizano, Thyolo

Visit Date(s): **June 28-29, 2021**

Implementing NGO: **World Vision**

**Focus Groups**

| 4 Men/ 5 Women | | 6 Men/ 4 Women | |
|---|---|---|---|
| 20-35: | **0** | 20-35: | **0** |
| 36-55: | **3** | 36-55: | **2** |
| 56+: | **6** | 56+: | **8** |

**Key Informant Interviews**

Extension Officer
Combined WMC/ Local Leaders
District Officials

*Figure 1: Team member Lauren Oliver walks alongside a focus group facilitator, a watershed management committee member, and a child to tour the community's watershed infrastructure.*

## Success Story

*During the tour of the watershed treatments, two women showed the Team a parcel of land once marked by a large gulley. Due to the success of WALA treatments in reducing erosion, the gulley had been reclaimed and could be used as farmland again. A conflict arose (and was quickly settled) amongst the neighboring landowners, as it had been so long since the land was arable that they were unsure who had the right to farm it.*

## Notes from Treatment Visit

A group of women who are active in watershed management in Chigwirizano led the Team on a tour of the watershed treatments. During the tour, the women showed off check dams and contour trenches that were built during and after WALA implementation. They noted that the treatments are maintained annually, typically in October. The women also showed the team the site of a previously deep gulley. Due to the effectiveness of the watershed treatments in reducing soil erosion, the landowner was able to reclaim the gulley for farmland and increase their crop yields.

## Quote

***"It is possible for someone to have keen interest in farming and try to grow some crops, but if that person does not have enough tools for farming then he is bound to harvest very little and face hunger."***

***-Focus Group Participant***

## Overview

### Successes

- Understood importance of treatments
- Community ownership of natural resources, especially by women
- Peer to peer knowledge sharing

### Challenges

- Coordination between local government and NGOs
- Inconsistent long-term participation
- Leadership dissatisfaction with community participation

## Key Insights

Both community members and district government representatives consider the WALA intervention to have been a success in Chigwirizano. In the focus group discussions, community members noted the importance of protecting and restoring their watershed and appreciated that World Vision gave them the skills and resources necessary to do so. Representatives from the Thyolo district agriculture office also expressed appreciation for the support of World Vision and other NGOs working in the area, but noted that coordination amongst the local government and external organizations could be improved.

The success of the WALA intervention should be attributed first to strong local leadership. The local traditional leader was responsible for choosing which community members would serve on the watershed management committee and coordinate efforts to expand and maintain watershed treatments. Unlike other communities the Team visited—where leaders chose friends and relatives to hold committee positions—the leader in Chigwirizano selected people who are well-respected and have the technical expertise necessary to oversee watershed activities. Second, there is a strong sense of ownership amongst community members, especially women, regarding the local natural resources. In one interview, a participant illustrated this sense of ownership, saying, "we continue these activities because the benefits of the treatments are for our community and not for World Vision." This poignant statement was in line with community members' perception of natural resources as collective assets and the management of said resources as a collective responsibility. This sense of ownership appears to contribute to community members' motivation to maintain their watersheds and work together to do so.

Additionally, extension officers played a key role in promoting positive behavior change regarding watershed management in Chigwirizano. The local extension officer coordinated a "Farmer Field School" which gave local farmers the opportunity to learn by demonstration from "Lead Farmers" who had additional skills and expertise in agriculture. This form of knowledge-sharing allowed farmers to learn from people they know and trust and see the installation and the benefits of the treatments on their own land.

*Figure 2: The watershed management committee members explain that this area of land, which was once a deep gully, was recently reclaimed due to check dams. There was a dispute between the two landowners on either side of the the new land regarding who should claim ownership of the newly farmable land. The maternal grandmother of the two people resolved the dispute and equitably distributed the land.*

In spite of these successes, both community members and key informants expressed frustration regarding the coordination between World Vision and both local and district leaders during WALA. At the community level, respondents felt that the FFW scheme negatively affected long-term participation in watershed activities as many community members were not interested in maintaining treatments after FFW ended. At the district level, government representatives suggested that organizations ask for their input during project design in order to better align government and NGO interventions.

## Drivers & Barriers to Sustainability in Chigwirizano

### Drivers

- Trusted and knowledgable WMC
- Opportunities for peer-to-peer learning
- Strong local leadership

### Barriers

- Food For Work affected long-term outlook on treatments value

# Nang'ombe, Mulanje

Visit Date(s): **June 30-July 1, 2021**

Implementing NGO: **Africare**

### Focus Groups

| 10 Women | | 9 Men | |
|---|---|---|---|
| 20-35: | **3** | 20-35: | **2** |
| 36-55: | **5** | 36-55: | **3** |
| 56+: | **2** | 56+: | **4** |

### Key Informant Interviews

Extension Officer
Combined Local Leaders and WMC
District Officials

*Figure 1: These trees were planted along the river during WALA implementation to create a riparian area that is better protected during heavy rain events.*

## Success Story

*Nang'ombe watershed raised their own seedlings without help because they saw their community school get washed away by a flood. This disaster sparked action by community members to keep the upland soils in place by reforesting the slope.*

## Notes from Treatment Visit

Due to logistical constraints, the Team was unable to visit many of the treatments installed during WALA. Community members were only able to show the Team several trees that were planted along the riverbank during WALA to create a riparian area and reduce flooding. The Team observed a dense area of trees lining the river that successfully holds soil in place and stabilizes the banks of the river. Due to the proximity of the tarmac to the river and community, the trees help to keep the road drivable, even during the rainy season.

## Key Insights

Located at the base of Mt. Mulanje and surrounded by hilly slopes, the community in Nang'ombe recognizes the need for watershed treatments to stabilize the steep hillsides and prevent soil erosion during major rainfall events. Since the completion of WALA, they have worked together to maintain the treatments installed during WALA and the entire community has benefitted as a result.

## Quote

***"I didn't wait to learn from anyone. I just observed the way some young people were growing in their tomato gardens; I learnt a few things and started doing the same in my field. I grew tomatoes three times in my field and the benefit was beyond my imagination. I even bought a bicycle."***

***-A Focus Group Participant***

## Overview

### Successes

- Clear understanding of the purpose and function of watershed treatments
- Increased crop yields, surpluses, and income
- Community ownership and pride due to community-based problem identification

### Challenges

- Reliance on middle man to get surplus to market

## Key Insights

Several factors have contributed to Nang'ombe Watershed's ongoing success. First among these is the community's early realization of the benefits of the treatments, especially the irrigation system. Since the irrigation system was installed, farmers' crop yields have significantly increased. Due to Nang'ombe's proximity to the main road and the local town, farmers have been able to sell their surplus goods at the local market and have translated these increased yields into additional income. Many reported that with the income they have earned using the irrigation system, they have been able to pay their children's school fees. These benefits, they reported, are what motivates them to continue engaging in watershed management. They did note, however, that they want more training in marketing so that they can earn more profit on their goods. Currently, they are relying on a middle man to take their crops to the market, which prevents them from pricing their goods competitively.

Another factor that contributes to the community's success is their shared desire to develop and improve the community through watershed management. Local leaders noted that the community was already benefiting from small-scale watershed projects they built before Africare came, which led to community members' positive reception of WALA and their motivation to scale the watershed treatments after WALA. Additionally, Nang'ombe's water security is a source of communal pride. Community members explained that they have invited other communities to come and learn from their successes. Leadership reported that they have worked on seven different projects in recent years with other NGOs due to their reputation as a hard working community.

This high level of community engagement is facilitated by a strong by-law system created and enforced by the local leaders. The leaders stated that everyone participates due to fines imposed on those who do not contribute, but there does not appear to be push back from the community members to this imposition. FGD respondents explained that when one person does not implement watershed structures in their fields, it affects their neighbors. This is why they place so much importance on by-laws that facilitate community monitoring of infrastructure and impose fines on those who do not comply.

Finally, district-level extension officers credit the success of Nang'ombe to the community's ability to self-organize and mobilize. They shared an example of successful community mobilization before WALA in which community members worked together after a flood washed away a local school. This work, they explained, illustrates the community's motivation to work together to improve the community. The extension officers support these efforts by building a sense of ownership in the community. They allow the community to identify their own problems rather than coming in and telling them what is wrong. This has led to Nang'ombe being highly driven to build interventions in the sloped uplands so they can have more water downhill because they identified this as their priority. The extension officers did explain, however, that they are overburdened because NGOs hand over projects to them without continued support. It is difficult for them to take over NGO projects because they are already understaffed and they are held accountable to too many different stakeholders with competing interests.

## Quote

***"Any organization should help us find markets for our produce, because selling to vendors is like throwing our precious produce away; they buy at very low prices."***

***-Focus Group Participant***

## Drivers & Barriers to Sustainability in Nang'ombe

### Drivers

- Access to extension officers for continued support
- Effective monitoring and enforcement
- Strong local leadership
- Strong motivation to reduce flooding

### Barriers

- Lack of watershed tools
- Lack of agricultural inputs
- Lack of marketing knowledge to maximize the profits of surplus crops

# Mitumbira, Mulanje

Visit Date(s): **July 2 & 5, 2021**

Implementing NGO: **Africare**

### Focus Groups

| 9 Women/ 1 Man | | 7 Women/ 2 Men | |
|---|---|---|---|
| 20-35: | **0** | 20-35: | **0** |
| 36-55: | **4** | 36-55: | **3** |
| 56+: | **6** | 56+: | **6** |

### Key Informant Interviews

Extension Officer
WMC
Local Leaders
District Officials

*Figure 1: A plot of land that is well-planted during the dry season as a result of retained water due to check dams.*

## Success Story

*During WALA implementation, community members learned several new techniques for preserving the soil, restoring fertility and increasing the water table. As a result of this, quality of life has improved.*

## Notes from Treatment Visit

The Team visited several treatments associated with WALA including a tree nursery, contour bunds, and vetiver grass that had been planted for soil stability. The Team also visited the gardens of community members who had learned and implemented conservation agriculture. Generally, structures were well maintained, with the WMC organizing maintenance activities every August. During the tour, watershed committee leaders also informed the Team of a community dam for irrigation and fish farming, though the Team was unable to visit it due to time constraints.

## Quote

***"The WALA project through Africare had extension workers who trained us in different activities to do with watershed management. So during the training we were taught theory and practical as well. We did seed multiplication nurseries and created dams that collected water. After doing all that even on a small piece of land we were able to harvest much more than before."***

***-Focus Group Participant***

## Overview

### Successes

- Improved soil fertility
- Reduced flooding
- Reduced soil erosion
- Community ownership of natural resources

### Challenges

- Gender and labor dynamics
- Hunters who destroy the treatmentts
- Fewer men participating than women
- Lack of adequate tools

## Key Insights

The community members in Mitumbira are clearly motivated and driven to engage in watershed management. Not only could they explain the functions and benefits of the different types of treatments, but they also described how they have started new activities to improve their watershed, including planting pigeon peas for improved soil fertility. They noted that land that was previously not cultivable is now cultivable. It was evident from their enthusiasm and success that the community members are driven and unified in their watershed management.

Much of Mitumbira's success can be attributed to the leadership of their traditional authorities and committees. Interestingly, Mitumbira's WMC consists of members who are responsible for coordinating activities and a sub-committee—the "technical committee"—that is responsible for overseeing treatment design, maintenance, and construction. Members of this sub-committee possess additional knowledge of the function of the treatments and are critical to the success of the watershed management. The local extension officer is even a member of this committee, and brings a wealth of watershed management knowledge to the community. The members of the WMC responsible for activity coordination, on the other hand, work to enforce the watershed constitution. All people are expected to fulfill the roles and responsibilities described in the constitution and these leaders ensure that this occurs through a well-functioning monitoring and enforcement system.

Though watershed management generally occurs without difficulty, there are complicated gender and labor dynamics at play in Mitumbira. During the interviews, the Team learned that the local custom and culture is matrilineal, where the man relocates to his wife's property after marriage. This norm appeared to contribute to an imbalance between men and women investing in watershed treatments. According to the community members, approximately 80% of those who participate in watershed management are women, which makes installing more labor-intensive treatments challenging and slow. This imbalance, however, appears to be reversed at the household level; the Team learned that although it is women who invest in land and watershed maintenance work, it is still men who are the primary decision-makers.

*Figure 2: The community has continued to plant indigenous trees to reforest the area, much like these trees that were planted during WALA implementation.*

This gender dynamic is further complicated by the presence of nearby tea estates where men can work for immediate pay. Given that men appeared to be less interested in investing in the community's land due to their inability to pass it on to their own kin, these estates offer a compelling alternative to participating in watershed management even though the work does not contribute to community-wide benefits. It should be noted, however, that no community members suggested that these dynamics are an issue, but rather explained that they are cultural norms. The village headman indicated that NGOs should expect this imbalance in participation when they come into Mitumbira to implement projects.

## Drivers & Barriers to Sustainability in Mitumbira

### Drivers

- High degree of technical expertise
- Strong local leadership
- Perceived self-efficacy
- Unity among community members

### Barriers

- Lack of watershed tools
- High labor demand of treatment expansion and maintenance

# Makande, Chikwawa

Visit Date(s): **July 6-7, 2021**

Implementing NGO: **Chikwawa Diocese**

### Focus Groups

| 9 Women | | 5 Men | |
|---|---|---|---|
| 20-35: | **0** | 20-35: | **0** |
| 36-55: | **2** | 36-55: | **0** |
| 56+: | **7** | 56+: | **5** |

### Key Informant Interviews

Extension Officer
WMC
Local Leaders
District Officials

*Figure 1: Team member Lauren Oliver and a Watershed Management Committee leader stand on a stone bund while looking out at the surrounding stone bunds that traverse the topography.*

## Success Story

*Recognizing the need for widespread adoption of treatments to improve the local watershed, community members in Makande have not only expanded the treatments within their own area since WALA ended, but have also travelled to neighboring communities to train farmers on watershed treatments and the importance of natural resource management.*

## Notes from Treatment Visit

The Team was taken on a tour of the interventions by two members of the Watershed Management Committee. The Team visited large check dams and stone bunds that the community members built together during and after the WALA implementation period. The stone bunds, in particular, were in very good condition and stretched as far as the eye could see. The community members noted that they typically have to repair the stone bunds annually due to cattle knocking down rocks. Bee hives could also be seen in the forest near the stone bunds. Compared to other communities, the committee reported fewer instances of community members destroying treatments, which is likely a result of the rule enforcement system and the positive perception of WALA amongst the community members.

## Quote

***"We benefited from WALA because now we have trees everywhere, and we no longer suffer effects of heavy winds; our children are healthy and no longer malnourished due to lack of food. We own this watershed; no one else can manage it for us but us. Some villages actually wish they could do what we do with our watershed. This watershed has really contributed to a positive change in the quality of our lives."***

***-Female Focus Group Participant***

## Overview

### Successes

- Increased resiliency to shocks
- Local leader support of WMC
- Increased crop yields
- Increased incomes are invested back into VSLs

### Challenges

- Lack of refresher trainings
- Self-reliance due to geographical isolation

## Key Insights

There is no doubt amongst community members and leaders in Makande that the WALA program was a success for their community and their watershed. In all of the interviews, respondents shared how their lives had improved since the Chikwawa Diocese came to implement WALA and install treatments. Initially motivated to construct watershed treatments after suffering major crop losses during drought years, community members are well aware of the importance of protecting natural resources and preparing early for future shocks. Furthermore, it was clear that the community members know that their efforts to maintain and expand the watershed treatments are worthwhile and that they are more resilient to shocks since WALA began.

The most notable feature of Makande's watershed is not the treatments, but the Watershed Management Committee (WMC). In Makande, the WMC is composed of several elected representatives who work in close coordination with the local traditional leadership. The WMC is responsible for assigning clear roles and responsibilities to community members and creating rules for protecting the treatments. For example, people found to be destroying treatments or not participating in maintenance are fined by the chief. It is worth noting that local leaders (including the chief) do not coordinate or oversee watershed activities, rather, they provide support to the committee by recognizing its authority and ability to make rules. This rule-making system works well in Makande because the enforcement of the rules is consistent and public. Both help to build trust amongst community members and leaders that all stakeholders are fulfilling their roles and contributing to the collective good that comes out of maintaining the watershed.

Makande's success should also be attributed to the self-reliance demonstrated by the community members and their leaders. Compared to other sites visited by the Team, Makande receives significantly fewer visits and interventions from external organizations. This lack of attention and support is likely due to the fact that the community is very difficult to access even by car. Interestingly, however, it seems to have contributed to the success of the WALA intervention; because community members cannot rely on the return of an external organization to provide aid or training, they have invested in creating a sustainable system for maintaining their watershed that does not rely on external support. In fact, when community members were asked how they would improve a future program, they suggested that there should be more refresher trainings after the intervention ends, but did not recommend additional support beyond this.

What motivates community members' interest in investing in this system and in their watershed are all the positive benefits derived from their efforts. For community members in Makande, these benefits go beyond increased crop yields and resilience due to their co-investment in many of WALA's complementary livelihoods. For example, many farmers invest the additional income they've earned from surplus crop yields into VSLs that were also introduced as part of WALA. The benefits that community members have seen from these investments also motivate their interest in protecting their watershed. Thus, the VSLs have helped promote positive environmental outcomes in the community, albeit indirectly.

*Figure 2: Bee keeping is a lucrative income-generating activity in Makande. The community protects the surrounding forest to keep the honey bees safe from fires or habitat loss.*

## Drivers & Barriers to Sustainability in Makande

### Drivers

- Strong watershed management committee
- Enforcement of monitoring and by-laws by local authorities
- Community-driven expansion of treatments
- Complimentary programs like VSLs motivate continued expansion and maintenance of treatments

### Barriers

- No significant barriers, but consider providing refresher trainings for the community

# Chikololere, Balaka

Visit Date(s): **July 8-9, 2021**

Implementing NGO: **Project Concern International**

### Focus Groups

| 10 Women | | 9 Men | |
|---|---|---|---|
| 20-35: | **3** | 20-35: | **5** |
| 36-55: | **5** | 36-55: | **3** |
| 56+: | **2** | 56+: | **1** |

### Key Informant Interviews

Extension Officer
WMC
Local Leaders
District Officials

*Figure 1: One of many wells which allow community members to irrigate their gardens year-round.*

## Success Story

*Recharged stream flow and a higher water table has led this community to be able to irrigate tomatoes, cabbage, and other vegetables located close to dug-out wells, year-round, thus increasing food security in the community.*

## Notes from Treatment Visit

During the tour of the treatments, community members showed the Team the wells they dug close to the river to irrigate their crops. These wells, they explained, allowed them to store groundwater and check the water table level. Located close to the river, the community members reported that the wells are full year-round, which was not the case before the WALA treatments were installed. The community uses the land surrounding the wells to grow tomatoes, cabbage, greens, and other fruit trees because the soil in the area is now moist and fertile and access to the the well water makes irrigation farming possible. Before the wells were dug, this land was not cultivable.

Additionally, the community members leading the tour explained that, due to the relatively flat topography of the community, modifications were made by the community to better suit their needs. For instance, the guides showed the Team a contour ridge in an agricultural area where the community added "dividers" because they realized that water would not flow through it due to the lack of slope. The dividers allow water to seep into the soil in a distributed manner throughout the field. The community then planted vetiver grass on the dividers to stabilize the soil.

## Quote

***"When we make swales we help the water table to come up, which allows our crops to feed on that moisture hence they grow healthy and strong. You can also see places where the water table is high because the bushes and the trees look healthy. That is why other farmers who did not benefit from the interventions during the project invite us to their fields to do the interventions so that they can also benefit."***

***-Male Focus Group Participant***

## Overview

### Successes

- Increased water availability lead to increased food security
- Less vulnerability to drought

### Challenges

- Difficult to transport water from wells to fields
- Thieves steal honey, mice hunters destroy treatments

## Key Insights

The greatest positive impact of WALA in Chikololere has undoubtedly been the restoration of the stream that runs through the community. Prior to WALA, the stream flowed only during the rainy season. Now, because of the watershed treatments, it flows year-round and community members are able to draw water from it for irrigation. They reported that this increase in water availability has made them more food secure and less vulnerable to droughts. Still, the community members expressed a need for more resources to maximize the success of their watershed management efforts and are keen to have another NGO come to support their watershed management efforts. For example, they noted that it is difficult to transport water to their farms and to build new treatments. They requested that NGOs provide them with treadle pumps and other tools to continue working on watershed activities.

In addition to lacking resources to expand their treatments, the community also struggles to maintain the treatments due to thieves and hunters destroying them. During the FGDs, respondents explained that the community keeps bees and is committed to protecting the forest where the hives are located. They often grow frustrated, however, when they find that thieves have stolen the honey from hives or mice hunters have disturbed tree seedlings. In the interview with the local leaders, the traditional authority noted that the issue of theft and destruction did not begin with WALA, though it has grown now that there are more treatments. To mitigate this issue, community leaders attempt to monitor and sensitize community members on the importance of watershed management. Additionally, they have developed a system of by-laws prohibiting theft and destruction and consequences for violators. Still, the impact of these efforts appears to be limited as community members report that theft and destruction continues.

Many community members connected the issue of treatment destruction to the use of a FFW program during the WALA implementation. Those who felt that FFW created long-term challenges suggested that when FFW ended, many community members still did not understand the purpose of the treatments and did not feel a sense of ownership of the treatments. Furthermore, leaders noted that the construction of treatments is highly labor-intensive so without an understanding of the purpose of the treatments or a direct incentive to build them, community members are uninterested in watershed management. The extension officers whom the Team interviewed echoed community leaders' frustration with the use of FFW in the WALA implementation. They also suggested that the sustainability of interventions is threatened when people do not feel ownership over their infrastructure. Furthermore, the extension officers explained that while WALA used FFW, other NGOs in the area have used different approaches to incentivize labor and ownership in communities. Not only do these different approaches create confusion amongst beneficiary community members, but they also make it difficult for extension officers to support the projects once the NGOs leave, as the district offices do not have the means to offer similar fiscal incentives.

*Figure 2: Tomatoes, cabbage, and other vegetables are grown year-round in this field thanks to an increased water table that allows wells to be full of water year-round. Farmers work together to stagger planting so as to not inundate the markets with too many crops at once.*

Extension officers suggested that instead of using FFW to motivate people to work, NGOs should pair short-term projects that show results quickly with longer-term projects like watershed management. Additionally, the community leaders suggested that cash would have been a better alternative to FFW because people need to pay school fees and other expenses. Though cash for work presents many of the same issues as FFW, participants are able to choose how to spend their earnings. The leaders also claimed that another reason why infrastructure was not expanded is that community members fear that if NGOs perceive the community to be self-sufficient, they will no longer provide resources (this viewpoint, however, was likely held by only a minority of community members).

## Drivers & Barriers to Sustainability in Chikololere

### Drivers

- Strong use of by-laws
- Perceived positive consequences of increased access to water

### Barriers

- Lack of incentives like FFW or cash for work
- Lack of ownership of communal treatments

# Namadidi, Zomba

Visit Date(s): **July 12-13, 2021**

Implementing NGO: **Save the Children**

### Focus Groups

| 11 Women | | 8 Men | |
|---|---|---|---|
| 20-35: | **0** | 20-35: | **3** |
| 36-55: | **5** | 36-55: | **1** |
| 56+: | **6** | 56+: | **4** |

### Key Informant Interviews

Extension Officer
Combined WMC & Local Leaders
District Officials

*Figure 1: Pond that serves a dual purpose of fish farming and holding water for irrigation; however, it's on private land.*

## Success Story

*The gullies and stone bunds uphill have helped to prevent soil erosion. Before these treatments were constructed, whenever it would rain, water would rush downhill at a high speed and wash away top soil and crops. This no longer occurs and people are able to harvest more crops each season.*

## Notes from Treatment Visit

The community members insisted on taking the Team to the site of the failed earthen weir. The community members then showed the Team the fish pond that was constructed on private land. It appeared to be very well-maintained and a source of pride in the community, but it is not benefitting the whole community as intended. Because it was built on private land, the management of the pond was handed over to owners of the land on which it was built. These landowners have, in turn, limited use of the pond to community members who are able to pay to use it.

En route to the failed weir, the Team observed stone bunds on the slope of the hill and a few existing check dams on some of the community member's plots.

## Quote

***"We would also want to have educational visits to other areas to see what they are doing so that we can learn from others. When we visited Mulanje during WALA we learnt a lot of things that changed the way we did our farming on our individual plots, so we would recommend more educational visits."***

***-Male Focus Group Participant***

## Overview

### Successes

- Soil erosion prevention

### Challenges

- Disconnect between leaders and community members
- Bias in selecting those to receive FFW
- Putting interventions on private land
- Keeping morale up after a failure

## Key Insights

The success of WALA in the Namadidi Watershed was stymied by various internal and external factors. Though FGD respondents reported that WALA was positively received by community members, many of the treatments are no longer maintained and the community's interest in watershed management has waned. Still, community members were eager to discuss some of the challenges that they faced during and after the WALA implementation, hoping to improve future interventions in Namadidi and elsewhere.

Community members primarily attribute the downturn of the WALA implementation in Namadidi to poor leadership. In fact, community members were surprisingly open to explaining how the leadership of the WMC and other committees (the community has an active ADC and VDC as well) failed to mobilize community members and maintain momentum. During the FGDs, respondents shared that there was a disconnect between the community leaders and community members during WALA implementation. They also accused these leaders of being biased in registering beneficiaries for FFW, which led to feelings of frustration and resentment amongst them. After providing this background, however, FGD respondents shared that they have better feelings towards and more confidence in their new leaders (they did not say when these leaders came into their positions, only that they are not the same ones as those who were responsible for the failure of the community's watershed management efforts). These new leaders, they reported, are younger and more driven. They have already demonstrated a more effective leadership style by establishing several subcommittees for different aspects of community management. The community members did not explain exactly why these subcommittees are better, but they are certainly satisfied with this new structure.

According to interview participants, Save offered to build a weir just outside the community that could help recharge the water table and increase streamflow for irrigation. The community members agreed, but insisted that Save build the weir using cement, fearing that it would wash away during a flood if they did not. Save refused to do so, explaining that it had limited cement available and needed it to build a well nearby (which community members were adamant they did not need or want). Save then built an earthen weir, which washed away after one season, and community members still point to its destruction as an example of the NGO failing them.

*Figure 2: During heavy rains, this earthen constructed weir was washed away.*

Based on these negative experiences, both leaders and community members had several suggestions for improving future interventions. First, they insisted that NGOs listen to the voices of the people they are serving from program design to implementation, and even monitoring. They also suggested teaching communities new skills and motivating them by organizing community-to-community visits.

Namadidi was the only case in which community members openly admitted that the WALA intervention had failed and expressed a high level of dissatisfaction with its implementation. Though the explanations of failure provided in the FGDs and KIIs differed, it is likely that both the community leaders and the lack of coordination between Save and community members acted as barriers to the community's success. The community appears to remain hopeful, however, that a future intervention could be more successful given that the new leadership is more driven and engaged.

### Drivers & Barriers to Sustainability in Namadidi

#### Drivers

- Peer-to-peer learning
- Aligning community interests to project design and implementation
- Post-project evaluations to correct what failed

#### Barriers

- Weak local leadership
- Lack of coordination between the implementing NGO and the community

# Majawa, Zomba

Visit Date(s): **July 14-15, 2021**

Implementing NGO: **Save the Children**

### Focus Groups

| 9 Women | | 9 Men | |
|---|---|---|---|
| 20-35: | **0** | 20-35: | **1** |
| 36-55: | **4** | 36-55: | **2** |
| 56+: | **5** | 56+: | **6** |

### Key Informant Interviews

WMC
Local Leaders

*Figure 1: A water absorption trench surrounded by a stone bund acts as a water overflow catchment barrier at the bottom of a large slope but above farmer's agricultural fields.*

## Success Story

*Though community uptake of watershed treatments was low during the WALA implementation period, a follow-up intervention by Emmanuel International led to widespread adoption of treatments and improved community resilience.*

## Quote

***"Government and NGOs should have been finding markets and vendors for us to be selling our produce to. They should have been bringing people here to buy our produce. A person like me can't just go to an institution to supply vegetables because I don't have connections. Those who have connections are the ones who go there and then they come back to buy from us at very low prices."***

***-Male Focus Group Participant***

## Notes from Treatment Visit

After the KIIs, members of the WMC took the Team to see many of the treatments constructed during the Emmanuel International watershed intervention. The treatments, which included water absorption trenches, contour ridges, and swales, were in remarkably good condition. The committee members were clearly proud of the treatments and were eager to show the Team how the treatments worked to efficiently slow water flow and protect crops during major rainfall events.

## Overview

### Successes

- Follow-up project from different NGO led to sustained treatments, increased crop yields, and community commitment
- High-functioning WMC

### Challenges

- Late WALA education led to low initial uptake
- A flood destroyed treatments
- Lack of tools to expand treatments

## Key Insights

Majawa should be considered a success case in terms of watershed treatment uptake and improved resiliency, though its path to success was considerably different than other WALA beneficiary communities. These differences suggest that even in communities in which WALA uptake was low, community members are still interested in watershed management and understand the importance of restoring and maintaining their natural resources.

First, Majawa differed from other study sites in regards to the timing of the WALA intervention. Whereas the construction of watershed treatments in most communities initiated at the beginning of the WALA implementation period in 2009, construction of treatments did not begin in Majawa until 2012. As a result, community members reported that they only received three months of training on the function and value of these treatments before Save the Children left. Soon after, many of the treatments were washed away by a flood and community members discontinued watershed management.

Not long after, however, NGO Emmanuel International (which was the partner organization responsible for WALA implementation in other beneficiary communities), led another watershed restoration intervention in Majawa. This intervention included the construction of many of the same treatments as the 2012 WALA project. Notably, however, Emmanuel International constructed more treatments, led more trainings, and implemented a Cash for Work program (Save the Children used a Food for Work program during the 2012 intervention). Since Emmanuel International's intervention, the community's watershed has dramatically improved, crop yields have increased, and community satisfaction with the treatments appears high. Now, Majawa is benefitting from many of the same positive impacts of watershed treatments as other communities visited by the team, in spite of its rocky history with WALA.

Moreover, the mechanisms that support its current success mirror those of many successful WALA communities. It's WMC, for example, has proven to be highly functional, coordinating watershed maintenance, creating by-laws, and developing a monitoring and enforcement system for these by-laws. Also, as in other communities with efficient and organized by-law systems, the WMC works closely with the district government. To support watershed management efforts, the district government recognizes the authority of the committee and provides enforcement support when necessary.

*Figure 2: The view from the bottom of the slope shows the different watershed treatments that all work together to protect agricultural fields from washing away during heavy rain events. These treatments allow water to more easily infiltrate the soil and disperse water across greater surface areas to slow down the flow rate.*

The challenges noted by community members in Majawa were also similar to other successful WALA beneficiary communities. While the treatments have transformed Majawa's landscape, respondents noted that they lack sufficient tools to maintain and expand their treatments. Others also added that the community could benefit from collective marketing as the failure of local markets prevents farmers from maximizing profits on their crops.

## Drivers & Barriers to Sustainability in Majawa

### Drivers

- Effective WMC
- Strong system of by-laws endorsed by local authorities
- Community ownership of treatments

### Barriers

- Lack of watershed tools
- Lack of necessary collective marketing skills

# Kasabola, Zomba

Visit Date(s): **July 16, 2021**

Implementing NGO: **Save the Children**

**Focus Groups**

| 10 Women | | 8 Men | |
|---|---|---|---|
| 20-35: | **1** | 20-35: | **0** |
| 36-55: | **9** | 36-55: | **8** |
| 56+: | **0** | 56+: | **0** |

**Key Informant Interviews**

Combined Local Leaders and WMC

*Figure 1: A vetiver grass nursery in the local headman's field. This headman teaches and leads his community by example.*

## Success Story

*Kasabola community members spoke differently about their watershed management than any other community members the Team met with; when asked about watershed interventions, they shared not only what they know about the importance of watersheds, but also spoke with great pride about all the things they are currently doing to protect theirs.*

## Notes from Treatment Visit

During the treatment tour, community members reiterated that the treatments installed during the PRIDE project picked up where WALA left off. They showed the Team a slope directly behind the village headman's land where the Team could see both WALA and PRIDE treatments. They also showed the team where they had constructed "eyeball" structures, in which seedlings are planted inside a stone semi-circle in order to reduce water flow, stabilize the soil and reforest the slope. Past these structures were stone bunds. The tour guides explained that these stone bunds help slow the flow of water down the slope during major rain events and increase soil infiltration. The Team then travelled to the village headman's land where they saw water absorption trenches and contour ridges. The headman also had a vetiver grass nursery, numerous fruit trees, and a multi-level permaculture garden constructed during the PRIDE project. According to the Team's guides, the garden took hundreds of people two days to construct and is now accessible for all community members. It was apparent to the Team after touring the headman's homestead that he leads watershed management in the community by example.

## Quote

***"The hills around here were bare because all the trees had been cut. In our fields, we were not harvesting much, especially when we were affected by droughts. Because of these challenges people were motivated to do the work. We have saved a lot of fields/gardens from being washed away. We no longer get shocks caused by natural disasters in our area. There are no floods or houses blown away by heavy winds."***

***-Local Leader***

## Overview

### Successes

- Ongoing support from NGOs and government officials
- Adaption of treatments to local context
- Community sensitization to watershed importance

### Challenges

- Food for Work timing
- Climate change
- Extension officer underfunding and understaffing

## Key Insights

Community members in the Kasabola Watershed take watershed management seriously. Not only did they expand watershed treatments on their own after WALA, but they also chose to participate in the Program for Rural Irrigation Development (PRIDE) project, a government-funded watershed management intervention. According to the local extension officer, this motivation to improve the watershed can be attributed to strong community leadership and the ability of community members to adapt watershed treatments to the local environment.

Kasabola leaders contribute to the success of watershed management by sensitizing the community on the importance of watersheds and coordinating and supervising group work. Additionally, leaders have been effective in mobilizing the community to maintain and expand treatments because they have good relationships with community members as well as a strong by-law system that includes fines for community members who do not comply. When the Team spoke to the leaders, they reported that they are very satisfied with the level of continued work by the community. They also noted that community members remain motivated to participate not because of the by-laws, but because they have seen the benefits of the treatments such as increased soil moisture, reforestation, and increased crop yields.

Next, community members proudly shared with the Team the ways that they have adapted the proposed watershed treatments to suit their local geography. Namely, they explained that they were able to effectively reduce the size of some of the watershed treatments (without reducing their effectiveness) in order to conserve farming space while still protecting the watershed. When asked how they made these adjustments, they explained that they determine which treatments are modified based on their preexisting knowledge of which fields are most affected by flooding. Then they scale the treatments accordingly.

Community members and leaders also shared with the Team several ways that future interventions could be improved based on their experiences with both WALA and PRIDE. First, they explained that the PRIDE project implemented treatments directly next to the WALA treatments. However, they would rather future construction take place in a completely different area in order to leave room for individual treatment expansion after a project ends. Next, community members recommended that NGOs provide more tools and equipment. They suggested that Save ought to have left them tools to expand and maintain the treatments after project closeout. Also, due to the effectiveness of the treatments and, consequently, an increase in water availability, community members expressed a need for irrigation equipment such as a treadle pump to transport water to the fields.

Additionally, community members had much to say about WALA's FFW program and how it could be improved. Some community members shared that they felt the amount of FFW provided during the WALA implementation was insufficient based on the amount of labor they contributed. Local leaders said that if they could change anything about the WALA project, they would alter the schedule of the FFW rations because they ended right as hunger season started and left the community vulnerable to food insecurity. Additionally, the extension officer noted that cash for work can be more effective than FFW, but only if there are stable markets nearby where people can purchase the goods they want/need at reasonable prices. If these market conditions exist, then cash is preferable, if not, then participants should be provided FFW.

*Figure 2: A modified water absorption trench in an agricultural field is fortified with pigeon peas planted on the overflow embankment.*

Finally, the extension officer also shared that NGOs could improve future projects by supporting district projects. He shared some of the challenges that the district faces regarding natural resource management including overpopulation (which increases the strain on already-degraded resources), climate change, and farmers' resistance to adopting new techniques. Overcoming these challenges is difficult, however, because the district is severely underfunded and understaffed. In fact, there is only one extension officer for every 3,000 households (the ratio should be 1:800) and no funds are provided to extension officers for transportation into the communities.

## Drivers & Barriers to Sustainability in Kasabola

### Drivers

- Leadership fueled unity and social cohesion
- Understanding of labor intensity fuels communal work

### Barriers

- Lack of watershed tools

# Mbeluwa, Zomba

Visit Date(s): **July 19, 2021**

Implementing NGO: **Save the Children**

### Focus Groups

| 9 Women | | 6 Men | |
|---|---|---|---|
| 20-35: | **2** | 20-35: | **1** |
| 36-55: | **0** | 36-55: | **1** |
| 56+: | **7** | 56+: | **4** |

### Key Informant Interviews

Extension Officer
WMC
Local Leaders
District Officials

*Figure 1: The watershed management committee leader shows off well-maintained stone bunds created during the WALA project.*

## Success Story

*Mbeluwa leaders demonstrated their ability to adapt WALA programs to best meet their needs by modifying the proposed structure of the Watershed Management Committee. Implementing NGO, Save the Children, suggested that no more than 10 members sit on the WMC, yet local leaders recognized the importance of forming a committee in which all voices are recognized. Therefore, the community formed a 13-member committee with one elected representative from each of the villages that comprise the watershed.*

## Quote

***"We would have wished that we were consulted before they made decisions on what activities to do. We were just told that they were going to do an irrigation scheme, and they even chose the location of the scheme for us. Unfortunately the place that was chosen belongs to farmers who are not interested in irrigation farming, and so after they left, the scheme has not been maintained and it's benefiting very few people. It would have been good if they had consulted us to see if the location was viable or not."***

***-WMC Member***

## Notes from Treatment Visit

During the tour of the watershed treatments, local leaders showed the Team both the watershed treatments and the irrigation system. The watershed treatments, which include contour ridges, deep trenches, and swales appeared to be in good condition. The tour guides explained that pigeon pea crops have been planted along many of the contour ridges to stabilize the soil and further maximize the impacts of the treatments.

## Overview

### Successes

- Increased crop yields
- New and diverse crop opportunities
- Adaptation of treatments/committees to better suit Mbeluwa's needs

### Challenges

- Irrigation scheme built on private land
- Market inundation from excess crops
- Stolen parts and lack of coordination to replace them

## Key Insights

Irrigation was the main topic of discussion in Mbeluwa. For this community, the irrigation system acts as both an illustration of the success of watershed management, and an example of possible implementation pitfalls. The irrigation system that exists currently was built as part of Save the Children's implementation of WALA in 2009. Those involved in building the system were farmers who expressed interest in learning to use irrigation schemes, though the system was built on private land. According to the local extension officer, many of the farmers who agreed to allow Save the Children to build the system on their land were not the same ones who were interested in building or using the irrigation system. After Save left, these landowners began charging use fees for the system. These use fees have prevented many farmers from using the irrigation system and has created conflict amongst the farmers who built the system and the landowners. Moreover, the irrigation system is being underutilized by the landowners as many of them were not interested in irrigation in the first place, an issue that only exacerbates the existing tension amongst the two groups.

According to the farmers, the greatest challenge preventing them from paying the use fees is market failure. In both focus groups, the farmers explained that even without the irrigation system, their crop yields have improved since the WALA implementation due to the positive effect of the treatments on the soil fertility and moisture. These additional yields have not translated into significant income gains, however, because the farmers have found that when they all bring their products to the market at the same time, the influx of goods drives prices down. Moreover, those who have used the irrigation system to "winter crop" have found success growing strawberries. There is not, however, an established market for strawberries in Zomba, leaving strawberry farmers frustrated that their investment in the irrigation system has not yielded significant returns.

Both the successes and challenges experienced by the community can be attributed to the leadership of the watershed and irrigation committees respectively. First, the WMC has been effectively coordinating activities and engaging with community members in all 13 of the villages in the Mbeluwa watershed since 2010. It should be noted that the existing structure of the WMC is not the ten-member one that Save the Children proposed during WALA. Instead, local leaders recognized the importance of representation for the success of NRM institutions and decided to form a committee consisting of one elected leader from each village in the watershed. Each representative is responsible for voicing the concerns of their own village, ensuring that all needs and interests are considered in watershed management.

On the other hand, the irrigation committee has not achieved the same success. Though there was not a consensus among respondents regarding the cause of the committee's ineffectiveness, respondents brought up the issue of a stolen gate valve in nearly every interview. According to leaders and community members, the gate valve (which controlled water flow from the local reservoir to the irrigation system) was stolen nearly one year ago and still has not been replaced. Community members believe that responsibility for coordinating the replacement of the valve should fall on the irrigation committee. The irrigation committee requested that district officials replace the valve, yet after the request was denied, took no further action. Without the valve, the irrigation system is significantly less functional in spite of the success of the watershed treatments in increasing the water table.

Thus, the case of the Mbeluwa watershed illustrates the importance of coordination between community leaders and implementing NGOs. Had Save the Children engaged in a more participatory design process, it is possible that the conflicts between landowners and irrigation farmers could have been avoided and community members could have voiced their concerns regarding the local markets before strawberries were introduced as a winter crop.

## Quote

***"We work with local leaders like chiefs to sensitize people on the benefits of taking care of the watershed through community meetings. We take time to explain to people the benefits of a watershed and how to maintain the interventions so that the others can see the benefits and desire to have these interventions in their gardens."***

***-WMC Member***

Furthermore, future NGOs must consider the needs and contexts of communities in the formation of committees. The Watershed Management Committee was successful because it ignored Save's recommendation to have no more than ten people on a committee. This should be a lesson for CRS to allow communities to form committees that best suit their needs. Moreover, once these committees are formed, CRS can best support them by ensuring that the committees are aware of their roles and responsibilities and prepared to carry them out.

## Drivers & Barriers to Sustainability in Mbeluwa

### Drivers

- Strong WMC
- Adaptations to committees for equal representation

### Barriers

- Lack of coordination between NGO and community members
- Lack of collective marketing education

# Katunga, Zomba

Visit Date(s): **July 20, 2021**

Implementing NGO: **Save the Children**

### Focus Groups

| 11 Women | | 12 Men | |
|---|---|---|---|
| 20-35: | **3** | 20-35: | **4** |
| 36-55: | **3** | 36-55: | **7** |
| 56+: | **5** | 56+: | **1** |

### Key Informant Interviews

Extension Officer
Combined WMC & Local Leaders
District Officials

*Figure 1: This irrigated agricultural field is able to grow crops even during the dry season thanks to the well-maintained irrigation system.*

## Success Story

*Community members benefiting from the irrigation scheme took initiative and came together in 2018 to raise funds to buy a new gate valve to replace the one that was broken. Each family contributed approximately 2 USD, a minimal amount compared to their increased income from year-round irrigation.*

## Notes from Treatment Visit

During the tour of the watershed treatments, the Team saw wells and irrigation canals that the community constructed and continues to maintain. The Team then visited the community fish pond that is used for irrigation and fish farming. From the community pond, the Team could see a well-forested slope, check dams, and vetiver grass that community members planted to stabilize the soil. The Team also noted that the hill on which community members installed treatments and planted trees is markedly more vegetated than all other surrounding hills.

The Team was informed that the part of the hill that Katunga watershed is responsible for was reforested using natural trees through a tree regeneration system. The team observed that these natural indigenous trees did better than non-native trees.

## Quote

***"I will give an example of my garden. My crops were washed away twice in one growing season by run off and so I stopped using it for years but once the watershed technology came and we dug swales and contours around that garden, that's when I started growing crops in it again and I harvested a lot from it."***

***-Female Focus Group Participant***

## Overview

### Successes

- Improved soil fertility and reduced erosion
- Better crop yields & food security
- Community ownership of natural resources

### Challenges

- Inconsistent use of incentives by different NGOs and government

## Key Insights

Community members in Katunga are very proud of their watershed treatments, irrigation scheme, and forested hills. They demonstrated a strong sense of ownership over this infrastructure, describing their watershed interventions as 'our' activities. Furthermore, the community spoke excitedly about all the positive impacts of the treatments they have seen and the ways that they have benefitted from these impacts. For example, they noted that their watershed treatments have helped to control soil erosion and allow water to infiltrate and that their agricultural production has increased as a result.

Many of these activities have been complemented by the local district agriculture office and NGOs programs post-WALA. From the local extension officers, community members learned manure making and crop diversification. The extension officers also encouraged the community to form and join co-operative groups and visit each other's gardens. NGOs that came after WALA introduced agroforestry, conservation farming, and expanded the treatment area with more marker ridges, woodlot creation, and promotion of horticultural activities.

During the interviews, respondents mentioned several best practices for watershed management that have helped increase and replicate their success. For example, the land resource officer told the Team about a radio talk show in which district officers ask local farmers to share their stories and help to inspire others. He confirmed the existence of farming co-operatives, especially in Katunga. Additionally, he explained that the government, through the district office, helps the farmers with marketing their produce and educates farmers about fruit juice making and bee-keeping.

The land resource officer also provided some recommendations for the improvement of future NGO projects. He highlighted the need for community capacity-building to be included in interventions and insisted that future NGOs engage in joint planning with community members in the project development process. Most importantly, the land resource officer observed that there is a need for NGOs to harmonize what they are doing with other government projects to avoid confusion in the community, especially in regards to FFW. Specifically, he noted that it is confusing for community members when some interventions use FFW, others use cash for work, and others provide no incentive at all. He also added that the government introduced catchment management guidelines that most NGOs do not adhere to.

*Figure 2: A WMC member poses beside the new irrigation gate valve that the community replaced last year when the old one broke.*

Katunga Watershed is relatively food secure due to the success of the watershed treatments and their watershed management activities. Community members are motivated to continue engaging in watershed management due to the financial benefits they receive from bee keeping and the controlled soil erosion from a combination of all the interventions. Furthermore, the factors enabling success in Katunga can be scaled and replicated by having other communities learn from Katunga Watershed's best practices such as forming co-ops and sharing knowledge on the radio. From the responses provided in the FGDs and KIIs, it was clear that district officials, in particular, believe that NGOs should prioritize coordination with many stakeholders during project design and implementation.

## Drivers & Barriers to Sustainability in Katunga

### Drivers

- Strong and able local leadership
- Peer-to-peer learning
- Continued NGO support
- Farmer co-operatives
- Short-term benefits

### Barriers

- Poor coordination between the community, NGOs and the government
- NGOs not following the catchment management guidelines

# Lingoni, Machinga

Visit Date(s): **July 21-22, 2021**

Implementing NGO: **Emmanuel International**

### Focus Groups

| 7 Women | | 7 Men | |
|---|---|---|---|
| 20-35: | **7** | 20-35: | **3** |
| 36-55: | **0** | 36-55: | **1** |
| 56+: | **0** | 56+: | **3** |

### Key Informant Interviews

Extension Officers
WMC
Local Leaders
District Officials

*Figure 1: A fish pond created during the WALA project stores excess water as well as creates other economic and food security activities through fish farming. The water level is low because the fish were just harvested that very week.*

## Success Story

*Lingoni Watershed, while far from the paved tarmac, was highly trafficked with cars and motorbikes, which people can now easily afford due to increased household incomes from the surplus of crops grown year-round due to the irrigation scheme.*

## Notes from Treatment Visit

The Lingoni watershed is located downhill from many mountains, all of which have slopes that are dark green and densely forested. The WMC leader took the Team to the base of the mountain where water was flowing through the irrigation system. Near the base of the mountain, the Team observed irrigation channels that were lined with concrete but noted that further into the center of the community, channels were not lined. The WMC chair explained that the channels can be blocked with a large rock to divert water into other areas or directly into community members' fields. He also noted that each year the flow of water is stronger than the previous year.

Next, the Team observed large check dams placed in agricultural fields nearby that had been reinforced with vetiver grass. The WMC leader said the community continued to build interventions and that they dug thousands more WATs and stone bunds throughout the watershed. In the multiple fields visited, bright green maize grew due to the easy access to irrigation in the community. In the middle of one maize field, the community members even built a pond to hold excess water and raise fish. The community was in the midst of draining it to harvest the fish during the site visit.

## Quote

***"We have been taking care of our natural resources. Even though there is climate change, when there is drought our rivers are still full of water since we started taking care of the watershed. No one can take away this knowledge and expertise from us."***

***-WMC Leader***

## Overview

### Successes

- Year-round crop production due to irrigation system
- Sustained motivation to maintain treatments
- Increased incomes, food security, health outcomes
- Monthly payments from irrigation scheme users maintain the system

### Challenges

- Stones in soil that require specialized tools
- Unlined portions of irrigation scheme
- Infrequent visits from extension officers
- Outsiders cut trees

## Key Insights

Community members in Lingoni Watershed were excited to speak about all of the success they have enjoyed due to the WALA intervention. They are especially proud of their irrigation system, which allows them to grow crops year-round. They explained that it is the WALA treatments that have made this irrigation system possible because the water that is trapped on the slopes from check dams and water absorption trenches have restored the water table.

In addition to the treatments, it was clear that the community's sustained motivation to maintain the watershed treatments has made their success possible. According to the community members, their motivation to engage in watershed management comes from several different sources. First, some community members explained that they were initially excited about the WALA intervention after Emmanuel International showed them a documentary about a very successful watershed management intervention in India in which farmers were able to increase their crop yields by installing watershed treatments. According to the leaders, this documentary convinced the community that they could do the same things and achieve the same success. Now, community members are motivated by the benefits they have reaped from their labor. For example, many shared that now that they grow crops year-round, they not only can afford things such as cars and motorbikes, but their families are also healthier and more food secure. Additionally, the idea of maintaining the treatments for the community's future success came up in several interviews. In the FGDs, some respondents reported that they maintain and expand infrastructure because they want their children to enjoy the benefits when they grow up.

Additionally, community members appreciated the role that the leaders and committees play in organizing watershed maintenance and other activities. For example, the WMC coordinates the collection of payments from community members for the irrigation system. According to interview respondents, each household that uses the irrigation system pays 1,500 kwacha each month so that there is enough cash to maintain the system. The local extension officer reiterated the importance of community leaders for the success of the watershed, explaining that the sustainability of watershed management in Lingoni stems from strong leadership that is able to organize activities and maintain a "development conscious" mindset amongst community members. Furthermore, the leaders have effectively engaged youth in watershed management in order to ensure the sustainability of the interventions.

*Figure 2: The WMC leaders took the team on a tour of the irrigation system, which was providing water to numerous fields growing maize. The Team visited during dry season and green maize was plentiful throughout the community.*

Respondents also shared with the team several challenges that they continue to face regarding the watershed. First, they noted that some portions of their irrigation scheme are not lined with concrete. In the unlined sections, water is lost to soil infiltration, making the system less efficient. Additionally, they noted that the extension officers do not come to the community often enough, though this could be due to them believing the community to be very self-sufficient. Finally, respondents stated that they occasionally catch outsiders cutting down their trees, but they are mitigating this by hosting learning visits and educating outsiders on the importance of maintaining the local forests.

## Drivers & Barriers to Sustainability in Lingoni

### Drivers

- Effective and strong leadership
- Unity and social cohesion
- Community ownership of natural resources
- Monitoring and enforcing by-laws

### Barriers

- Lack of watershed tools

# Mbangu, Nsanje

Visit Date(s): **July 23, 2021**

Implementing NGO: **Total Land Care**

### Focus Groups

| 2 Women | | 8 Men | |
|---|---|---|---|
| 20-35: | **1** | 20-35: | **3** |
| 36-55: | **1** | 36-55: | **2** |
| 56+: | **0** | 56+: | **3** |

### Key Informant Interviews

Extension Officer
WMC
Local Leaders
District Officials

*Figure 1: A stone bund protects the boundary of an agricultural field from severe flash floods by slowing the water and dispersing it over time and space.*

## Success Story

*Since WALA ended and Mbangu community members realized the benefits of watershed treatments on reducing disaster risk, local committees have mobilized community members to triple the size of the area covered by the treatments.*

## Notes from Treatment Visit

Committee members took the Team to a local hillside to observe many of the treatments they have installed to slow the flow of water down the mountain during major rain events. These treatments included stone bunds and water absorption trenches, which the community members reported have reduced soil erosion and increased infiltration. During the tour, the committee members noted which treatments were built during WALA and which treatments they built on their own after WALA ended. The committee members also showed the Team where the river had once flowed, but it has been so long since the river was rerouted that the old river bed is almost indiscernible.

## Quote

***"Our lives are dependent on natural resources. For us to get rains, we need natural resources. For soil to stay firm, we need natural resources like trees and rain."***

***-Local Leader***

## Key Insights

While the success of Mbangu's watershed mirrors that of other communities with strong committees and rule systems, the motivation of Mbangu's community members to participate in watershed management activities is different. As noted several times by respondents and the Team's facilitators, Mbangu is located in the driest region in all of Malawi. More than any of the other communities visited by the Team, Mbangu is highly susceptible to drought- and flood-related destruction.

## Overview

### Successes

- Positive perception of WALA due to lowered risk of flood destruction
- Tripled treatment cover
- Higher water table, greater crop yields, increased income

### Challenges

- Lack of resources to scale and create irrigation system

## Key Insights

In fact, one community member shared that before the WALA watershed treatments were constructed, entire houses and occasionally children were being washed away in flash floods. This harsh reality strongly motivates the successful maintenance and expansion of watershed treatments post-WALA.

The community's dedication to maximizing the success of its watershed treatments is illustrated by the way it has adapted the WALA intervention to meet the community's unique needs and context. First, the arrangement and membership of the committees was adapted from the structure that was proposed by TLC when WALA began. As in other sites visited by the Team, TLC suggested that Mbangu's leaders form a WMC composed of 10 well-respected farmers. The community, however, preferred a representative structure, with one person elected from each of the 18 villages that comprise the Mbangu watershed to sit on a committee. Therefore, Mbangu leaders formed three committees (a WMC, a Village Natural Resource Committee, and a Protection Management Committee). There are a total of 18 positions for community members across the three committees and all committees work efficiently together to ensure that the watershed is protected and disaster risk is minimized.

Additionally, TLC worked with the local leaders to adapt the WALA treatments to suit the unique context of the Mbangu watershed. Mbangu was the only site in which community members spoke of "river drenching" or rerouting a river away from critical infrastructure. TLC included this activity in the WALA intervention after learning that the river near the village often flowed over its banks during heavy rains, which was the primary cause of the flash floods that washed away people and buildings. Though the river drenching was difficult and labor-intensive, there is now a significantly lower risk of destruction in Mbangu and the community's perception of WALA continues to be very positive.

The Mbangu community has demonstrated their understanding of these benefits and their appreciation of the positive impacts by expanding the WALA treatments to cover nearly all of the Mbangu watershed. In fact, the area now covered with treatments is nearly triple the area that was covered before the WALA implementation. Moreover, community members shared that, as a result of this expansion, the water level in their wells is higher, their crop yields are greater, and they are earning additional income from selling surplus crops at the market.

*Figure 2: A stone bund has stones in disarray from people hunting mice.*

Now, the greatest challenge that the Mbangu watershed community faces is a lack of resources to scale. According to the community members, there is now enough water in the watershed to support an irrigation system, but the community lacks a sufficient pump to operate such a system. Specifically, the community members expressed a need for a solar pump, arguing that the treadle pumps that NGOs have provided in the past are too labor intensive. It was not clear from the answers provided by community members why the community (or the committees) have not mobilized to purchase a solar pump, though the district representatives suggested that the community members are likely waiting for an NGO to provide one for them

### Drivers & Barriers to Sustainability in Mbangu

#### Drivers

- Community members' perceived self-efficacy due to treatment adaptations
- Understanding of positive consequences of treatments due to disaster risk reduction

#### Barriers

- Lack of resources to scale treatments
- Reliance on NGO for scaling support

# Summary of Key Findings

| Watershed | Drivers | Barrier | Markers of Sustainability | |
|---|---|---|---|---|
| Muluma | • Community members' perceived self-efficacy<br>• Understanding of positive consequences of treatments<br>• Strong local leadership | • Lack of watershed tools<br>• Lack of refresher trainings<br>• High labor demand of treatment expansion and maintenance | Functioning WMC | ✔ |
| | | | Maintenance | ✔ |
| | | | Adaption | |
| | | | Scaled up | |
| Natama | • Strong local leadership<br>• Unity of the community<br>• Collaboration with the neighboring community | • Lack of tools for the activities<br>• Market failure<br>• Low levels of literacy that caused low adoption rates of new technologies | Functioning WMC | ✔ |
| | | | Maintenance | ✔ |
| | | | Adaption | |
| | | | Scaled up | |
| Chigwirizano | • Trusted and knowledgeable Watershed Management Committee<br>• Opportunities for peer-to-peer learning<br>• Strong local leadership | • Food for Work affected long term outlook on treatments value | Functioning WMC | ✔ |
| | | | Maintenance | ✔ |
| | | | Adaption | |
| | | | Scaled up | |
| Nang'ombe | • Access to extension officers for continued support<br>• Effective monitoring and enforcement<br>• Strong local leadership<br>• Strong motivation to reduce flooding | • Lack of watershed tools<br>• Lack of agricultural inputs<br>• Lack of marketing knowledge to maximize the profits of surplus crops | Functioning WMC | ✔ |
| | | | Maintenance | ✔ |
| | | | Adaption | |
| | | | Scaled up | Internal, External |
| Mitumbira | • High degree of technical expertise<br>• Strong local leadership<br>• Perceived self-efficacy<br>• Unity among community members | • Lack of watershed tools<br>• High labor demand of treatment expansion and maintenance | Functioning WMC | ✔ |
| | | | Maintenance | ✔ |
| | | | Adaption | ✔ |
| | | | Scaled up | |
| Makande | • Strong Watershed Management Committee<br>• Enforcement of monitoring and by-laws by local authorities<br>• Community driven expansion of treatments<br>• Complimentary programs like VSLs motivate continued expansion and maintenance of treatments | • No significant barriers, but consider providing refresher trainings for the community | Functioning WMC | ✔ |
| | | | Maintenance | ✔ |
| | | | Adaption | |
| | | | Scaled up | Internal, External |

| Watershed | Drivers | Barrier | Markers of Sustainability | |
|---|---|---|---|---|
| Chikololere | • Strong use of by-laws<br>• Perceived positive consequences of increased access to water | • Lack of incentives like FFW or cash for work<br>• Lack of ownership of communal treatments | Functioning WMC | ✔ |
| | | | Maintenance | ✔ |
| | | | Adaption | ✔ |
| | | | Scaled up | |
| Namadidi | • Peer-to-peer learning<br>• Aligning community interests to project design and implementation<br>• Post-project evaluations to correct what failed | • Weak local leadership<br>• Lack of coordination between the implementing NGO and the community | Functioning WMC | ✔ |
| | | | Maintenance | |
| | | | Adaption | |
| | | | Scaled up | |
| Majawa | • Effective Watershed Management Committee<br>• Strong system of by-laws endorsed by local authorities<br>• Community ownership of treatments | • Lack of watershed tools<br>• Lack of necessary collective marketing skills | Functioning WMC | ✔ |
| | | | Maintenance | ✔ |
| | | | Adaption | |
| | | | Scaled up | |
| Kasabola | • Leadership fueled unity and social cohesion<br>• Understanding of labor intensity fuels communal work | • Lack of watershed tools | Functioning WMC | ✔ |
| | | | Maintenance | ✔ |
| | | | Adaption | ✔ |
| | | | Scaled up | Internal |
| Mbeluwa | • Strong Watershed Management Committee<br>• Adaptations to committees for equal representation | • Lack of coordination between NGO and community members<br>• Lack of collective marketing education | Functioning WMC | ✔ |
| | | | Maintenance | ✔ |
| | | | Adaption | ✔ |
| | | | Scaled up | |
| Katunga | • Strong and able local leadership<br>• Peer-to-peer learning<br>• Continued NGO support<br>• Farmer co-operatives<br>• Short-term benefits | • Poor coordination between the community, NGOs and the government<br>• NGOs not following the catchment management guidelines | Functioning WMC | ✔ |
| | | | Maintenance | ✔ |
| | | | Adaption | |
| | | | Scaled up | Internal |
| Lingoni | • Effective and strong leadership<br>• Unity and social cohesion<br>• Community ownership of natural resources<br>• Monitoring and enforcing by-laws | • Lack of watershed tools | Functioning WMC | ✔ |
| | | | Maintenance | ✔ |
| | | | Adaption | ✔ |
| | | | Scaled up | Internal, External |

| Watershed | Drivers | Barrier | Markers of Sustainability | |
|---|---|---|---|---|
| Mbangu | ● Community members' perceived self-efficacy due to treatment adaptations<br>● Understanding of positive consequences of treatments due to disaster risk reduction | ● Lack of resources to scale treatments<br>● Reliance on NGO for scaling support | Functioning WMC | ✔ |
| | | | Maintenance | ✔ |
| | | | Adaption | ✔ |
| | | | Scaled up | Internal |

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## Sebastian Bascom

**SUSTAINABLE DEVELOPMENT**

Sebastian Bascom is interested in agriculture and its intersection with rural development and natural resource management. He has multiple experiences working with farmers in East Africa and Asia. After graduating, Sebastian plans to work in the non-profit sector to empower local development solutions.

**UNITED STATES**

## Emily Kaplan

**SUSTAINABLE DEVELOPMENT**

Emily was an aquaculture extension agent in Zambia with the Peace Corps and is interested in food & water security, natural resource management, and corporate social responsibility. Emily plans to enter the private sector to help corporations decarbonize as she believes climate change is the world's most pressing challenge.

**UNITED STATES**

## Lauren Oliver

**SUSTAINABLE DEVELOPMENT**

Lauren is passionate about community-driven natural resource management. Her work in this area is informed both by her background in water resources engineering and experience working in Uganda, Benin and now, Malawi. She will soon pursue a PhD in Environmental and Political Science and study how aid agencies can improve NRM interventions.

**UNITED STATES**

## Arthur Ssembajja

**SUSTAINABLE DEVELOPMENT**

Arthur is an ordained Catholic priest interested in poverty alleviation through entrepreneurship and business. An MBA & MGA dual degree student, Arthur has worked with entrepreneurs and start-ups through Notre Dame's IDEA Center and hopes to use his education and pastoral skills to address poverty in Africa.

**UGANDA**