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LEARNING BRIEF: Apolou Activity in Karamoja

Learning from Different Models to Address Water Point Management in Karamoja: Apolou's Integrated Community-Based Management System Plus (ICBMS+) Approach

August 2023

SERIES

This learning brief is part of a series bringing together experiences and lessons learned from the Apolou Resilience Food Security Activity (2017—2023). The briefs are designed for practitioners, including local government representatives, civil society organizations, and other actors working on issues related to climate change, water point sustainability and management, and sanitation.

ABSTRACT

This learning brief summarizes how the Apolou Activity piloted two slightly different operation and maintenance models for waterpoints in the Karamoja sub-region of Uganda. Uganda endorsed community-based management of water point infrastructure in the 1980s, and more recent refinements of this approach have favored partnerships between communities and professional services providers. In Karamoja, Apolou worked with a social enterprise, Whave Solutions, and with Hand Pump Mechanics Associations and Save the Children, to ensure that community-based water user committees have the professional support they need to address infrastructure maintenance and breakdowns. This combination of community management with a professional area services provider is called integrated community-based management system plus (ICBMS+) in Uganda. A survey of water points in Karamoja in 2016 found that only around half (53%) were functioning at the time of the survey. After Apolou supported interventions and the application of ICBMS+, water point functionality rose to more than 95%. However, it remains unclear whether these improvements can be sustained without continued external professional and financial support.

PRO-WASH
Practices, Research and Operations in Water, Sanitation and Hygiene

SCALE
Strengthening Capacity in Agriculture Livelihoods and Environment

DISCLAIMER

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PHOTOS

Apolou Resilience Food Security Activity, 2023. All photos reproduced with permission.

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ACRONYMS

ASP	Area Services Provider
BHA	Bureau for Humanitarian Assistance
CBMS	Community-based Management System
CBMS+	Community-based Management System Plus
DWO	District Water Office
HPMA	Hand Pump Mechanic Association
ICBMS+	Integrated Community-based Management System Plus
MUS	Multiple-use Water System
MWE	Ugandan Ministry of Water and Environment
O&M	Operation and Maintenance
PPP	Public-private Partnerships
RFSA	Resilience Food Security Activity
SCI	Save the Children International
SILC	Savings and Internal Lending Communities
USAID	United States Agency for International Development
WASH	Water, Sanitation, and Hygiene
WUC	Water User Committee

Apolou is made possible by the support of the American people through the United States Agency for International Development (USAID) and is implemented by Mercy Corps and partners.

ACTIVITY BACKGROUND

The Apolou Resilience Food Security Activity (RFSA) was a United States Agency for International Development (USAID) Bureau for Humanitarian Assistance (BHA) initiative that worked to boost food and nutrition security for 310,000 people in the Kaabong, Karenga, Kotido, Moroto, and Amudat districts of Karamoja, Uganda (Figure 1). From 2017–2023, Mercy Corps led a consortium of partners—Save the Children, Whave, Karamoja Peace & Development Agency (KAPDA), Riamiriam Civil Society Network–Karamoja, Nakere Rural Women Activist (NARWOA), and Tufts University Feinstein International Center—to implement the activity. Apolou worked with households, community leaders, the Ministry of Karamoja Affairs, the Government of Uganda, the private sector, and others to address underlying causes of chronic food and nutrition insecurity and build community and household resilience.

Apolou adopted four purposes grounded in social and behavioral change to support gender-transformative and resilience outcomes:

- **Purpose 1:** Inclusive and effective governance contributes to food and nutrition security;
- **Purpose 2:** Adolescent girls, pregnant and lactating women, and children under 5 are nutritionally secure;
- **Purpose 3:** Reduced incidences of water, sanitation, and hygiene (WASH)-related diseases; and
- **Purpose 4:** Improved livelihoods and income support household food security.

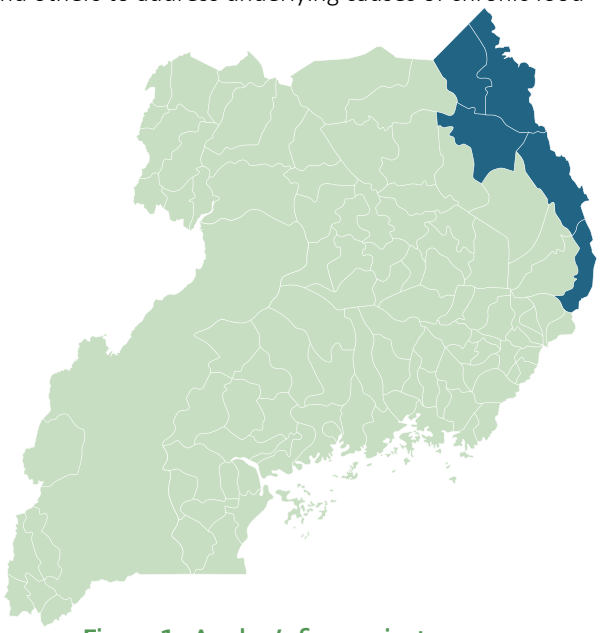

Figure 1. Apolou's five project areas highlighted in blue: Amudat, Kaabong, Karenga, Kotido, and Moroto.

The Apolou WASH component aimed to improve the availability and use of household and community WASH services. Apolou's WASH strategy can be divided into two elements: sanitation and hygiene (covered in a parallel learning brief) and water point sustainability (the topic of this brief). Groundwater is the key to water supply in Karamoja: notably, a 2018 baseline study[1] found that 73% of households are reliant on boreholes in this area. However, boreholes are often non-functional: assessment by Apolou in 2018–2019 showed that most water sources in Karamoja were not functional due to limited preventive maintenance, mismanagement of resources, poor environmental conditions, and a lack of funding.

ACTIVITY CONTEXT

Water Supplies in Karamoja

Uganda's Karamoja sub-region covers about 27,000 km2in the northeast of the country and includes the districts of Amudat, Kaabong, Karenga, Kotido, and Moroto. Rainfall averages around 300-500mm per year. Livestock raising (pastoralism) is common, and rainfed agriculture is precarious. Karamoja is one of Uganda's poorest regions, and almost two-thirds of the population live in absolute poverty. Inter-clan cattle raiding and cross-border incursions along the long border with Kenya worsen livelihood insecurity. Climate change is eroding the natural resource base, increasing rainfall variability, and exacerbating competing water demands.

Primary sources of water supply in Karamoja include boreholes and seasonal rivers. Water is used for both domestic purposes and small-scale irrigation. The pastoralist reliance on livestock rearing[2,3] means that stock watering is an

1 USAID and ICF Macro, Inc. (2019). *2018 Baseline Study of Food for Peace Development Food Security Activities (DFSAs) in Uganda.*

2 Nicol, A., Debevek, L., & Ayaru, O. (2022). Water and complex problem sheds in Karamoja, Uganda. *Water International, 47*(6): 952–968.

3 Mugerwa, S., Stephen, K., & Anthony, E. (2014). Status of Livestock Water Sources in Karamoja Sub-Region, Uganda. *Resources and Environment, 4*(1), 58–66.

important use of water too. Poverty, conflict, and instability influence the sustainability of water access in Karamoja.

To manage water points, the community-based management system (CBMS) has been the most common operation and maintenance (O&M) model for rural water supply infrastructure in Uganda since 1986.[4] At its core is a strong emphasis on community responsibility and authority over the development and management of rural water supplies. While over the years CBMS has registered visible success in O&M of rural water facilities, more recent strategies have moved beyond CBMS towards arrangements that include a professional services provider offering formal, contract-based performance management (i.e., a Professional Management Arrangement) for long-term functionality of all rural water systems in Uganda.[5]

APOLOU'S WATERPOINT SUSTAINABILITY STRATEGY

One of the most intractable problems in maintaining clean water in the Karamoja region (and elsewhere) is ensuring that water infrastructure, including pumps, boreholes, and spring protections, break down only rarely, and when they do, are repaired promptly. The challenge for Apolou was how to move from corrective to preventive maintenance approaches. Apolou applied its water point sustainability expertise in Karamoja to develop a proactive Professional Management Arrangement (PMA) approach. This approach focuses on preventing breakdowns in water infrastructure rather than simply fixing them after they happen, as prevention is easier and more efficient than addressing or repairing issues. Apolou's water strategy focused on the rehabilitation and management of existing water points, instead of building new water infrastructure.

Water point with garden near Karenga.

Drawing on its experience, Apolou blended several strategies focused on water point sustainability and multiple water use for the PMA. This mixed strategy, called Integrated Community-based Management Systems Plus (ICBMS+), blended community and market-based approaches to pursue longevity and sustainability of water infrastructure through public-private partnerships (PPPs). The model relied on partnerships between communities, local government, and the private sector to promote water source sustainability, while supporting multiple water uses. Each had a role to play:

1. **Communities:** At the village level, water user committees (WUCs) represent water users through gender-balanced committees of elected members. Their responsibilities include the collection of fees from water users, among other duties.
2. **Local government:** At the district level, the Ministry of Water and Environment (MWE) is represented by the District Water Office (DWO) who provides oversight and coordination between the water boards.
3. **Area Service Providers:** Operating within geographic clusters, area service providers (ASPs) take responsibility for the O&M of rural water facilities and can include private sector organizations, non-governmental organizations, or hand pump mechanics' associations (HPMAs). The ASP is also responsible for collecting and banking user fees from the WUCs, and also ensures the quality and availability of spare parts.
4. **Water Boards:** Bridging communities, ASPs, and local government, water boards at the district and sub-county level operate professional management structures. Water board members include the district water officer and three to five water users from local WUCs.

4 Ugandan Ministry of Water and Environment, Directorate of Water Development, Department of Rural Water Supply and Sanitation (2020). *National Framework for Operation and Maintenance of Rural Water Infrastructure in Uganda.*

5 Ugandan Ministry of Water and Environment, Directorate of Water Development, Department of Rural Water Supply and Sanitation (2021). ***Water Supply Services Boards (WSSB): Operational Manual.***

Apolou worked with each of these different stakeholders, and this engagement can be summarized in Figure 2 as follows:

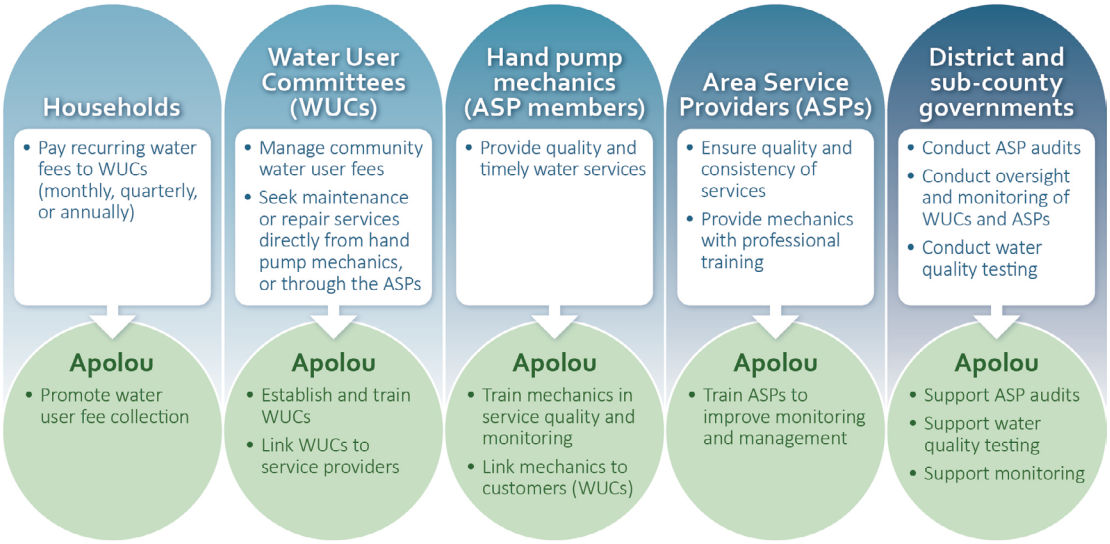

Figure 2. Apolou's work with stakeholders

Water Point Service Provision: Two private sector models

To implement its ICBMS+ approach, Apolou implemented two slightly different models in the different regions of Karamoja. This included a centralized social enterprise model and an associational model. In each case, an ASP handled the maintenance and repair of water points, while community WUCs collected user fees and paid these to the ASPs. The ASPs and the WUCs enter into formal agreements to ensure accountability. In the first model, a social enterprise called Whave Solutions was the ASP. In the second case, Hand Pump Mechanics Associations (HPMAs) acted as the ASP, supported by Save the Children International (SCI).

Model 1: Social Enterprise Whave

In Kaabong, Kotido, and Karenga Districts of Karamoja, Apolou contracted with Whave Solutions, a Ugandan non-profit social enterprise to lead the maintenance service provision for water points. Whave's model is a centralized private sector led approach in which the social enterprise directly liaises with both the government and communities through WUCs. Whave's technicians perform regular checks and respond immediately when worn parts threaten a breakdown, ensuring that water keeps flowing every day. Communities pay a small annual fee through the WUCs, and the government provides regulation and support, with the aim that the services are sustainable at scale. In 2020, the Government of Uganda, officially endorsed Whave's Public-Private Partnership service delivery model in the launch of a national O&M framework. Whave contracts with local hand pump mechanics on a performance-payment basis to carry out private maintenance services on boreholes.

A baseline assessment of 638 boreholes conducted in Karamoja by Whave in 2016 found that only 53% were functional. This is contrasted with functionality rates of more than 95% in the Whave districts by 2020.

Model 2: Hand Pump Mechanics Association (HPMA)

In 2011 the Uganda Ministry of Water and Environment adopted a strategy of establishing district-based HPMAs to strengthen O&M of rural water systems and increase functionality of rural water sources. In Moroto and Amudat Districts, Apolou partnered with SCI to adapt an association-based maintenance model that supported these HPMAs in each district with training and business coaching. At the end of Apolou's involvement, the backstopping support to the associations was transitioned to water boards.

A visit was conducted in 2022 to the Moroto and Amudat Districts in Karamaja's far east to inspect 161 boreholes rehabilitated under this model. A checklist based on seven categories was used: location, water point functionality, water quality and quantity, hygiene, site protection, sustainability, and multiple water use. According to these criteria, 95% of the boreholes were found to be performing at an average level or higher at the time of the survey.

Both types of ASPs were engaged by Apolou on a payment-for-performance basis and signed preventative maintenance agreements with WUCs. Whave Solutions provided hardware, services, and specialist advice and equipment to the local maintenance technicians, ensuring continuity of services. SCI played the same role with the HPMAs. In both cases, the WUCs collected user fees and paid these to the partners for the water infrastructure services received. Both models were effective in improving and sustaining water point functionality (functionality rates of over 95% for each during their involvement with the project). The following table summarizes the number of water points rehabilitated in each case, together with progress in multiple-use water services at some sites.

Water point near Karenga undergoing maintenance.

Table 1. Number of Water Points and their Add-ons

	Social Enterprise			Mechanics' Association	
	Kaabong	Kotido	Karenga	Moroto	Amudat
Rehabilitated and ASP-supported	98	98	50	79	83
Gardens established	8	5	8	5	12
Livestock troughs installed	88	85	37	77	73
Income generation (bricks) started	2	1	1	0	0

Key Apolou Water Activities

Apolou's work in water supply can be summarized as six main activities:

Activity 1: Water point assessment and mapping	In collaboration with DWOs, Apolou mapped existing water sources and maintenance/repair needs across the target communities.
Activity 2: Co-develop the public-private partnership for preventive maintenance with local government	With the DWOs, Apolou identified and engaged HPMAs to function as ASPs. Apolou sought to strengthen the capacity of district and sub-county water boards to oversee the training and regulation of ASPs.
Activity 3: Form, train, and strengthen gender balanced WUCs to mobilize communities	At the community level, Apolou established and/or strengthened WUCs to manage serviced water points. The WUCs attended training on responsibilities and financial management and were coached to formulate a banking plan and set water fees.
Activity 4: Train and coach hand pump mechanics and provide support to HPMAs as ASPs	To improve hand pump mechanic management and coordination, Apolou supported ASPs to improve monitoring and decision-making. This included supporting the development of annual improvement work plans and access to the m-Water app to monitor water points.
Activity 5: Establish and strengthen capacity of district water board and sub-county water boards	At the district and sub-county levels, Apolou sought to establish water boards as professional management structures supporting communities and area service providers. The structure and modality of water boards has been documented by the MWE.[6]
Activity 6: Strengthen capacity of water office in water quality testing	Apolou, in collaboration with the MWE and the United Nations Children Fund (UNICEF), sought to strengthen the capacity of district local government staff, including district health officers (DHOs), health assistants, and DWOs in water quality testing and analysis. The project also provided portable water quality testing laboratories.

Remote Sensing

Apolou and SCI used remote telemetry (hand pump sensors) to provide advance warning of water point failure in 15 handpumps in Amudat District, and 15 in Moroto District. This was done in collaboration with the International Lifeline Fund. These sensors showed borehole functionality in real time, via an online dashboard, measuring liters of water pumped per hour or day. This system helped the ASP (SCI in these two districts) respond more promptly to breakdowns and also saved the ASP time, human resources, and money. Similar sensors were also used by Whave in its districts.

Multiple-use Water Systems

Multiple-use water systems (MUS) is an approach to water service delivery that takes into consideration the needs of domestic, agriculture, and livestock activities. By providing reliable water access to communities or households, MUS can boost users' resilience to shocks and stresses, improve food security, and support livelihoods and economic activities. But MUS can also present a more complex set of challenges than single-use water services, which are not always solved by standard approaches to water infrastructure. MUS approaches are supported by USAID/BHA and are being investigated or implemented by several RFSAs.

6 Uganda Ministry of Water and Environment, Directorate of Water Development, Department of Rural Water Supply and Sanitation. (2021). *Water Supply Services Boards (WSSB): Operational Manual*

Apolou promoted MUS in communities which were being supported with borehole rehabilitation and maintenance services. Apolou used a sequencing, layering, and integrating approach in planning for irrigated gardens (and other MUS activities), in which the WUCs worked closely with Apolou's agronomy teams. Apolou also trained communities how to form savings and internal lending communities (SILC-groups) to help them save for capital expenses.

1. **Gardens:** Apolou encouraged WUCs to start gardens close to boreholes to easily access irrigation waters. Community members could choose to use profits from gardening to help pay water user fees to the WUCs. In all districts, 38 vegetable gardens were planted at or near the water points.

2. **Livestock:** Animal watering facilities were used in some areas. Water troughs were installed in 150 boreholes in Amudat and Moroto and 210 were installed in the other three districts.

3. **Income generation:** In other cases, and depending on the local context, Apolou encouraged income generating activities like bricklaying.

While MUS uptake has not been as high as Apolou initially anticipated, Apolou has been able to explore whether MUS would work effectively in the Karamoja region generally, and the exact type of interventions that might deliver success, as well as investigate problems specific to some areas. Apolou has also worked on the various other social, commercial, and economic factors that can impact the success of MUS in Karamoja. For example, Apolou reported that some communities did not accept the water trough design or reported that the water made their animals sick. Some communities prefer to pay water user fees in kind during the harvest seasons, and this should be accommodated in the model. The cattle troughs' exact locations near boreholes mattered a lot. For example, if the borehole was near gardens or institutions like schools or health centers, the area leadership didn't want animals crowding near these facilities. In these cases, alternatives for stock watering such as valley tanks might be used. Furthermore, where vegetable gardens already existed near boreholes, community members did not want animals close by, in case the animals damaged the crops. Finally, in many cases the boreholes were not originally designed for multi-use and did not yield enough water for purposes other than domestic use.

Figure 3. A pump in Karamoja missing its inspection cover and bolts (L) and a vandalized pump with the handle taken for use in plowing (R).

RESULTS

Apolou's use of ICBMS+ approaches to ensure water point maintenance infrastructure and sustainability has led to some encouraging results:

1. **Government of Uganda endorsement of public-private partnership models:** There has been buy-in from local politicians and others in the Government of Uganda, who have assisted some communities with contributions to help them meet their WUC annual fees. Furthermore, the Government of Uganda has officially endorsed public-private partnership models including social enterprises and association of mechanics in its 2020 national O&M framework.

2. **Significant increase in hand pump functionality:** The functionality of handpumps supported by the project ranged between 95% and 96% immediately at the end of the intervention, up from an estimated 53% (according to Whave's baseline assessment of 638 boreholes in 2016). However, it has yet to be shown whether these improvements can be sustained without the professional support of the ASPs, and without Apolou's convening role. In the absence of Apolou, it is intended that the waterboards will play this role.

3. **Rehabilitation of non-functional water sources:** Apolou rehabilitated and maintained 408 boreholes, leading to 82,759 people gaining access to water under the associational model (HPMA), and a further 98,258 people gaining access to safe water under the social enterprise model (Whave). Furthermore, 20 institutions including schools and health centers gained access to safe water.

4. **Strengthened WUCs:** A total of 408 WUCs were selected and trained, of which 267 went on to sign preventive maintenance contracts with ASPs after their boreholes were rehabilitated.

5. **Acceptance of the user fees:** Apolou found acceptance of the fee model in user communities. However, only about 54% of WUCs were found to be regularly collecting user fees once Apolou support ended. Ability to pay appears to be a key issue here, and it was found that poor harvests particularly impacted the ability of WUCs to collect user fees.

6. **Improved community outcomes:** WUCs reported a reduction in livestock illness, improved water availability in households including for household cleaning, and a reduction in gender-based violence as women gained access to closer and more secure water sources.

CHALLENGES AND RECOMMENDATIONS

Apolou has trialed both MUS and ICBMS+ to improve sustainability and WASH outcomes in Karamoja. More work is needed to address specific challenges in combining the two approaches and adapting them to local conditions. There is also a need to evaluate how sustainable the CBMS+ model is, without continued support by ASPs and the RFSA.

Both the centralized social enterprise model (in partnership with Whave), and the associational model (in partnership with SCI) were shown to be capable of delivering water point functionality rates of 95% or higher in the relevant districts, up from a background water point functionality rate in Karamoja of around 53%. The Apolou RFSA provided steer and support in both cases, and the medium to long-term sustainability of these models is a vital question that will be answered in the coming few years after Apolou has closed. In the meantime, experience of both models suggest that the following are required:

	Challenges	Recommendations
Multiple-use	• Many hand pumps are overused, leading to early breakages. As sources fail, increasing pressure is put on nearby sources. In areas of heavy use, water tables fall and MUS systems make additional demands on the water resource. This issue is worsened by periodic droughts, and in some cases, community members have locked boreholes at times to promote recharge and water table recovery.	• Design water systems appropriately. For MUS, it is essential that infrastructure, water quantity, and water quality are appropriate for the uses envisaged (e.g., stock watering). A knowledge of local preferences and social dynamics is needed to ensure the best chance of success (see below). • Utilize automated sensors in hand pumps to reduce response times to breakdowns, and improved functionality and knowledge of volumes used.
Community Engagement	• Vandalism is a problem in some areas, particularly where some community members are not fully invested in the water scheme. • Communities have moved (for drought related and security reasons). • Extreme hunger (drought related) meant that people were not able to pay for water. • Not all communities understood the terms in the service agreement since it was in English and not local languages.	• Engage the community to ensure understanding of operation and maintenance costs and the necessity of user fees. • Empower communities to understand the terms and conditions of the water service agreement, and to hold the ASP accountable. • Understand the drivers of community migration and the impact transhumance might have on community ability to maintain water infrastructure. • Ensure that services agreements, and other important communications, are in local languages and are understood by communities. • Engage with communities to reduce vandalism.

	Challenges	Recommendations
Sectoral Coordination	• The question of who maintains water infrastructure can complicate matters. For example, when non-profit organizations and local politicians rehabilitate water sources for free, it hampers efforts to encourage user fee payments and sustain governance approaches like CBMS+. • District councils and the MWE have delayed approving water boards in some cases. • Building the governance structures and institutions takes time—the O&M policy for rural water supplies was only endorsed in 2020. • The Government of Uganda recently (2020) endorsed the new PPP model and further experience is required to explore the model's viability in remote areas.	• Bolster local government support and cross-border support in pastoralist communities to reduce cross-border conflict and thereby strengthen collaborative approaches to water point governance. • Utilize sectoral coordination and allow time to build governance structures for O&M. Adequate time and resources are needed and should be planned at project start. • Bolster government collaboration to define areas of operation for implementing partners, to prevent the different organizations working in silos and help embrace the new O&M frameworks focused on preventive maintenance.
Tariffs and Finances	• Financial sustainability of water point infrastructure can be problematic, particularly when more expensive repairs are necessary. • Willingness to pay, and ability to pay, are both critical community issues. • It is not yet completely clear whether ICBMS+ approaches, including the funds necessary for the ASP, can be self-financing, or whether long-term financial support is necessary. This question depends to some extent on the environmental and institutional characteristics of the regions where the work is being done.	• Set appropriate tariffs and fees. The issue of water user fees and payment for services is crucial to the ICBM+ model, and care needs to be taken on setting tariffs and how fees are collected. Early indications are that not all users can afford fees, and that fee collection by WUCs is sometimes precarious. Flexible approaches to fee collection may be needed, e.g., payment in kind, or payment following the harvest when cash is available. • Build community support, ensuring community members see the results and services that they receive for their fees. • Encourage WUCs to engage with the SILCs, as this provides an immediate financial resource that can be later refunded to the SILC groups during peak earning season. • Employ multi-use approaches to give community members more opportunities for earning cash, which they may choose to spend on water user fees.

	Challenges	Recommendations
Construction and Manufacturing	• Rust problems were initially addressed by providing stainless-steel borehole rising mains. However, the threaded couplings on the stainless steel pipe were frequently inferior to those found on the standard galvanized steel pipes, leading to early breakages, particularly where long rising mains were required. • Other common problems with water point infrastructure include faulty cylinders, broken pedestals, broken or rusted GI pipes, broken water tanks, worn ball bearings, broken pedestals, damaged aprons, drainage channels, and missing inspection covers. • Development partners in Karamoja often do not follow quality control processes during the construction of water infrastructure, making subsequent repair and maintenance more difficult.	• Carefully choose materials, taking into account water chemistry (likelihood of corrosion), depth of boreholes, frequency of use, and other factors, to help ensure long water point life. For example, in Karamoja the Apolou team found that too many lengths (more than 17) of the locally available stainless steel rising main were too heavy and led to failure—in these cases a galvanized iron rising main was preferred instead. • Ensure adequate supervision and quality control during water point installation, in collaboration with the ASP, to prevent construction problems and promote adequate O&M.

CONCLUSIONS

Apolou's experience demonstrates that ICBMS+ approaches can improve water point sustainability and MUS when all stakeholders are closely involved in the process, including the support of an established ASP. Further research will be needed to explore if the benefits achieved under these ICBMS+ approaches are sustained after Apolou closes, since Apolou's local knowledge and oversight is vital. System strengthening must also be a core focus, at the community level and across the wider WASH system—ASPs, water boards, WUCs, communities, and local governments all need to collaborate. Actors should also consider capital maintenance expenditure drawn from user fees; how much is paid, who collects them, and what happens if some people do not pay. A key question is whether the approaches are financially self-sustaining or will need to be subsidized in some way in the long run. Monitoring these systems in Karamoja over the next few years will help answer this question.

Community members harvesting from a thriving garden in Karamoja.