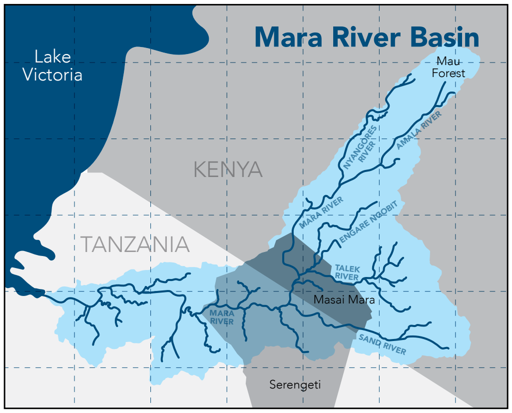
# Using the WSI Process to Assess and Plan for Source Water Protection in the Mara River Basin

## A WATER SECURITY CASE STUDY

## Challenge: Domestic water security and source water protection in the Mara River Basin




Rural communities in the Mara River Basin, where more than one million people across Kenya and Tanzania reside, depend on multiple sources of water for drinking and domestic needs and their livelihoods. The Mara River Basin also contains key tourist and conservation areas, such as the Maasai Mara National Reserve and Serengeti National Park. Access to water for many of the communities in the Mara River Basin is a challenge. Boreholes can be expensive and often fall into disrepair while abstraction of surface water can be costly for rural communities and requires treatment. Freshwater springs, on the other hand, are generally accessible to local communities and the perennial nature of the springs ensures water availability during the dry season.

Freshwater springs in the Mara River Basin, however, are severely degraded and can pose health risks to communities who depend on them. A USAID

Climate Vulnerability Assessment (CVA) found that approximately 20 percent of the residents in the Nyangores sub-catchment in Kenya collect water from unprotected wells and springs. The assessment also noted that 23 percent of the households in the Mara Wetlands in Tanzania rely on unprotected springs as a primary source of drinking water. However, habitat loss and mixed uses, such as onsite washing, livestock watering, and agriculture, have exposed the springs to water quality risks. Further, extreme flooding caused by more irregular and intense precipitation due to climate change inundate the springs and increase risk of contamination. According to the USAID CVA, nearly half of the 500 freshwater springs in the Nyangores sub-catchment are in need of rehabilitation, but only 22 have been protected. Green and gray infrastructure can limit the potential harm to the spring and surrounding habitat caused by humans and livestock and reduce risks of contamination from runoff. Protection measures can improve water quality and reduce public health risks from drinking contaminated water and ensuring that water is sufficient for different uses, especially drinking, sanitation, and hygiene (WASH) needs. Spring protection efforts that address WASH needs and other uses, like livestock watering and washing, requires involvement from local communities, WASH entities, and water resources management (WRM) institutions to ensure design, accessibility, and management considerations accommodate these multiple uses. In the Mara River Basin, communities are at the forefront of managing WASH infrastructure, but WRM and WASH entities have distinct mandates and do not always have the human and financial resources to coordinate source water protection efforts.

## Intervention: Engage stakeholders to protect and manage freshwater springs

Between 2018 and 2020, the USAID Sustainable Water Partnership (SWP) used SWP's Water Security Improvement (WSI) process to facilitate a stakeholder-driven collaboration to address water security risks in the Mara River Basin. This three-year pilot activity, called Sustainable Water for the Mara, supported local stakeholders with water security assessments, planning, evidence-based decision-making, and community-based interventions to improve water security. Through the WSI process, stakeholders prioritized spring protection efforts in the Nyangores sub-catchment and Mara Wetlands, a low cost and quick impact measure which would improve water availability and water quality and strengthen the water security of local communities who rely on them for domestic and livelihood activities.

To ensure spring protection efforts responded to domestic and livelihood needs as well as abide by key national standards for WASH infrastructure, SWP coordinated community, WRM, and WASH stakeholder involvement in site assessments and inputs into plans and designs. SWP provided technical and financial support and facilitated joint planning exercises, site assessments, water quality testing, and preparation of site designs. Table 1 highlights the stakeholders SWP engaged in Kenya and Tanzania. In Kenya, springs are managed by spring committees comprised of local community members and overseen by the Water Resources Authority (WRA) and the Water Resources Users Associations (WRUA). In Tanzania, the Lake Victoria Basin Water Board (LVBWB) and the Mara North and Mara South Water User Associations manage water resources while the village water committees manage WASH infrastructure at the springs. The village water committees are supported by the Rural Water and Sanitation Agency (RUWASA), which is a national-level institution that oversees rural WASH systems and service delivery. The following sections explain how SWP built the capacity of WRM and WASH stakeholders to protect springs.

**Table 1. Water Management and WASH entities in Kenya and Tanzania**

| Institution | Kenya | Tanzania |
|---|---|---|
| **Basin Management Institutions** | Water Resources Authority (WRA)<br>**Role**: Manage water resources, including water quality testing | Lake Victoria Basin Water Board (LVBWB),<br>**Role**: Manage and protect water resources<br><br>Rural Water and Sanitation Agency (RUWASA)<br>**Role**: Regulate, manage, and develop water supply and sanitation services |
| **Water User Associations** | Nyangores Water Resources Users Association (WRUA)<br>**Role**: Manage conflicts between water users and support catchment conservation efforts | Mara North and Mara South Water User Associations (WUA)<br>**Role**: Manage conflicts between water users and support catchment conservation efforts |
| **Water Point Managers** | Spring Committees<br>**Role**: Manage protected springs | Village Water Committees<br>**Role**: Manage WASH infrastructure and mixed uses at springs |

**SWP STAFF AND LOCAL STAKEHOLDERS INSPECT A RETAINING WALL AT A SPRING IN THE MARA WETLANDS, TANZANIA.**

## Assessing Source Water Protection Options

In Kenya, SWP convened county-level environment, water, forestry, and agriculture officials, as well as representatives from the Nyangores Water Resources User Association to discuss water security risks and assess spring protection options. SWP and the stakeholders reviewed and updated the Nyangores sub-catchment management plan, an evidence-based planning tool that guides source water protection and catchment rehabilitation efforts. SWP organized transect walks, or walking tours, to inspect springs highlighted in the plan. Six freshwater springs were selected in the process, based on the number of communities who depend on the spring, the spring's flow rate, and level of degradation around the spring.

In Tanzania, SWP organized site visits and transect walks with the LVBWB and the Mara North and Mara South Water User Associations to 20 communities in the Mara Wetlands. During these visits, SWP met with local stakeholders to discuss community water security priorities. During these visits, SWP met with local stakeholders to discuss community water security priorities and confirmed that overgrazing, deforestation, and land conversion for agriculture were degrading freshwater springs. In consultation with the LVBWB, the Water User Associations, and local communities, SWP selected four freshwater springs and two boreholes for protection and rehabilitation based on their vulnerability to climate change, level of degradation, and community needs.

## Evaluating Site Conditions and Capacity Building Needs

SWP facilitated site assessments to evaluate the conditions at each spring location. The stakeholders jointly examined the state of vegetation and the surrounding landscape to assess environmental risks to the water source. Some springs were surrounded by invasive and water-intensive plants, which raised the risk of over-abstraction. Water uses around the springs, including domestic washing and livestock watering, increased the risk of contaminants and sediment flowing into the spring eye. At some of the springs, previously installed water storage, livestock troughs, and washing bays were no longer functional due to cracks and sediment build-up. As a result, many communities sourced water directly from the spring eye, which was a risk to their health and the environmental conditions of the spring. Water quality tests indicated the presence of bacteriological contamination at nearly all of the springs.

SWP validated the site assessments through community focus group discussions led by the water user associations. The discussions focused on household water security, including water access and storage; use of water for hygiene, drinking, and other domestic needs; and livelihood uses such as gardening and livestock watering. The group discussions revealed that the local communities depended significantly on the freshwater springs, particularly during the dry season.

SWP also adapted its institutional capacity tool to assess each committee's capacity for governance, planning, and service delivery of the WASH infrastructure and management of the spring. This was important to understand training needs as well as the potential for long-term sustainability. In Kenya, spring committees were new entities and required support to organize and fulfill their management responsibilities. In Tanzania, longstanding village water committees lacked the technical and financial resources to properly manage and maintain the protected sites. The assessments also reiterated the need for management support from the Water Resources Authority in Kenya and RUWASA in Tanzania to the spring and village water committees.

## Implementing Source Water Protection Measures and Capacity Improvements

Drawing on the results of the site assessments and focus groups, SWP prepared site designs that reflected the water security needs of local communities and accounted for the specific conditions of each spring. The designs included retaining walls and water tanks to capture and store water from the spring, and taps where residents could collect water for drinking and other uses. Washing bays and livestock watering troughs were added downstream of the collection points to minimize risk of contamination to the water taps and stored water. The site designs also included landscape restoration measures such as planting of indigenous vegetation around the spring and installation of fencing to limit access to the spring eye.

The designs were reviewed and validated by the Water Resources Authority in Kenya and the LVBWB and RUWASA in Tanzania to ensure compliance with national-level WRM and WASH standards. SWP hired a contractor in each country to complete the site rehabilitation and infrastructure improvements and facilitated joint site inspections with the Water Resources Authority, LVBWB, and RUWASA before handing over the facilities to the Village Water Committees and Spring Committees.

Using capacity assessment findings, SWP worked with the Water Resources Authority and RUWASA to organize trainings that were tailored to the needs of each committee. In Kenya, the trainings focused on defining roles and responsibilities, outlining financial management tasks, and describing community outreach. In Tanzania, RUWASA designed trainings that met the national requirements for rural water service provision. For one of the committees, RUWASA also explored the possibility of registering the village water community as a community-based water supply organization, which would formally recognize the committee as a rural service provider. Spring and village water committees also received onsite training on management and maintenance of the installed infrastructure and vegetation around the spring.

## Results

Overall, six springs in Kenya were protected and three springs along with two boreholes were protected and rehabilitated in Tanzania. Approximately 21,000 residents now have improved access to water.

Water quality tests performed after the spring protection activities were completed indicated that concentrations of pathogenic contamination, likely caused by livestock, remained high. To address this, SWP worked with the Water Resources Authority, RUWASA, and the LVBWB to perform shock chlorination, which reduced concentrations of pathogens to within national water quality standards. RUWASA and the Water Resources Authority committed to regular water quality testing and to working with spring and village water committees to notify local water users if pathogenic contamination increases.

One of the springs in the Mara Wetlands also showed high concentrations of arsenic. After multiple rounds of testing confirmed the initial results, SWP worked with the LVBWB and community leaders to close the spring for domestic usage, and to notify local water users of the potential health risks of using the spring. Given the nature of water access in the Mara Wetlands, the springs represented one of several resources available to the community to meet their WASH, domestic, and livelihood needs. SWP and the LVBWB tested the alternative sources used by the local community and confirmed that the water was safe for public use.

Last, more than 50 committee members in Kenya and Tanzania received training from the Water Resources Authority and RUWASA. While the committee members would have benefited from longer and more extensive capacity building, these trainings allowed the Water Resources Authority and RUWASA to strengthen their relationships with the committees for long-term engagement. In Tanzania, this was particularly important as RUWASA is a new institution and reflects a renewed effort by the government to strengthen rural water service delivery.

## Lessons learned

There are three lessons learned from SWP's experience with spring protection in the Mara River Basin.

> First, precise definition of water security risks helps ensure appropriate design of water security improvement activities. The WSI assessments confirmed that springs were key sources of water for community domestic, WASH, and livelihood needs. The assessments and focus group discussions, however, confirmed that poor water quality posed public health risks while degradation around the spring and water and land use practices threatened the long-term viability of the springs. SWP and its WRM and WASH partners used this information to prepare site-specific designs that met local community needs and national guidelines and standards.

> Second, targeted activities help WASH and WRM stakeholders overcome barriers to collaboration and coordination around source water protection. Different institutional mandates and lack of resources to fulfil their mandates can impede efforts by WRM and WASH entities to integrate source water protection measures and WASH improvements. Community, WASH, and WRM stakeholder involvement in the transect walks and community discussions, site assessments, and planning activities provided opportunities for WRM and WASH stakeholders to jointly evaluate risks and design appropriate source water protection measures.

> Third, the WSI process requires time to learn from, adapt, and scale water security interventions. The spring protection measures addressed a small sub-set of water security risks in the basin, yet a tangible step that provided a strong foundation for long-term collaboration between local communities, WRM, and WASH entities for managing the protected springs and planning for other source water protection measures. Being able to show results as part of the iterative WSI process is essential to mobilize and motivate stakeholders, propose more ambitious future activities, and adapt interventions to the evolving context.

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### ABOUT THIS SERIES

This case study is part of a series of products of approaches under the Water Security Improvement (WSI) process. This series is produced by USAID's Sustainable Water Partnership (SWP) activity and can be found here: www.swpwater.org.