



GLOBAL WATERS



RESILIM helped local communities by the Marico River, South Africa, apply for a UNESCO Biosphere Reserve designation. The area is part of the headwaters of the Limpopo Basin. Photo credit: USAID/South Africa

Addressing the Water Shortage Puzzle in Southern Africa

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River basins in southern Africa, like river basins around the world, are under threat from increasing water use and shifting rainfall patterns, which are exaggerating flood and drought cycles and degrading water quality. It is hard enough for one country to adapt to these changing conditions, but most of the world's water basins — 263 lake and river basins, covering almost half of the earth's nonocean surface — cross national boundaries. To ensure that collaboration rather than competition wins out in basin management, neighboring countries need to work together. In the case of southern Africa's Limpopo River Basin, home to 18 million people, this collaboration requires the participation of Botswana, Mozambique, South Africa, and Zimbabwe.

Image for post.

“Supporting these four countries as they work together on water management can be challenging,” says Jeanette Normand, a USAID environment officer. “There are

lots of regulations on the books, but getting the different national departments to work together, and then raise that collaboration up to a transboundary scale, poses additional challenges.” Normand helps manage a seven-year USAID program (2012–2020) that is taking on this challenge.

Approach

Resilience in the Limpopo Basin Program (RESILIM) is comprised of two components, one of which ended in 2017 and supported efforts in the four countries to improve shared management of water resources. Overall, the program’s goal was to improve and protect the Limpopo River’s health, and therefore, improve the lives of the millions who depend on it, from the community to the international level. Consultation, collaboration, and partnership were at the heart of RESILIM’s approach. The other component of RESILIM — which runs through 2020 — is managed by the Association for Water and Rural Development (AWARD), a South African NGO, and focuses on the Olifants catchment within the overall Limpopo Basin.

The program used a “Nexus Approach,” which takes into account the fact that reducing vulnerability and building the resilience of people and ecosystems requires integrating scientific evidence on water, biodiversity, and climate — too often addressed separately — into policies that solve problems that residents face every day. Rather than taking a siloed approach, RESILIM encouraged stakeholders to think holistically in translating evidence into action to improve governance, strengthen livelihoods, and manage water demand. As outlined in the program’s final report, RESILIM grounded its work in robust science, leveraged partnership opportunities to attain shared goals, and capitalized on collaborations with different levels of government, the private sector, and civil society to ensure the sustainability of program achievements.

RESILIM focused on “ground up,” local-level, bilateral, and transboundary activities resulting in scalable basin-specific impacts that improved natural resource collaboration and management, and catalyzed broader policy action. The team developed strong working relationships with a wide range of government and nongovernment actors in all four basin countries to build a community of practice around this Nexus Approach, and shared research broadly throughout the basin through multi-stakeholder technical workshops.

This nuanced approach, simultaneously addressing opportunities at both the individual river and overall basin level, allowed the project to engage on multiple levels and scale up productive approaches. “The basin-level portion of the RESILIM project coordinates efforts at a transboundary level and helps harmonize differing rules and approaches that exist in each state so that they can better coordinate,” explains Normand. The Olifants portion of the program allows RESILIM to focus on community-level issues within the Olifants catchment, and gives the program the flexibility to address resource management problems and solutions on a variety of levels. This combination of approaches allowed RESILIM to build on existing initiatives and pilot and roll out promising new ones.

Kule Chitepo, project director of the basin-wide initiative, explains that another reason for the program’s flexibility was the funding source. “Alongside water and sanitation funding, RESILIM was funded in almost equal parts by climate change and

biodiversity resources,” he says. “This allowed us to work on solutions to problems that were holistic in nature.”

According to Normand and Chitepo, the flexibility from multiple mechanisms working at multiple scales, while programming multiple sources of funds, was one of the driving reasons behind the program’s success. “If you’re trying to work at a basin level, owing to the diverse challenges we encounter, we really need that mix of approaches and geographies in order to truly affect water quality and the health of the river, and as a result benefit the communities that rely upon the river” Normand explains. “We were able to do that using an integrated approach enabled by integrated funding.”

Grants to more than a dozen local and international partners extended the program’s reach while establishing a diverse set of scalable and sustainable interventions. Some of these interventions, discussed in further detail below, include water hyacinth control, designation of UNESCO Biosphere protected status to key catchments, water pollution monitoring, and aquifer surveying. Taken together, these initiatives illustrate the multisectoral Nexus Approach, working from the community to the national to the transboundary level, and covering the breadth of issues confronting the Limpopo River Basin.

Water Hyacinth Control

A significant threat to water in southern Africa comes from a surprising source: a lovely purple flower called the water hyacinth. Introduced from South America, water hyacinth has become an invasive species, spreading quickly through the waterways across Africa and growing in thick green mats that choke off aquatic oxygen supplies for fish, block navigation of waterways, and reduce access to water sources. This is a huge problem in the Limpopo Basin. “Hyacinth limits the availability of water because it depletes supply in an already a water-scarce basin,” says Chitepo. “There’s a lot of reliance on rain-fed economic activity, whether it’s subsistence agriculture or commercial agriculture, and when this [rainfall] is not certain due to the impacts of climate change, then you want to be able to draw on other sources of water. But if those other sources are compromised because of poor water quality or the clogging up of dams and rivers you can get into a vicious cycle of over-abstraction and degradation.”

Governments in the basin acknowledge the challenges, and appreciate RESILIM’s help in addressing them. “The governments of South Africa and Botswana have a long history of partnering on water issues but have lacked resources to work collaboratively in addressing invasive species like the water hyacinth,” explains Normand. “To address this shared challenge, they’ve created a collaborative management agreement and jointly track water hyacinth and water quality in portions of the river.” Armed with data showing the current and projected future impacts of water hyacinth on the water, biodiversity, and economy of the basin, the RESILIM team brought the two governments together to share experiences and take coordinated action on both sides of the border. An additional hope is that the government relationships built through this agreement will translate to stronger future partnerships on other water-related issues.

RESILIM also explored ways to make use of all the biomass that water hyacinth cre-

ates (its weight can increase by 50 percent in just seven days). “We helped them look at options for how they could use the water hyacinth sustainably,” says Chitepo. One of these options was charcoal production from water hyacinth. Wood charcoal is a common fuel source in rural southern Africa, leading to unsustainable tree cutting, so any alternative fuel source is valuable.

The team demonstrated that water hyacinth can be used to form charcoal briquettes. A self-sustaining briquette production program could result in the removal of the invasive plants, a reduction in deforestation, and the creation of an important income source. RESILIM’s study on water hyacinth biomass charcoal production also generated interest outside the basin, with requests for more information coming from other countries feeling the pressure of deforestation.

UNESCO Biosphere Status

RESILIM applied its Nexus Approach to the protection of an entire ecological zone by applying for UNESCO Biosphere Reserve designation for a critical catchment area in the headwaters of the Limpopo Basin. A Biosphere Reserve is an area that is deemed to have special global ecological significance. It consists of three interrelated zones with corresponding levels of protection: 1) the core area, which is most strictly protected in terms of human uses; 2) the buffer zone, which surrounds the core area and where human activities compatible with preservation, such as ecotourism, can take place; and 3) the transition zone, where the greatest range of activity is allowed, including carefully managed agriculture.

Communities around South Africa’s Marico River, part of the Limpopo River’s headwaters, are proud that water from their river is clean enough to drink without treatment and wanted to make sure it stayed that way. RESILIM worked with a local community group, the Marico River Conservation Association (MRCA), to apply for UNESCO Biosphere protected status. The area had to first be declared a protected environmental area by South Africa’s Department of Environmental Affairs (DEA), which happened in September 2016. The Biosphere application then had to be submitted to and accepted by the South Africa Department for Rural Environment and Agriculture Development (READ), the provincial conservation authority. With READ approval in hand, the application then went through an extensive public participation process, which included soliciting input from landowners and detailing baseline data on its current conservation status.

Lara Rall, RESILIM’s communications officer, explains that the project expanded in scope as more landowners came on board over the months of discussions. “Originally this area was only going to be about 60,000 hectares. After about a year and a half of consultation with local landowners, and their recognition of the value that the protected status will bring, it’s now going to be about 450,000 hectares.” In addition to recognizing the ecological value of their land, landowners in the area were also convinced of the economic opportunity that Biosphere designation could bring through increased tourism. READ supported this expansion, which protected three additional rivers in the headwaters region of the Limpopo Basin. The DEA formally submitted the Biosphere application to UNESCO in August 2017, and the community group is hoping to receive confirmation that it has been approved following a UNESCO meeting in June.

This complex process required sustained partnership between USAID and the MRCA, and resulted in a powerful and well-organized unit including the community group, lo-

cal landowners, and local government. Chitepo explains how USAID helped the MRCA navigate this complex process. “We provided scientists and scientific input where we could,” he says. “At many different levels, we helped them take what was initially a small, regional concept and transform it into a huge biodiversity-significant conservation initiative.”

MRCA director Daan van der Merwe credits the important role USAID played in making this vision a reality. “MRCA could without fail fall back on the unwavering assistance of the RESILIM/USAID team for encouragement and financial support,” he says. “For this ongoing support, the MRCA team and landowners of the area salute the USAID team.”

Surveying Aquifers

As extreme weather events like droughts become more common and surface water sources become more scarce or unreliable, pressure on groundwater sources grows. The problem is that very little is known about aquifers throughout Africa. RESILIM stepped in to try to fill this information gap for the Ramotswa Aquifer along the border between Botswana and South Africa. This transboundary Ramotswa project investigates the hydrogeological, socio-economic, and institutional conditions of the aquifer with the hope that the emerging scientific data will promote transboundary and collaborative management of this critical source of water in the upper Limpopo Basin.

“For the first time, we are investigating the aquifer to understand how it works, how groundwater recharges, how much water is there, and what is the quality of the water,” says Rall.

For three weeks in early 2016, RESILIM partner Exploration Resources International used a helicopter fitted with sophisticated sensors to survey the aquifer from the air. They collected electromagnetic readings fed into a database that stakeholders can use to create GIS-enabled maps related to groundwater availability, productive areas for recharge, at-risk areas for aquifer contamination, and other groundwater-related themes. RESILIM trained government and NGO representatives on both sides of the border to use the database to inform water management activities, with a focus on water supply, contaminant control, and water as an input for sustainable livelihoods and development.

“We worked together with our partners from the International Water Management Institute, the Joint Permanent Technical Commission on Water Quality and Water Hyacinth, and various universities to study the aquifer,” says Rall. “This is a really important piece of science that we’ve produced that I think is going to be quite valuable for the future.”

Monitoring Water Pollution from Mining

In one part of the river basin, communities learned how to use science and the law to empower themselves in the fight against water pollution from platinum, coal, and vermiculite mining. Limpopo Province has historically struggled with both legal and illegal mining operations dumping waste into the river and its tributaries. Under RESILIM’s cooperative agreement, the South African NGO AWARD has developed an app that collects data from monitoring stations along the waterways and displays in real-time where water levels are getting low. When this happens, the dilution potential of the riv-

er decreases and concentrations of toxic chemicals can become problematic, exposing people to serious health risks. “But a sudden increase in the flow of a river doesn’t always mean rainfall,” explains Hugo Retief, one of AWARD’s team of researchers. “It could be due to a toxic spill or an unlawful discharge into the river.” AWARD’s innovative FLOW Tracker app helps communities monitor what is happening to its rivers.

Normand explains that AWARD worked with a community-based human rights organization to collect evidence to prosecute polluters. “This organization works with citizens to help them understand what their rights are and then advises them on the robust chain of evidence required in each case. This builds capacity to correctly collect evidence and data in a way that it is able to be used in a court of law,” she says. “This is really empowering people at a local level to take matters into their own hands.” In the long run, this sort of grassroots pressure may change policy and regulation to favor future water quality over short-term mining interests.

Lessons Learned

Many lessons came out of the complex five-year program. While working across boundaries with sovereign nations, strong relationships are critical to navigating political complexity, catalyzing joint management, and minimizing conflict or competition over resources. This was certainly the case with the water hyacinth control activity. “It’s not very easy to get countries to cooperate across borders in the first place,” says Chitepo. “It’s essential to form relationships, build the trust required for countries to sit down, cooperate and plan together, and collaboratively think through the implications of national planning on basin-wide approaches.”

RESILIM staff and partners found that collaborating with existing institutions, rather than creating new initiatives, injects new energy into existing systems and supports impact sustainability. This type of collaboration also avoids the creation of duplicative or redundant institutions that would confuse mandates and compete for already scarce resources.

Other important lessons learned, as the work on the Biosphere application process demonstrated, include the importance of democratic and accountable governance; long-range thinking and planning; the engagement of a motivated private sector; organizational and institutional capacity and visionary political leadership; and aligned incentives.

Conclusion

RESILIM’s mandate is challenging: to bring together four national governments, including multiple agencies in each, to work on the common goal of preserving their shared water resources in the midst of changing environmental conditions. Over five years, the program was able to build capacity and levels of trust among all the stakeholders — from local, regional, and national governments to the private sector and local community groups — leading to real sustainable progress on the ground. From water hyacinth control to the creation of Biosphere reserves to the monitoring of water quality to researching groundwater sources, RESILIM has demonstrated that its scientifically based Nexus Approach is helping build the resiliency of communities and ecosystems to cope with changing natural resource conditions.

Results

Thirty-eight significant policies and management plans related to transboundary management of water quality, water sources, national parks and conservation areas, and disaster preparedness were enacted across the basin.

More than 250 government leaders and technical managers received training and other capacity development on transboundary management of natural resources and extreme climate event adaptation.

Twenty-five in-depth scientific reports and analyses were produced, including:

- detailed studies on environmental flows, water quality, and disaster preparedness;
- a landmark assessment of risk and vulnerability that prioritized eight Resilience Action Areas across the four basin countries; an economic valuation of coastal mangrove habitat in Mozambique;
- a data-rich Limpopo River Basin atlas documenting the natural and man-made drivers of ongoing change in the basin;
- and a comprehensive hydrological mapping and database on the Ramotswa aquifer.

More than 4,500 men, women, and youth **received training on water conservation, protection of biodiversity, and extreme climate event adaptation**; awareness and outreach efforts reached another 8,000 people. RESILIM also helped create jobs related to bush firefighting in South Africa and the production of sustainable food and cosmetic products from marula trees in Botswana.

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