Qualitative Results Organized by Project or Basin



ECOWAS

Information

Shared information boosts riparian trust and confidence and forms the basis of transboundary cooperation OUTCOME AREA 2. Shared data, knowledge, and analytical tools enable timely, transparent, and regionally beneficial decision making

Water Atlas: With CIWA support, the Economic Community of West African States (ECOWAS) is elaborating the first Fouta Djallon Water Atlas, which will help fill existing knowledge gaps pertaining to the Guinean Highlands. Although mostly located within Guinea, the Highlands have tremendous regional significance as the source of 12 transboundary rivers, including the Niger River, West Africa's longest river; the Senegal and Gambia Rivers; and rivers in Sierra Leone, Liberia, Maritime Guinea, and western Côte d'Ivoire. Strengthening the knowledge around this 'water tower' of West Africa is critical to enable the appropriate watershed protection mechanisms and inform sustainable national and regional planning. The Fouta Djallon Water Atlas provides an integrated description of the Highlands, including its physical components and its water resources, their uses, and their roles. It contains the results of a recent study meant to determine the state of current knowledge on the basins and sub-basins and provide an exhaustive synthesis of the hydrological regimes of the main rivers deriving from the Fouta Djallon Highlands. Most important, the preparation of the Water Atlas has established an initial basis for sharing knowledge among countries and stakeholders that are interested in or dependent on water from the Highlands. Facilitated by ECOWAS, countries endorsed the Water Atlas in a regional workshop in May 2017. The Water Atlas supplements historic work of the Regional Program for Integrated Development (RPID) of the Fouta Djallon Highlands started by the African Union in 1981.

Institutions

Effective regional and national institutions enable riparian states to manage shared risks and harness net benefits of cooperation OUTCOME AREA 1. Strengthened, adaptable, institutional structures enable robust water management amidst growing uncertainty due to climate change and competing demands for water

Common Directive: With CIWA support, the Water Resources Coordination Center of ECOWAS led the validation process for the Directive on West African Shared Water Resources. Unanimously decided during an ECOWAS Conference of Heads of State in 2000, the directive was driven by a common desire of West African states to have a binding regional instrument for implementing the Regional Water Resources Policy (WARWP). The process of elaboration and validation of the Directive started in 2013 and adoption of a participatory, consultative process across ECOWAS countries has resulted in gradual progress. CIWA supported two regional workshops to review the draft Directive over which countries reviewed and improved text around adoption of IWRM and also validated the Directive in June 2017. CIWA's financial and technical support has allowed widened stakeholder consultations and integration of stakeholder concerns and priorities into the drafting of the text. Once adopted by countries, this Directive forms a cornerstone in establishing and enabling a legal environment for the sustainable management of water resources at the regional level. In particular, the Directive focuses on the prevention and peaceful resolution of conflicts between Member States over shared water resources and on the promotion of water resources for socioeconomic growth among ECOWAS Member States. The Directive also facilitates the implementation of the 1997 United Nations Convention on International Watercourses in the region.

OUTCOME AREA 2. Financially and institutionally sustainable regional organizations provide effective water management services to countries

Financing Mechanisms: A CIWA-supported study by the Water Resources Coordination Centre of ECOWAS explores sustainable financing mechanisms for the Mono Basin Authority (MBA). Having established the MBA in 2014, Benin and Togo sought support from CIWA and ECOWAS to understand viable financing options for its effective and sustainable operationalization. The MBA is one of Africa's newest, and among its smaller, RBOs. A technical committee of experts from the MBA, along with ECOWAS and CIWA, has concluded a study that examines the MBA's functions and needs; identifies cost-saving approaches; evaluates potential financing mechanisms; and provides recommendations for short-, medium-, and long-term financing for the authority. The study was informed by regional experiences in smaller African RBOs (including Cestos, St. John, Moa) as well as a number of larger African RBOs (including Volta, Niger, Congo, and Senegal). The study examined several financing mechanisms, including Member State contributions, a dedicated regional tax, user fee-based financing, polluter fee-based financing, sale of data and services, project management fees for infrastructure projects, management and administration fees, dividends from an investment fund, donor contributions, and public-private partnerships (PPPs). It recommends application of a small user-fee-based levy to the hydropower and mining sectors to allow a compact MBA to focus on priority functions and most important, to function independently from Member State contributions. Pending review and decision by its Council of Ministers, the MBA is a step closer to adopting a financing strategy that allows the two small nations to operationalize this RBO for cooperative and peaceful decision making around the shared waters of the Mono River.

IGAD

Information

Shared information boosts riparian trust and confidence and forms the basis of transboundary cooperation OUTCOME AREA 2. Shared data, knowledge, and analytical tools enable timely, transparent, and regionally beneficial decision making

Resource Assessment: Shallow groundwater, mainly found in wadi beds and tapped through shallow traditional wells, is widely used in the region. Shallow groundwater availability is subject to seasonal variability and is vulnerable to drought. Several projects and initiatives in the region focus on expanding this resource through the construction of water harvesting and recharge structures. Scaling up of water harvesting and watershed management initiatives in all IGAD countries can contribute to building drought resilience but will also impact surface water flows and downstream users, including those in neighboring countries. A better understanding of the surface water availability and improved planning and information sharing is therefore essential for a balanced regional development. The region is underlain by a number of aquifers that vary in size and potential. The knowledge on these deeper groundwater resources is scattered and incomplete. The deeper groundwater is potentially an important source of water for urban centers, for regions that do not have access to surface water and can form an important back-up to the shallow groundwater resource and thus strengthen climate resilience. Locally deep groundwater could also provide opportunities for economic development. The CIWA-supported program with IGAD will expand the assessment of surface water availability and the planning of investments for water harvesting at a national level. The program will also contribute to the creation of a regional Water Resources Information System through the creation of the groundwater component of such a regional system.

Institutions

Effective regional and national institutions enable riparian states to manage shared risks and harness net benefits of cooperation OUTCOME AREA 2. Financially and institutionally sustainable regional organizations provide effective water management services to countries

Protocol Development: CIWA will support IGAD's role as regional facilitator in water resources management by supporting discussions on a regional water protocol. It will also strengthen the capacity of the Water Unit in data management and sharing through the development of an online groundwater information system.

Investments

Regionally beneficial investments generate socioeconomic benefits and gender-inclusive poverty reduction OUTCOME AREA 2. Coordinated investment planning and inclusive stakeholder engagement ensures equitable benefit sharing and effective risk management

Socio-economic Assessment and Communication: A small portion of the drought relief budgets focus on improving access to high-quality and reliable water points even though the largest economic impacts of droughts in the region are in the livestock sector and are the result of inadequate access to water and fodder. The activities under the CIWA project aim to strengthen the profile of groundwater in the drought resilience agenda through the support to IGAD in developing a communication strategy. Building drought resilience is the most efficient way to protect economic activity in rural areas, mainly in the livestock sector, and to prevent people from migrating after losing their livelihoods. Through a socio-economic assessment, the CIWA program will help IGAD to identify more precisely the most vulnerable groups in each country that require support and investments to build resilience to climate shocks.

Lake Chad

Information

Shared information boosts riparian trust and confidence and forms the basis of transboundary cooperation OUTCOME AREA 2. Shared data, knowledge, and analytical tools enable timely, transparent, and regionally beneficial decision making

Risk Mapping: Analytical work and knowledge sharing in the Lake Chad Basin aims to help Lake Chad Basin Commission (LCBC) better understand uncertainty surrounding the lake's future and define the framework for a development plan. Major knowledge gaps regarding regional hydrology combined with climate change impacts result in tremendous uncertainty about the future of Lake Chad. A major decrease in the lake's volume or water guality would seriously threaten the region's vulnerable population and its already endangered ecosystem. An analysis conducted with CIWA support used best available technical information to reveal hydrological scenarios that would cause future changes in Lake Chad's morphology. The data on changes to the lake size were also linked with socioeconomic data to describe how water-use and precipitation changes will affect the socioeconomic and productive systems in the region. A series of publications, events, and consultations with policy makers highlighted these findings and is fostering dialogue toward an improved and regionally beneficial approach to decision making.

Modeling: Based on needs identified through detailed stakeholder consultations, the LCBC is collaborating with the World Bank, the United Nations Educational, Scientific and Cultural Organization (UNESCO). other development partners and to improve groundwater-surface water modeling of the lake and institutionalize information sharing. CIWA-supported consultations undertaken by the World Bank team with relevant stakeholders, including the LCBC, LCBC Members States, and development partners, identified the need for a system of monitoring and modeling the lake to provide a decision-support mechanism that informs effective implementation of the basin's Water Charter. The Lake Chad Basin Water Charter is a binding framework for the Member States for promoting sustainable development through integrated, equitable, and coordinated management of natural resources in and around the lake.

A CIWA-supported workshop organized jointly by the World Bank and UNESCO with the LCBC in May 2017 brought together a large number of development partners and research organizations—Agence Française de Développement(AFD), the specialized institution of the Permanent Interstates Committee for Drought Control in the Sahel (AGRHYMET), Federal Institute for Geosciences and Natural Resources (BGR), Geological Survey (BRGM), Economic Community of Central African States (ECCAS), Instituto Madrileño De Estudios Avanzados (IMDEA), L'Institut de recherche pour le développement (IRD), Observatoire du Sahara et du Sahel (OSS), Princeton University Climate Partnership, and Project ResEau funded by the Swiss Government-to create a working group that contributes to different aspects of updating and improving an existing groundwater model of the basin. While the model encompasses the entire basin, a higher resolution will be adopted for three focus areas based on population coverage and socioeconomic information, livelihood activities, and hydrological and ecological importance for the lake and its vicinity, the Chari-Logone watershed, and the Komadougou-Yobe watershed. The groundwater model will be linked to a separate surface water model to allow for water balance calculations, recharge estimations, indirect evapotranspiration measurements, and modeling of abstractions and consumptive uses.

Participants agreed that while data would be shared within the working group through identified focal points for each agency in the short term, the LCBC would develop a publicly accessible web-based data sharing platform to institutionalize information sharing in the longer term. The working group also agreed to develop a joint publication which will synthesize all available data and information and recommend research and analysis useful for resource management and planning. This coordinated effort of different players in conjunction with the LCBC lays the foundation to strengthen the understanding about the links between water and the lake's socioeconomic systems, develop the knowledge to support evidence-based decision making and governance instruments such as water regulations or sustainable abstraction caps, and advance and inform sound investments.

Investments

Regionally beneficial investments generate socioeconomic benefits and gender-inclusive poverty reduction OUTCOME AREA 2. Coordinated investment planning and inclusive stakeholder engagement ensures equitable benefit sharing and effective risk management

Climate Resilient Investment: With CIWA support, countries in the Lake Chad Basin developed the Lake Chad Development and Climate Resilience Action Plan (LCDCRAP) which highlights cross-cutting investment needs in the lake area. After launching the plan at the 21st United Nations Framework Convention on Climate Change Conference of the Parties (COP 21) in Paris in 2015, the World Bank has been working with countries to develop an IDA operation to address some of the important challenges in the region and harness opportunities identified. Pipeline lending will focus on priority actions identified in the plan to improve the resilience of Lake Chad livelihoods and ecosystems under current population growth pressures, hydrological variability, and climate uncertainty. The proposed sustainable investments aim to enhance the livelihoods and reduce the vulnerability of the lake's resource-dependent population.

Lake Tanganyika

Investments

Regionally beneficial investments generate socioeconomic benefits and gender-inclusive poverty reduction OUTCOME AREA 1. Improved technical and resource mobilization capacity enhances investment quality and advances preparation of regional projects

Options Analysis: An options analysis on Lake Tanganyika has helped develop a better understanding of lake water level trends and constraints to port access and explored opportunities for sediment management and improved navigation. The governments of the Democratic Republic of Congo and Tanzania jointly approached the CIWA program for support in restoring port access in Lake Tanganyika. A 2013 study showed that rebuilding the Lukuga Barrage, an estimated US\$65 million investment, would improve port access. However, questions on the technical design and sustainability of the investment led countries to request CIWA analytical support. The analysis revealed that sediment accumulation from tributary rivers—not decreasing lake water levels as widely perceived—is the main challenge limiting port access. The study recommended a combination of sediment management techniques, including sediment removal from ports, sediment trapping in tributaries, and upstream catchment management as well as regular monitoring of water level and guality. Given the transboundary nature of Lake Tanganyika—it spans across Burundi, the Democratic Republic of Congo, Tanzania, and Zambia, and its catchment also includes Rwanda-sediment management and lake monitoring inherently require a coordinated effort in terms of investments, institutions, and information structures. This options analysis has provided a basis for countries to come together and agree on strategic investments they may undertake cooperatively to sustain the regional navigation benefits provided to them by the shared lake. Currently, the riparian countries are in the initial stages of exploring two regional programs on Lake Tanganyika related to improving navigation and enhancing environmental health to be supported by the World Bank.

Niger

Institutions

Effective regional and national institutions enable riparian states to manage shared risks and harness net benefits of cooperation OUTCOME AREA 2. Financially and institutionally sustainable regional organizations provide effective water management services to countries

Donor Coordination: With support from CIWA, the World Bank has revived the coordination of development partners financing projects or programs hosted by the Niger Basin Authority (NBA). Development partners are joining efforts with the view of establishing a concrete dialogue on ways and means for the NBA to improve its performance, notably with respect to the basin-level public goods it generates such as information on the hydrology of the basin, Observatory of the Environment activities, flow forecast, and processing of requests by countries to carry out activities with potential transboundary impacts. Another area of focus of the ongoing dialogue is the synergies between

the various projects and programs. Through this dialogue and in coordination with the pipeline Niger Basin Climate-Resilience Project, the scope and focus of institutional support for the NBA may be realigned.

Investments

Regionally beneficial investments generate socioeconomic benefits and gender-inclusive poverty reduction OUTCOME AREA 1. Improved technical and resource mobilization capacity enhances investment quality and advances preparation of regional projects

Resilient Investments: Capacity-building events and technical assistance provided to the nine Niger Basin countries have improved technical capacity for climate resilience and adaptation. In 2015 and 2016, CIWA supported an array of workshops, consultations, and technical assistance activities requested by the countries and the NBA. These activities served to support the effective preparation and implementation of investments to be included in the Niger Basin Climate Resilience Investment Plan (CRIP) and assist the mobilization of resources and investments for climate resilience throughout the basin. Over 100 participants from relevant line ministries (water, energy, agriculture/livestock, environment); ministries of finance and foreign affairs; and national and sub-regional river basin authorities were involved. Activities addressed specific capacity needs, including the ability to identify the additional challenges posed by climate change, new opportunities available to mitigate climate risk, and the benefits of cooperative approaches to avoid the effects of maladaptation. The training also helped participants better understand the climate financing landscape and the policies and mechanisms specific to different entities. This year, the NBA and its members continued to work with actual projects and proposals to package investments targeted at specific funding sources, including the private sector. Thus, in 2017, they advanced critical actions for the CRIP that will further serve them as they advance other programs and priorities for the basin. Next steps include preparation of a Niger Basin regional project with the World Bank as well as a resource mobilization conference during which the countries and the NBA will showcase their climate-resilience investment needs under the CRIP to targeted donor partners and financiers.

Implementation Assessment: Analysis of lessons learned and best practices for large-scale resettlement associated with the construction of large-scale transboundary infrastructure in fragile states contributed to improving quality of investments in the region. The assessment of the first phase of the Kandadji resettlement program was finalized this year. It generated a number of key lessons learned that were discussed in detail during a workshop in Niamey held at the end of May 2016. Assessment findings are being used by the Government of Niger to implement additional activities in support of populations resettled under Phase I and to inform the conceptualization of the second phase of the Kandadji resettlement program. Key areas of focus included (a) increased attention to the needs of women, youth, and vulnerable groups; (b) additional support to improve housing guality and basic services at resettlement sites; (c) implementation of complementary and/or additional livelihood restoration activities; and (d) enhancement of the existing grievance redress mechanism to make it more accessible at the community level. This assessment will be part of a broader analysis to identify good practices and lessons learned in the implementation of similar resettlement interventions in weak institutional capacity environments. The analysis will be used to inform and strengthen investment throughout the region.

Quality Assurance: The NBA, the World Bank, and countries that share the upper Niger River Basin are in the process of redefining support for the project to improved decision making as far as investments are concerned. Using the resources of the project, the NBA has recruited a high-level expert specialized in multipurpose dam projects who will help steer the ongoing studies on the Fomi Dam and do a quality control, notably on the quality of the multicriteria analysis.

Modeling: Advanced modeling of ecosystem services in the Niger Inner Delta will inform upstream development and investment choices. Progress was made toward selecting the operators who will develop the improved model of the Niger Inner Delta to help decision makers understand ecosystem services available in the delta under different flow regimes. Based on a fairly accurate topography, the modeling exercise will help better correlate the natural and altered flooding pattern and the associated socioeconomic benefits.

OUTCOME AREA 2. Coordinated investment planning and inclusive stakeholder engagement ensures equitable benefit sharing and effective risk management

Resilience Planning: The Niger Basin CRIP highlights investment needs related to climate change adaptation in the basin to gather support for securing investment finance. Taking a basin-wide approach to climate resilience planning is considered best practice in the field, but the approach is not easily or widely implemented. CIWA supported the countries and the NBA as they developed, vetted, and presented the Niger Basin CRIP at COP 21 in Paris to raise the profile of their climate adaptation needs. The CRIP consists of a careful selection of resilience-building investments from key existing regional and national planning documents. It totals 246 investments, amounting to an estimated US\$3.1 billion in financing needed. Each investment included in the plan was examined and vetted by Member States through a comprehensive consultative process with multisectoral participation, strategically coupled with exercises to build local capacity. The World Bank is preparing an investment project to address some of the needs identified in the CRIP.

Stakeholder Engagement: Scoping work on regional stakeholder engagement will help CIWA identify where future support is needed on this topic. CIWA requires a deeper understanding of the strengths and weaknesses of citizen engagement mechanisms in the basin to strategically support them in future projects in the Niger Basin. Stakeholder organizations are actively involved in the development and rollout of the CRIP and in other investments in the basin. An analysis is under way that closely examines the details of regional processes with respect to capacity, functionality, and utility of various organizations. An initial report has helped elucidate a deeper understanding of citizen engagement in the basin that will help teams determine which mechanisms may be usefully employed by planned operations and could inform a trust-funded technical assistance or capacity-building activity to strengthen relevant organizations. This future support will be planned in line with the pipeline Climate Resilience Project and the CIWA grant to the NBA.

Stakeholder Mapping: Development of the web-based stakeholder mapping and visualization tool intended to manage benefit sharing for transboundary infrastructure has been placed on hold due to capacity limitations. CIWA's support for the development of an innovative tool that maps high-resolution socioeconomic and operational data for long-term monitoring and management of benefit sharing around the Kandadji and Fomi multipurpose project was placed on hold this year. In spite of initially promising consultations around development of the tool, the program determined that clients and stakeholders did not have sufficient capacity to successfully implement this activity in light of the many competing demands for their attention.

Nile

Information

Shared information boosts riparian trust and confidence and forms the basis of transboundary cooperation OUTCOME AREA 1. Effective information platforms enhance responses to water-related hazards, which are more frequent and extreme in a changing climate

Hydromet System: The Nile Basin Initiative Secretariat (NBI-SEC) is commencing implementation of the first phase of a basin-wide hydromet network. The detailed design and implementation plan for the hydromet network was developed by the Nile-SEC in close collaboration with the countries. Following ministerial-level approval from the countries and having recently secured funding from the European Union (EU) and the German Federal Ministry for Economic Cooperation and Development (BMZ), the Nile-SEC is implementing a subset of the basin-wide hydromet network delineated in the first phase of the plan. The Nile-SEC is also continuing discussions with national-level water resource management programs to ensure that the new hydromet stations identified under the plan are harmonized with national-level plans.

Sharing Real-time Information: The Nile Basin Initiative (NBI) is working to expand its services to countries and provide real-time information. While the NBI is recognized as the 'go-to' regional repository for historic hydrological data on the Nile, the Nile countries' agreement to establish a regional hydromet system, based on the NBI-facilitated process and design, has expanded the NBI into a regional authority for real-time information, and the NBI centers are working to begin delivery in this new role. Leveraging their modeling capabilities and tools developed over the years, the Eastern Nile Regional Technical Office (ENTRO) and the NBI Secretariat (Nile-SEC) are jointly working to develop a short-term-to-seasonal river flow forecasting system for the whole Nile Basin. The forecasting system will rely largely on public domain climatic data, use NBI-developed analytical tools, and make forecasts for the whole basin publicly available on the NBI knowledge platform. Besides providing data and related analysis to the countries, the NBI will work with countries to establish a process for generating seasonal water availability forecasts and water balance bulletins, based on flow forecasts and the baseline for water use across the basin that countries have agreed upon.

Flood Forecasting: ENTRO continues to issue regional flood forecasts and improve and scale up flood preparedness and early warning activities in the Eastern Nile. Seasonal and weekly flood forecasts were provided in 2017 for the seventh consecutive year. These forecasts are used by governmental and relief authorities and can help plan cropping for the season, reduce property damage, and minimize disruption of productive activities. Daily flood forecasts provided during the flood season help avert loss of lives and livestock. The flood reports are disseminated to the public through a range of channels, including in coordination with National Flood Forecast Centers, through the ENTRO web portal, and e-mail. During peak flood season, a growing number of institutions at the subnational, national, and regional levels, including United Nations agencies, rely on daily forecasts generated by ENTRO to provide timely relief assistance. Among those at highest risk are subsistence farmers and livestock pastoralists who are exposed to more frequent and extreme floods with the onset of climate change. Approximately 350,000 people across the region receive early warning messages during flood season and daily alerts in flood prone areas, while 1.7 million more people across the region benefit indirectly from these alerts and messages.

With Cooperation in International Waters in Africa (CIWA) support, ENTRO has been continuously enhancing its rainfall forecasting system and expanding its geographical coverage. In recent years, the system has been configured with Weather and Research Forecasting (WRF) models, links with national forecast centers of the countries have improved, and forecasting has been extended to cover flood-prone areas in the Baro-Akobo-Sobat sub-basin. An analysis of flash floods was carried out for vulnerable areas in Sudan. ENTRO will further improve calibration of its models with on-ground and satellite data and expand provision of its services into yet uncovered flood-prone regions in the basin and improve dissemination of forecasts. In conjunction with the Nile-SEC, ENTRO plans to expand its flood forecasting work into seasonal flow forecasting for the Nile Basin and will provide value beyond disaster risk management to include agricultural planning.

Stakeholder Communication: Following a mapping of its stakeholder network across the Nile countries, the Nile Basin Discourse (NBD) is working to strengthen its communication platforms as informed by a newly approved Communication and Outreach Strategy. Among the information services the NBD provides, its national-level civil society organization networks are monitoring national-level media for events and articles related to climate, livelihoods, environment, water resources, and harvesting and sharing of relevant information. The NBD has revamped its website to include user-generated content and hosting of online webinars toward its goal of serving as a platform for communication and information dissemination among member organizations. Meanwhile, the NBD has used existing social media and event platforms to steadily expand outreach and connections among civil society members in a relatively short period. These strengthened horizontal communication channels help build capacity of civil society organizations and citizens and enable coordination among organizations that are working on similar and related themes across the basin, both of which contribute to increased civil society voice in informing development. The NBD continues to play a facilitation role in connecting civil society with investment planning, where tailored consultations have provided valuable inputs to ongoing projects such as the Niymur Multipurpose Water Resources Project, Baro-Akobo-Sobat Development Program, and the Lake Edward and Albert Fisheries Project financed by the African Development Bank (AfDB).

OUTCOME AREA 2. Shared data, knowledge, and analytical tools enable timely, transparent, and regionally beneficial decision making

Decision Support: Countries have continued to use the Nile Basin Decision Support System (DSS) for comprehensive climate-resilient water resources development planning. With CIWA support, the Nile-SEC has continued to provide training and support to the countries for applying modeling tools recently added to the DSS, such as those enabling climate change and trade-off analysis. The DSS has been used for developing the Lake Tana Integrated Water Resources Plan in Ethiopia, designing dams for flood control in the Sebeya River in Rwanda, exploring water management scenarios in the Nyando catchment in Kenya, and issuing water permits in Rwanda. The Nile-SEC continues to promote further mainstreaming of DSS usage in basin-scale development planning, building upon a progressive set of actions that include distribution of DSS licenses across government ministries and universities in the Nile countries, regional and national training on DSS applications by all three NBI centers, establishment of a DSS user community and online help desk to support users troubleshoot technical issues and provide a platform to foster collaboration, and provision of an online modeling portal where the public can access modeling outputs. Collectively, these actions help close the technical capacity gap across basin countries, build a shared understanding of different scenarios of development, and promote collaborative planning and implementation of investments on the shared Nile River.

Strategic Planning: Following establishment of an official baseline for water use across the Nile Basin, countries have agreed that the Nile-SEC will undertake a second phase of strategic analyses including options for enhancing basin water yield and conservation, conjunctive use of groundwater and surface water, optimal management of dams, and others. This agreement demonstrates a shared understanding of resource availability in the Nile Basin and the potential to strengthen the platform for technical dialogue and basin approach to planning. Funding for some of this work has been secured from the German Agency for International Cooperation (*Deutsche Gesellschaft für Internationale Zusammenarbeit*, GIZ) and the EU, with CIWA to fund aspects of modeling related to climate change.

The agreed baseline water use emerged from strategic hydrological analysis undertaken by the NBI using the Nile DSS (with GIZ support, augmented with funds from the Nile Cooperation for Results INCORE], and using tools developed under the Nile Basin Trust Fund [NBTF] and with CIWA support). The analysis showed that while there is considerable irrigation and hydropower potential, national plans for irrigation expansion in the long term can only be met through cooperative management of the Nile River that carefully considers intersectoral trade-offs of water use, emphasizes use of smart agriculture techniques, and includes a landscape of improved regional trade and integration. Agreement on a basin-wide water-use baseline is a substantial step forward in technical cooperation as no official figures of this type have been agreed in the past.

Modeling: The Nile Equatorial Lakes Subsidiary Action Program-Coordination Unit (NELSAP-CU) continues to strengthen its suite of hydrological and water-use simulation models and build capacity of countries to use them in investment planning. The NELSAP-CU has incorporated enhanced economic models to allow the evaluation of technical and economic dimensions of projects and enable more holistic investment in project planning. Under the auspices of the Multi-Sector Investment Opportunities Analysis (MSIOA), the NELSAP-CU continues to use its modeling framework to assist countries to prioritize and select regionally significant development projects and to plan regional investments in a sustainable manner that maximizes transboundary benefits and minimizes transboundary risks. The NELSAP-CU is training on water allocation modeling and analysis in countries that request it, including Tanzania and Rwanda, and will be expanding its capacity building to the other Nile Equatorial Lakes Subsidiary Action Program (NELSAP) countries. The NELSAP-CU has provided support to Rwanda's Interministerial Water Resources Committee and trained the Ministry of Water to provide technical analysis for policy makers in Integrated Water Resources Management (IWRM) issues. National-level institutions' use of a common set of comprehensive planning tools, with the NELSAP-CU providing technical support, evidences a growing level of professional capacity in the region and an increasing norm of taking a transboundary approach to investment prioritization and planning. In the coming year, the NELSAP will be applying its array of models in a new investment planning process to be funded by CIWA.

Knowledge Portal: The three NBI centers are working to create an integrated knowledge platform that provides a single portal through which users can access NBI knowledge resources. Over the past two decades, the centers have assembled and validated a wealth of data and have prepared a vast number of knowledge products on pertinent basin-wide and sub-basin issues and disseminated them to stakeholders. As part of the NBI's increasing focus on establishing itself as a service provider to countries for water resources knowledge services. analytical work, and investment preparation and implementation, there is an increasing need for a consolidated platform which users can identify as a 'go to' for Nile resources. The integrated knowledge platform will improve ease of access to the NBI knowledge resources, thereby enhancing usability of data and information; ensure consistent data management; and streamline workflow for data quality control, processing, and posting. The knowledge portal will make a significant amount of information available to the general public.

Stakeholder Dialogue: The NBI and the NBD continue to partner to foster dialogue and information exchange to promote Nile cooperation.

Platforms for information sharing include annual Nile Day celebrations and the biennial Nile Basin Development Forum (NBDF). Nile Day highlights the needs and opportunities for cooperation around Nile water. It brings together Nile water ministers, development partners, basin officials, and a large number of civil society organizations and stakeholders. The NBDF fosters dialogue among civil society leaders pertaining to issues of trust, reciprocity, common rules, norms and sanctions, connectedness, and technical innovations. These platforms aim to generate awareness on the need and opportunities for cooperative development in the Nile Basin among governments, regional and national organizations, and the civil society; to strengthen the NBI-NBD working partnership; and to ensure that investments prepared and advanced by the NBI are sustainable, regionally beneficial, and relevant to stakeholder needs.

Institutions

Effective regional and national institutions enable riparian states to manage shared risks and harness net benefits of cooperation OUTCOME AREA 1. Strengthened, adaptable, institutional structures enable robust water management amidst growing uncertainty due to climate change and competing demands for water

Just-in-time Capabilities: The NELSAP-CU has worked with countries to provide just-in-time analytical services in water resources management and development, including in estimating flood extents and evaluating trade-offs in water resources investments. With CIWA support, the NELSAP-CU aims to expand its just-in-time technical support and capacity-building services into emerging priority areas in the region, including dam safety, addressing climate variability, and others identified by countries.

Dam Safety: Following the Eastern Nile Council of Ministers' endorsement of ENTRO's regional dam safety guidelines, Eastern Nile countries have established dam safety offices. With CIWA support, ENTRO plans to focus on building capacity of the national dam safety offices and the growing regional network of dam professionals (including policy makers, operators, regulators, and academia), facilitated by a regional dam safety unit at ENTRO. ENTRO's dam safety work has been lauded as groundbreaking in the transboundary waters arena by the International Commission on Large Dams (ICOLD); it was featured at the international ICOLD conference as an example of best practice and is being used as the source of an international working paper by ICOLD.

Study Tour: Technical representatives from Eastern Nile countries and international water and energy experts undertook a study tour to the western United States to learn about best practices in water resources management in the United States and internationally, including specifically the Colorado, Rio Grande/Rio Bravo, and the Columbia River Basins. Water resources management comprises various competing priorities, including climate change, growing water demand, water quality hazards, environmental preservation needs, potential and actual conflicts, and economic development objectives. While the scope and scale of these priorities differ by country, addressing them effectively depends on strong institutions, which are based on collaboration, information sharing, and trust. The CIWA-supported technical study tour comprised site visits and discussions on large interstate multipurpose water projects, data and information sharing and exchange, institutional

cooperation and governance structures, sustainability and community participation, domestic communication strategies, opportunities for capacity building both within and across states, drought monitoring and forecasting, and long-term supply and demand planning in the context of adapting to climate change. In addition to learning about best practices, participants reciprocally shared lessons learned and experiences from the Nile Basin.

OUTCOME AREA 2. Financially and institutionally sustainable regional organizations provide effective water management services to countries

Coordinated Planning: ENTRO has advanced its study on a road map outlining steps the Eastern Nile countries could take for coordinated planning and implementation of dams. The draft roadmap was consulted with countries in November 2016, and countries evaluated mechanisms for coordination in the Eastern Nile context in juxtaposition with examples of coordination in other international settings as presented by the World Bank. Countries recognized the significant amount of data collection and exchange, capacity building, and technical work that would be needed to eventually coordinate dam operations and asked ENTRO to provide additional capacity building where possible. ENTRO will continue to explore mechanisms for financing of additional work and for coordination through the newly established national dam safety offices, helping countries lay important groundwork for safe, economically optimal, environmentally sustainable, and regionally favorable operation and design of large storage structures in the Eastern Nile.

Sustainable Institutions: CIWA's collective donor coordination has continued to deliver efficient development assistance and has strongly emphasized country ownership for the NBI, which is reflected in increased demand for water management services from the NBI centers and an increasing trend in financial contributions from countries (excepting those undergoing active conflict situations). Countries are also exploring alternate staffing plans to ensure sustainability and continuity of the NBI centers. CIWA worked closely with GIZ and Stockholm International Water Institute (SIWI) to help the NBI in planning its 2016 Strategic Dialogue which involved consultations with all Nile countries and donors on the NBI's progress, its inclusiveness and financial sustainability, and identification of key areas for the NBI to focus on moving forward, with the goal of improving the NBI's institutional sustainability while further mainstreaming its role in cooperative water resources management and development of Nile waters. The meetings also collected feedback on the NBI's and the NBD's progress under CIWA, with many countries requesting further CIWA support for the NBI's programming.

Investments

Regionally beneficial investments generate socioeconomic benefits and gender-inclusive poverty reduction OUTCOME AREA 1. Improved technical and resource mobilization capacity enhances investment quality and advances preparation of regional projects

Resource Mobilization: The NELSAP-CU continues to proactively mobilize resources for its pipeline of investments, many of which were prepared with CIWA support. The NELSAP pipeline includes 37 new regionally significant investment projects approved by countries for preparation. At targeted meetings with bilateral or multilateral financiers, as well as in the regional and global fora, the NELSAP-CU has showcased to financiers the series of bankable projects prepared with CIWA support with an emphasis on technical robustness, equitable sharing of benefits, and environmental and social suitability.

Public-Private Investment: Supported by the World Bank's Public-Private Infrastructure Advisory Facility (PPIAF) and CIWA, the NELSAP-CU has worked with countries to screen its portfolio of projects and identify possible candidates for public-private investment. Over a workshop in November 2016, facilitated jointly by the NELSAP-CU and the PPIAF, the Nile Equatorial Lakes countries established the criteria for investments of transboundary significance to be suitable for PPPs. Based on these criteria, 15 priority water and power projects identified and prepared by the NELSAP-CU were screened and two were found to be viable in the immediate term. The screening methodology and outcomes were presented to the countries at a follow-up workshop in May 2017, to enable participants to understand the approach to structuring PPP-favorable investments. Also discussed were outcomes for each project considered and how each could be structured differently to improve PPP viability. Attended by the Permanent Secretaries for Energy from the countries and technical representatives from the Ministries of Water, Energy, and Finance, the workshop helped build country understanding of what next steps could be taken to take viable PPP projects forward for financing. As the NELSAP-CU's portfolio of transboundary projects expands and countries seek to expand the sources of financing they may tap into, this exercise has enabled a concrete step to establish the NELSAP-CU as a convener and facilitator for preparing and implementing PPP transboundary investments.

Watershed Management: Eastern Nile governments have prioritized four watershed management projects in Sudan and Ethiopia prepared by ENTRO for immediate delivery. Sudan and Ethiopia continue to seek funding for implementation from their national budgets and with multilateral financiers. The Council of Ministers has directed ENTRO to identify a next round of projects to prepare, demonstrating the value that countries derive from adopting a transboundary approach to sustainable investment preparation and showcasing the effective role ENTRO has played in promoting cooperative water resources management amid a fragile political context. In addition, successful watershed management actions piloted by ENTRO in the Eastern Nile countries have contributed to enhanced livelihoods, improved water quality, and reduced infrastructure maintenance costs. With CIWA support, ENTRO will undertake an evaluation of the success of various pilot livelihood-based integrated watershed management interventions to inform riparian-led scale-up of select best and most viable practices and training practitioners on lessons learned. As part of this capacity-building work, ENTRO will explore opportunities to engage active professionals and universities into a network of practice for watershed management and provide a platform for exchange of information and training on topics such as sediment management.

OUTCOME AREA 2. Coordinated investment planning and inclusive stakeholder engagement ensures equitable benefit sharing and effective risk management

Mainstreaming Functions: The NELSAP-CU is working with involved

stakeholders to formulate and agree on devolution of the duties of the Mara, Sio-Malaba-Malakisi, and Kagera River Basin Management Projects to intergovernmental coordination committees. The River Basin Management Projects have been ongoing, with support of the NBTF and CIWA, in the three priority 'hotspot' sub-basins and have prepared watershed management and restoration plans as well as feasibility studies and environmental and social assessments of small-scale multipurpose water resources development projects with water supply, food security, and livelihoods benefits to local communities. Additionally, the projects have collaborated with the country governments to prepare frameworks for transboundary management and development within the sub-basins. Mainstreaming of the projects' river basin management functions into intergovernmental coordination committees is part of the process to improve the institutional and financial sustainability of the coordination mechanisms and technical capabilities built through the projects. The NELSAP-CU has outlined the functions to be devolved, as consulted with the countries and the Lake Victoria Basin Commission (LVBC), which also supports countries in the sub-basins. It is envisioned that the NELSAP-CU and the LVBC will continue to support the coordination committees on specific functions that are to their respective comparative advantage.

Stakeholder Engagement: The NBD's partnerships with governments and regional development organizations is ensuring that social concerns shape water, power, and commodity investments. The NBD contributed to the finalization of the stakeholder engagement and communication plan for the Baro-Akobo-Sobat Multipurpose Project in Ethiopia and Sudan, whose preparation is being financed by the AfDB. The stakeholder engagement emphasizes ecosystem sustainability and reducing poverty through post-conflict livelihood rehabilitation. The NBD facilitated stakeholder consultations for the Nyimur-Aswa Multipurpose Project in Uganda and South Sudan to advance a preliminary project design to benefit the local community, for example, by aligning the project access road to link cross-border markets and facilitate trade. The NBD's successful role on this front has been recognized by the Government of Uganda, which requested that the NBD participates in the national-level Steering Committee for the Nyimur-Aswa project alongside Ministries of Water and Agriculture; at the local levels, a similar structure is replicated where the NBD-affiliated civil society and nongovernmental organizations (NGOs) are working with local governments as part of the project's local implementation Steering Committee. Further, through national-level civil society organizations in the Democratic Republic of Congo, the NBD enhanced the design of the US\$21 million Multinational Lake Edward and Albert Integrated Fisheries and Water Resources Management Project (LEAF II) and continues to facilitate stakeholder engagement through the project's implementation supported by the governments of the Democratic Republic of Congo and Uganda with the AfDB and GEF financing.

Sustainable Engagements: Through the CIWA-supported NCORE Project, the NELSAP-CU continues to advance preparation of four investment projects of regional significance in a technically robust, environmentally and socially sustainable, and regionally favorable

manner—Kabuyanda Irrigation and Watershed Management Project in the Kagera Basin, Mara Valley and Ngono Irrigation and Watershed Management Projects in the Mara Basin, and the Sio-Sango Irrigation Project in the Sio-Malaba-Malakisi Basin. These projects target underserved border areas with otherwise largely neglected, vulnerable populations characterized by high poverty levels. The feasibility studies and the ESIAs both contain provisions for analysis of vulnerability characteristics and causes to be factored in project design. The NELSAP-CU has requested consultants to redouble their community consultation efforts in several cases, to ensure that community needs and concerns are addressed and benefits reach intended populations. The NELSAP-CU has put in place many measures to ensure high-quality preparation of the projects, including the use of a dam safety panel, and capacity building for country counterparts.

The Mara Valley and Ngono feasibility studies and the ESIAs are proceeding in a satisfactory manner and are in advanced stages of preparation. The performance of the firm undertaking the studies for the Kabuyanda and Sio-Sango Projects, however, has not been deemed satisfactory, and the NELSAP-CU has fast-tracked the hiring of an alternate consultant. The extension of the NCORE Project until 2020 with the approval of the second additional financing in April 2017 allows time for the completion of the studies. Studies for a planned fifth investment, the Ruvyironza Irrigation and Watershed Management Project in the Kagera Basin, have been cancelled for the time being due to the security situation in Burundi, with the possibility of resuming work if the situation improves in the future. Building on this success, technical analysis and country consultations undertaken by the NELSAP-CU has led to the countries approving 37 new projects of regional significance for preparation, demonstrating the now-established procedural norm for countries to collaboratively consider, evaluate, and endorse transboundary projects for preparation.

Investment Prioritization: The NELSAP-CU is working with countries to prioritize a new Nile Equatorial Lakes Investment Program (NELIP) that strengthens regional intersectoral coordination and national sector-wide planning. The NELIP will be a natural extension of the NELSAP-CU's ongoing strategic planning process and leverage the Nile Equatorial Lakes MSIOA as well as NELSAP's expertise in modeling, multipurpose project preparation, and inter-country facilitation to advance various types of transboundary water resources investments. Responding to demand from its member countries, the NELSAP-CU will facilitate the NELIP process to prioritize a multisector portfolio of investment projects-including built and natural infrastructure, institutional setup, environmental protection measures, and information and monitoring systems—to be implemented by Nile countries in a coordinated manner based on a joint basin-wide investment strategy. With CIWA support, the NELSAP-CU and the countries will strengthen their strategic communication and resource mobilization of prepared projects. The NELIP process will provide valuable long-term targeted technical capacity building to countries, to help them assess critical water resources challenges in the context of region-wide opportunities, and support engagement with inter-ministerial mechanisms at the national level on these issues.

Multi-criteria Optimization: ENTRO has held its final consultation for the Eastern Nile MSIOA, at which countries sought ENTRO's assistance in new areas, including groundwater assessment and management and exploring opportunities for water savings. Responding to requests from active member countries to identify the next round of investment projects of transboundary significance, with support from CIWA, ENTRO facilitated the MSIOA process to analyze risks and opportunities for cooperative development, explore possibilities for turning risks into opportunities and potential roles for ENTRO to play in facilitating countries to evaluate trade-offs around shared and competing uses of water at a sub-basin scale, negotiate mutually beneficial arrangements for water use, and jointly prioritize investments to prepare. Countries agreed on the fundamental insights yielded by the MSIOA-that business as usual prioritizing only national perspectives is not coordinated evaluation. sustainable and that planning, and implementation of water resources investments and beyond are critical for economic prosperity, poverty alleviation, and stability in the region. Country participants suggested that ENTRO explores pursuing "no or low regret" cooperative actions in 10 critical areas, namely energy sharing, improved agriculture, coordinated dam operations, environmental and social measures, groundwater, watershed management, water resources data and information, and optimization of water resources development to enhance win-win opportunities. ENTRO is working with countries to prepare concept notes for regional initiatives in these 10 areas. With CIWA support, ENTRO will undertake a study to better understand the availability of groundwater in the region and assess the performance of irrigated agriculture toward providing insights to countries on ways to improve agricultural water-use efficiency.

Stakeholder Mapping: Through civil society organizations, community leaders, elders, and coalitions, the NBD mapped out links between communities and national and regional players in Nile Basin development. This comprehensive stakeholder map enables project designers to communicate with and understand the interests of the different types of resource users and to manage or resolve conflict. This ultimately ensures that benefits of projects of transboundary significance reach communities, particularly women and vulnerable people.

Community Engagement: The NBD is building the capacity of civil society organizations across the basin and fostering horizontal networking among them to link organizations working on similar themes in different parts of the basin. The NBD has trained over 500 men and 250 women from over 200 organizations across 10 Nile countries on ways to manage climate risks. Improved understanding of changing temperatures; shifting rainfall patterns, floods and droughts; and subsequent implications on lives and livelihoods equip communities to initiate adaptive actions and inform larger-scale development projects about climate-related issues.

Okavango

Institutions

Effective regional and national institutions enable riparian states to manage shared risks and harness net benefits of cooperation

Investments

Regionally beneficial investments generate socioeconomic benefits and gender-inclusive poverty reduction OUTCOME AREA 2. Financially and institutionally sustainable regional organizations provide effective water management services to countries

Institutional Development: During the MSIOA process, Member States and partners held substantive discussions around strengthening Okavango River Basin Water Commission (OKACOM) to deliver on the vision for the basin. The commission defined an ambitious Sustainable and Equitable Climate Resilient Investment Program to address underlying drivers of poverty to safeguard the unique public goods within the basin. This represents the next phase in the institutional evolution of OKACOM, following its initial foundational phase (advancing dialogue, improving communication, aligning strategies), as it assumes a more active role by helping the Member States advance investments in the basin. These transformative discussions represent an important step in enhancing OKACOM's ability to achieve better outcomes through cooperative development and promote more efficient use of available water resources.

OUTCOME AREA 2. Coordinated investment planning and inclusive stakeholder engagement ensures equitable benefit sharing and effective risk management

Investment Scenarios: The Cubango-Okavango MSIOA, completed in FY17, included stakeholder consultations and national engagements to identify implementable, prioritized, and cooperative actions to address underlying issues of poverty in the basin while preserving the unique ecological status of the basin and its delta. Poverty is widespread in the Cubango-Okavango River Basin and survival strategies often threaten land and water quality and the region's biodiversity. The Cubango-Okavango MSIOA considered various investment scenarios, which include economic development projects that would not only benefit people in the basin, the Member States, and the broader SADC region but also help preserve the environmental integrity of the delta. Through an iterative facilitated process, the MSIOA identified a series of potential investment programs to advance sustainable development within the basin. The scenario analysis compared the costs and benefits of cooperative and/or joint investments with unilateral development, which highlighted ways to achieve cooperative benefits to exceed the benefits of independent development approaches within and beyond the Cubango-Okavango River Basin. The study also accounted for different climate change scenarios, for example, by examining the impact of projected drought and drying trends on proposed options. The findings were presented to the three Member States through a series of national stakeholder workshops.

Investment Planning: Three regionally relevant, joint investments have been identified that balance the economic, social justice, environmental, and climate resilience priorities as reflected in the vision for the basin. These joint actions inform the Sustainable and Equitable Climate Resilient Investment Program and are structured around three target areas: (a) Climate-Resilient Livelihoods Enhancement Program, focused on addressing the underlying drivers of poverty in the basin; (b) Enabling Basin-Wide Ecotourism in the Cubango-Okavango River Basin Program, focused on extending the benefits of tourism throughout the basin; and (c) Cooperative Infrastructure Development Program, focused on joint development of the Mucundi Dam to provide multiple benefits in the basin. Implementation of the joint actions in the three proposed programs is estimated to be in excess of US\$900 million and will enable a series of innovative institutional reforms to reaffirm the cooperative agenda and would inform the establishment of a dedicated endowment fund. Financing options include global public funds, a framework for facilitating private sector investments, and a roadmap for joint development of large-scale infrastructure. These are intended to support long-term investments by shifting away from short-term project financing toward longer-term sustainable financing.

Stakeholder Engagement: To inform the MSIOA, a benefits assessment and collaborative stakeholder mapping helped better inform options and opportunities to advance the basin investment programs. These were carried out through consultative mechanisms and cooperation with a range of stakeholders within the basin and the Member States as well as development partners, including the DFID Climate Resilient Infrastructure Development Facility (CRIDF), U.S. Agency for International Development (USAID) Southern Africa Regional Environmental Program (SAREP), United Nations Development Programme (UNDP), GEF, United Nations Economic Commission for Europe (UNECE), the European Commission (EC), and Swedish International Development Cooperation Agency (SIDA). The team employed the Net Map tool, which helps stakeholders understand, visualize, discuss, and improve situations in which many different actors influence outcomes. The analysis of the numerous complex relationship pathways between various stakeholders helped inform political economy considerations to clarify links and levels of influence of various actors and institutions, identify risks, and formulate strategies for effectively advancing implementation. A scenario analysis provided the tools for exploring methods to foster more altruistic behaviors and address negative externalities to achieve cooperative benefits. The analysis assessed the costs and benefits of cooperative and joint investments compared with unilateral development within and beyond the Cubango-Okavango River Basin.

Orange-Senqu

Institutions

Effective regional and national institutions enable riparian states to manage shared risks and harness net benefits of cooperation OUTCOME AREA 1. Strengthened, adaptable, institutional structures enable robust water management amidst growing uncertainty due to climate change and competing demands for water

Options Analysis: The Lesotho Highlands-Botswana Water Transfer Study considered options to carry forward this regional investment for water security in southern Africa. Three of the riparian states in the Orange-Senqu River Basin—Botswana, Lesotho, and South Africa—established a Joint Study Management Committee to oversee the recently completed study in accordance with the Memorandum of Understanding between the three countries. This strategic analysis covered technical, institutional, and financial options to implement and operate such a transfer. The technical options have been endorsed by the ministers from the riparian states and additional studies are being formulated to advance preparations under the auspices of the Orange-Senqu River Commission (ORASECOM).

Financing Options: A range of possible institutional options for the regional development of water resources have been developed in parallel to inform options that could be used to carry forward and develop the project. These are related to possible financial mechanisms linked to the various institutional models to stimulate debate and discussion among the riparian states around options for development. These transboundary models of infrastructure development are based on a typology of six models that are based on different ownership and revenue streams. An accompanying financial model has been developed to pilot the application of the models within the context of the proposed options for the transfer of water from the Highlands of Lesotho to Botswana.

Investments

Regionally beneficial investments generate socioeconomic benefits and gender-inclusive poverty reduction OUTCOME AREA 1. Improved technical and resource mobilization capacity enhances investment quality and advances preparation of regional projects

Technical Assessment: The Lesotho Highlands-Botswana Water Transfer Study was completed this year, confirming the viability of a range of technical options for transferring water from the Highlands of Lesotho to Botswana and South Africa. The analysis considered the extent and timing of transferring water from the Highlands of Lesotho, the institutional framework under which such a project could be implemented, and possible financial mechanisms for storage and transfer of water. The reconnaissance study assessed engineering, social, environmental, economic, and financial information related to the water transfer. The results were presented at a meeting of the Joint Steering Management Committee and Senior Officials in Gaborone in October 2015 and endorsed by the relevant ministers in November 2016. The three parties resolved to proceed to the subsequent phases of the study as envisaged in the original Memorandum of Understanding. A condition precedent to the implementation of the study's next phase is a Memorandum of Agreement (MoA) by the parties, which is pending ministerial approval with signing expected by the end of December 2017. To help inform regional water security options, an assessment of the other supply options, including transfers from the Chobe-Zambezi, are providing a comparator against which to evaluate the technical, environmental and social, institutional, financial, and geo-political considerations.

A parallel World Bank-executed activity around the development of a Water Evaluation and Planning (WEAP) model for Lesotho was used to simulate major hydrologic flows, represent demographic trends and evaluate the effects of water management responses including the proposed transfer, and confirmed the availability of sufficient water under a range of future climate scenarios. By evaluating the regional trade-offs of potential water transfers in the region, the study has helped delineate options for future investments, informed a range of institutional options among the countries, and highlighted a number of financing considerations, thereby diminishing risks and improving opportunities for the best shared return on investments. Under the initial Memorandum of Understanding, Botswana was responsible for raising the financing and a Joint Study Management Committee established to oversee the study. In accordance with the agreements between the riparian states, the subsequent phases are to be further developed through ORASECOM. The next phase of this multiphased response includes financing from a range of partners, including the African Water Facility and the New Partnership for Africa's Development (NEPAD) Infrastructure Project Preparation Facility as part of the Climate Resilient Water Resources Investment Strategy and Multipurpose Project Preparation. This is aimed at promoting sustainable socioeconomic growth in the basin through climate resilient water resources development in the framework of basin-wide cooperation facilitated by ORASECOM.

SADC

Information

Shared information boosts riparian trust and confidence and forms the basis of transboundary cooperation OUTCOME AREA 2. Shared data, knowledge, and analytical tools enable timely, transparent, and regionally beneficial decision making

Groundwater Analysis: The Southern Africa Development Community (SADC) Groundwater Management Institute (GMI) supports national institutions and River Basin Organizations (RBOs) in conducting multidisciplinary analyses in selected transboundary aquifers through Transboundary Diagnosis Analysis and Strategic Action Plans. Under the guidance of the SADC-GMI, Mozambigue and Malawi have agreed to cooperate on the participatory identification of cross-border water issues requiring shared management and development of institutional mechanisms that support the achievement of equitable and sustainable resilience-strengthening water-use approaches based on conjunctive management of the Shire River and aquifer systems. This work will also document and disseminate regionally relevant principles and guidelines for promotion of transboundary conjunctive management of river/aquifer systems. The GMI has also developed, through collaboration with the United Nations' International Groundwater Assessment Center (IGRAC), an online groundwater information portal that disseminates regional groundwater information. The portal also includes а dedicated workspace and viewer for the SADC-hydrogeological map, containing detailed information for each map layer and allowing data to be used for offline processing and analyses.

Institutions

OUTCOME AREA2. Financially and institutionally sustainable regional organizations provide effective water management services to countries

Groundwater Capacity Building: Institutional arrangements for the SADC-GMI were refined and additional staff hired so that the organization can play its intended role as a regional center of excellence in groundwater management and development. Following the official project launch in September 2016, the SADC-GMI completed the hiring of all its technical and administrative staff that work out of the SADC-GMI offices established at the University of Bloemfontein, South Africa.

Among the first activities launched by the SADC-GMI is the development and implementation of a capacity-building program for groundwater data collection and management within and across the SADC Member States. IGRAC and the host institute University of the Free State Institute for Groundwater Studies (UFS-IGS) have engaged to collect data from Member States, analyze the data, and develop action plans and implement training programs for groundwater monitoring and data management for both individual Member States and the SADC regional level. An overview of the current state of data and information management is being prepared based on consultations, desk study, and field visits to Member States to undertake gap analyses and identify priority actions at the national and regional levels

Investments

Regionally beneficial investments generate socioeconomic benefits and gender-inclusive poverty reduction OUTCOME AREA 2. Coordinated investment planning and inclusive stakeholder engagement ensures equitable benefit sharing and effective risk management

Inclusive Investment: The SADC GMI has developed a Sub-Grant Manual to promote regional investments that generate socioeconomic benefits resulting in gender-inclusive poverty reduction. The GMI supports Member States in planning for appropriate and sustainable groundwater infrastructure solutions in priority areas, to include rehabilitation, operation and maintenance, and modernization or scaling up of existing infrastructure aimed at improved groundwater utilization, management, and protection. To learn from experiences, the GMI has reviewed small-scale investments made under a previous World Bank-supported regional project on drought management. The review evaluated socioeconomic benefits of these projects, with a focus on women and the poor. Proposed rehabilitation and improvements will be taken up under the new grant scheme.

Volta

Information

Shared information boosts riparian trust and confidence and forms the basis of transboundary cooperation OUTCOME AREA 1. Effective information platforms enhance responses to water-related hazards, which are more frequent and extreme in a changing climate

Stakeholder Communication: A CIWA-supported diagnostic of the communications of Volta Basin Authority (VBA) has laid the groundwork to inform development of its Communications Strategy and Plan. With support from CIWA, the VBA is developing a Communications Strategy that defines its key audience, messages, channels, and tools to be used across stakeholders. The strategy also establishes guidelines for a platform for exchanging information and harmonized data among stakeholders. This platform will help create a shared understanding of the basin's needs, resources, and trends under a changing climate. The VBA will also develop a Communications Plan to operationalize the strategy. Improved communications aim to enable enhanced dialogue among VBA stakeholders and improve water resource management and development in the basin in the longer term. Procurement of the consultant who will work with the VBA in developing its Communication Strategy and Plan is under way.

OUTCOME AREA 2. Shared data, knowledge, and analytical tools enable timely, transparent, and regionally beneficial decision making

Knowledge Sharing: The VBA is strengthening knowledge generation and dissemination in the Volta Basin. CIWA has facilitated staff participation in the Global Environment Facility (GEF) International Water Learning Exchange and Resource Network (IW-Learn) activities and helped disseminate a learning report at the World Water Week in Stockholm. CIWA has supported the VBA to help share studies and knowledge products ranging from regional planning documents to more technical studies on water resources management, climate risks, and water economic infrastructure in the region, both through an improved VBA website and through direct interactions and participation in other international workshops.

Water Charter: The VBA is developing a Water Charter through a process that ensures harmonization of regional and national legal structures. Elaboration of the Water Charter is based upon a consultative process among riparian states, across sectors, and is inclusive of all stakeholders. The consultations are informed by an in-depth diagnostic study comprising technical, legal, and institutional assessments of issues to be addressed by the Charter, including water availability and uses across the basin, constraints to water development, and regulations and legal systems in force at the local, national, and basin levels. The CIWA-GEF supported process includes drafting and collaborative evaluation and validation by stakeholders, leading to ministerial adoption of the Charter. It includes support for strategic communication to raise awareness and advocacy activities to enhance the understanding, ownership, and operationalization of the Charter's principles and shared rules. While the basin-wide legal framework provided by the Charter will define the guiding principles for improved water resources development and management in the basin and strengthen the VBA's position to carry out its mandate, the collaborative approach taken by riparian governments in preparing, drafting, and vetting the Charter will lay the foundational steps for cooperating around their shared water resources. It is envisioned that this inclusive process of developing the Water Charter will contribute to basin-wide understanding of the value of such a cooperative framework for regional water resources management, facilitating heads of state approval, and country ratification in the longer term.

The elaboration of the Water Charter was launched during a workshop held in Ouagadougou in June 2017, and the diagnostic phase is under way. The Program Implementation Unit within the VBA has attended trainings to strengthen capacity on legal aspects of shared waters and has had several exchanges with other RBOs to build understanding around transboundary water charters.

Institutions

Effective regional and national institutions enable riparian states to manage shared risks and harness net benefits of cooperation OUTCOME AREA 2. Financially and institutionally sustainable regional organizations provide effective water management services to countries

Institutional Assessment: The World Bank-executed institutional assessment of the VBA has identified institutional and capacity gaps in the VBA and outlined recommendations to strengthen the VBA institutional structure and operational capacity. The recommendations are tailored toward enabling the VBA to more effectively facilitate cooperative water resources management and development in the basin, including development and further implementation of the Water

Charter. The final report was delivered to the VBA in June 2017. Recommendations at both the strategic and operational levels include actions that will be carried out in the framework of the World Bank-supported Volta Strategic Action Programme Implementation Project (VSIP) (cofunded by CIWA and GEF) and others that VBA member countries and other partners may develop as a contribution to operationalize the VBA's second Strategic Plan 2015–2019.

Institutional Development: With joint support from CIWA and GEF, the VBA is preparing a study that will help establish national focal structures that are currently missing and will assist the organization to mobilize the political and financial support it needs to fulfil its mandate. The study will build on a 2013 study by the AFD on autonomous financing mechanisms to operationalize the much-needed improvement in national contributions from Member States to cover the VBA operating expenses. In line with the VBA's 2015–2019 Strategic Plan and recent decisions of the Council of Ministers, the study will provide operational proposals to enable the existing National Focal Points and their staff to play an immediate role in securing national financial contributions and, in the longer term, to establish national focal structures and ensure their effective functioning. The study was launched in June 2017.

Investments

Regionally beneficial investments generate socioeconomic benefits and gender-inclusive poverty reduction OUTCOME AREA 2. Coordinated investment planning and inclusive stakeholder engagement ensures equitable benefit sharing and effective risk management

Demonstration Projects: CIWA and GEF are jointly supporting the preparation of demonstrative subprojects (US\$1.1 million each allocated for preparation and implementation) on small-scale irrigation in Mali; riverbank restoration in Burkina Faso; and reforestation in Benin, Togo, Ivory Coast, and Ghana. These investments target transboundary impacts through improvements in water guality and flows and will contribute to community livelihood improvement. The subprojects build upon strategic priorities identified in the basin's Strategic Action Program (SAP) to preserve and restore critical soil and water ecosystem functions in select hot spots and optimize water usage among primary functions and among riparian states in a sustainable manner. They will include the promotion of income-generating activities directly benefiting local populations. The investments will have the potential for replication or scale-up in other parts of the basin. Preparation and implementation of these demonstrative subprojects will build on a participatory process that involves citizens in the construction, operation, and maintenance of the said investments and the socioeconomic benefits they will provide.

The feasibility studies for the six subprojects are under way. The project implementation unit and national focal points are conducting field missions in each of the subproject areas to raise awareness and inform local stakeholders, including citizens, authorities, and civil society organizations. The project implementation unit and national focal points also undertook a study tour in Benin in December 2016 to learn about implementation challenges and successes of a similar community livelihood project implemented by the neighboring NBA.

Water Master Plan: In its 2015–2019 Strategic Plan, the VBA envisions the development of a Water Master Plan to help riparian states evaluate

trade-offs, negotiate mutually beneficial arrangements for water allocation and use, and prioritize investments optimizing benefits. Should future CIWA-support become available to the VBA, progress made through current CIWA support could contribute to the preparation and implementation of such a Water Master Plan that would advance a basin approach to water resources development, including integration of issues such as climate change adaptation and environmental and social safeguards into investment planning.

Zambezi

Information

Shared information boosts riparian trust and confidence and forms the basis of transboundary cooperation OUTCOME AREA 2. Shared data, knowledge, and analytical tools enable timely, transparent, and regionally beneficial decision making

Decision Support: Phase I of the system design for Zambezi Water Information Management System (ZAMWIS), as an effective DSS for the Zambezi River Basin, is complete. This is jointly supported by Danish International Development Agency (DANIDA) and is part of the initiatives meant to operationalize the ZAMCOM agreement. The project includes Rules and Procedures for Data and Information Sharing that were adopted by the ZAMCOM Council of Ministers. These specify and clarify the roles for all stakeholders including Member States, ZAMSEC, data providers, and other relevant institutions. ZAMWIS comprises an integrated system that includes a data collection platform linked to Member States' data collection platforms and management systems, a knowledge portal and time series data, along with a platform for spatial data. The second phase, which is under way, entails the design and operationalization of the DSS, including modules for monitoring and forecasting, reservoir operations, and planning. ZAMWIS will support the Member States in improved decision making on water resources planning and operations amid increasing climate variability, decreasing resource predictability, and increasing demand from competing water users. The improved ZAMWIS is also expected to facilitate implementation of the Procedures for Notification of Planned Measures adopted by ZAMCOM. ZAMWIS is also expected to enable timely and informed water management decisions through forecasting and early warning systems, along with the longer-term planning and management of the basin's water resources through application of integrated basin models and information management systems. ZAMCOM will employ forecasting and analysis from ZAMWIS, informed by national data and development plans, in facilitating the basin-wide strategic plan for the Member States to cooperatively manage and develop shared water resources.

Institutions

Effective regional and national institutions enable riparian states to manage shared risks and harness net benefits of cooperation OUTCOME AREA 1. Strengthened, adaptable, institutional structures enable robust water management amidst growing uncertainty due to climate change and competing demands for water

Legal Studies: Legal equivalence studies meant to inform the process of the harmonization of laws associated with the Zambezi Watercourse States as required under the ZAMCOM agreement are under way. A compendium of water-related policy and legal instruments from the Member States has been compiled. Gap analyses, including a comparative assessment of the ZAMCOM agreement, have been carried out to assess the degree of equivalence and identify any potential areas of conflict. Final outputs will be an Options Paper outlining key options and modalities on how to improve harmonization and equivalence of the national legal frameworks related to water resources in the basin. The legal equivalence studies will also inform the strategic policy direction of the Zambezi River Basin Strategic Plan (ZAMSTRAT) within the context of benefit sharing, as well as equitable and reasonable utilization. These studies will inform the form and character of future institutional structures associated with infrastructure development across the basin and the SADC region.

Strategic Planning: Preparation of ZAMSTRAT is under way after approval of the Inception Report by the Joint Steering Committee. The Strategic Plan is envisaged under the agreement as a master development plan comprising a general planning tool and process for the identification, categorization, and prioritization of projects and programs for the efficient management and sustainable development of the Zambezi Watercourse, as well as policy and planning tools to promote, support, and coordinate the efficient management, sustainable development, and reasonable and equitable utilization of the basin's water resources across both sectors and national borders. An Inception Report has been reviewed and approved by the Joint Steering Committee. A diagnostic assessment phase is now under way and key outputs will include the Situation Analysis and Strategic Direction Reports. The activity is being carried out through a consultative process that primarily relies on national and basin-wide committees established under ZAMCOM to facilitate communication and consultations. Other consultative arrangements include workshops with government officials and other representatives with legitimate interests in each of the Member States.

Background Analysis: Development of ZAMSTRAT is underpinned by improved knowledge and advanced analytics, as well as facilitating inter-country dialogue, which deepens the shared understanding of issues across the Zambezi River Basin and reveals options for cooperative water resources management. This work includes a set of studies on key issues pertinent to the basin through the World Bank-executed Zambezi Basin Support Program. The Climate Change Assessment of the Energy-Water Nexus in the Zambezi River Basin evaluates trade-offs between irrigation and hydropower in the basin under projected climatic conditions. This is being complemented through a series of climate risk assessments, specifically for the Batoka Gorge Hydro-Electric Scheme and natural assets in the basin. These build on the earlier foundations developed through the MSIOA and are among a series of tools that the riparian states can use to better understand the impacts associated with increased hydro-variability, inform options for investment planning, and guide potential infrastructure development in the sector within the agreed framework provided by the Strategic Plan.

OUTCOME AREA 2. Financially and institutionally sustainable regional organizations provide effective water management services to countries

Financial Sustainability: The Permanent ZAMCOM Secretariat, hosted by Zimbabwe, was established in 2014 and is making progress toward

financial sustainability. Following the 2016 endorsement by the Council of Ministers of a shared definition and cost of its minimum functionality, Member States have increased contributions from US\$25,000 in 2016 to US\$60,000 in 2017 and committed to increase these by US\$10,000 each year to US\$100,000, the agreed target. There are still challenges in ensuring financial sustainability and governments will need to honor the commitments for ZAMCOM to develop into a sustainable institution and allow for a reserve fund to allow for contingencies. The sustainability of ZAMCOM is still a work in progress but is moving in the right direction. Central to long-term financial sustainability is ensuring that ZAMCOM continues to build on the momentum toward institutional sustainability by ensuring that it realizes value for money for the Member States and delivers on the key water resource management and development issues among the Member States.

Communication: A Communication Strategy for ZAMCOM, which was informed by a mapping of its stakeholders and approved by the Council of Ministers, is now guiding development of targeted communication products around the principles of sustainable development and utilization, harm prevention, inter-generational equity, and cooperation, among others. The products inform part of a public information program that creates awareness at the regional and national levels as an essential basis for cooperation. ZAMCOM has advanced relationships with universities and research organizations in the basin, with the goal of institutionalizing academic partnerships to enhance the basin's knowledge base and develop long-term water resources management capacity in the basin. To facilitate this, stakeholder coordination committees have been established at both the regional and national levels. These coordination committees are now conducting dialogue with possible partner organizations based on the alignment of objectives with ZAMCOM.

Investments

Regionally beneficial investments generate socioeconomic benefits and gender-inclusive poverty reduction OUTCOME AREA 1. Improved technical and resource mobilization capacity enhances investment quality and advances preparation of regional projects

Impact Assessment: The engineering, environmental, and social studies for the Batoka Gorge HES are nearing completion. The geotechnical investigations have been completed, along with the draft Environmental and Social Impact Assessment Report (ESIA) and the draft Environmental and Social Management Plan. The panel of experts financed under the Kariba Dam Rehabilitation Project are providing support through the review and guidance of the reports. An additional 11 months has been requested to the current closing date, along with additional work, for the engineering and the ESIA to ensure a robust assessment of the technical elements and to allow for appropriate consultations with a full range of stakeholders.

Resource Mobilization: With CIWA support, the Zambezi River Authority (ZRA) and the countries are actively leading a process to mobilize resources for the Batoka Gorge HES, with the goal of developing the scheme in the shortest possible time to meet the power shortages in the Southern African Power Pool (SAPP). The Council of Ministers has endorsed a three-in-one development model involving (a) public financing for the dam, (b) a special purpose vehicle for the North Bank

Power Station, and (c) a special purpose vehicle for the South Bank Power Station. The ZRA, with the support of the transaction advisers, has participated in a series of consultations to assess the appetite for financing the Batoka Gorge investment. In March 2017, the governments of Zambia and Zimbabwe jointly hosted an investors conference, with facilitation support by the ZRA, where they presented the technical and financial structuring options for the project to potential investors from development institutions and the private sector. The AfDB has subsequently been appointed by the two governments as the Lead Financial Arranger and will work closely with the ZRA and the countries to further develop financial structuring for the planned investment. The transaction advisers under the CIWA financing will complete the Solicitation Strategy, Preliminary Debt Financing Strategy, and Preliminary Information Memorandum while the AfDB will be responsible for the solicitation and mobilization of financing for the dam on behalf of the two countries and the special purpose vehicles in Zambia and Zimbabwe. The World Bank's technical support and the AfDB's financial guidance can be leveraged to grow private sector confidence for financing of the two power stations.

Investment Coordination: Concomitant analytical studies supported by CIWA have leveraged additional support for improved implementation of investments in the Zambezi Basin. For example, additional grant financing from Sweden improves coordination among dam operators in the Zambezi Basin, ZAMCOM, national power utilities, and the Southern Africa Power Pool, primarily by cultivating understanding and application of the Hydropower Sustainability Assessment Protocol as a tool for sustainably developing hydropower in the Zambezi Basin. This will help ensure that the technical studies are completed in a robust manner, to ensure that the countries and potential investors have a technically sound and robust analysis on which to base future design and financing decisions. Under this parallel work supported by the World Bank, training, capacity building, and platform for dialogue are provided to operators in the region to strengthen their understanding of and ability to sustainably design and operate hydropower schemes. As part of this work, the ZRA is completing a self-assessment of the sustainability of the Batoka Gorge scheme and is planning to participate in a workshop on the self-assessment later in 2017.

This grant financing is also providing support to the development of a dam break analysis for the Zambezi River Basin. This has been contracted by the ZRA as part of the Kariba Dam Rehabilitation Project but is being implemented jointly by the dam operators along with the Zambezi Watercourse Commission. This builds on the detailed topographic LiDAR data acquired through a range of parallel activities, including a U.K. Department for International Development (DFID) contribution to the World Bank-financed National Water Resources Program in Mozambique, the IDA-financed Water Resources Development Program in Zambia, and additional surveys financed under the Zambezi River Basin Program.

A Macroeconomic Assessment of Public Investment Options (MAPIO) is also being carried out to estimate the impact of the proposed Batoka Gorge HES investment program on key macroeconomic variables in Zambia and Zimbabwe. The MAPIO model assesses the impact of the program in two ways: (a) the increase in demand that occurs as a result of the program's implementation and (b) the additional impact on the economy's output as a result of the program's completion.

Climate Resilience: Innovative approaches to decision making under uncertainty will support the ZRA and the countries as they consider how to design and operate the Batoka Gorge HES as the climate changes. Resilience of the Batoka Gorge HES investment to climate change and other development-related factors is an important consideration during preparation of the bankable design. Additional study and support is needed in relation to this preparation, particularly related to the potential impacts of climate change on the flow in the Zambezi River and planned upstream abstractions. A new CIWA-supported analysis initiated this year will provide a detailed assessment of the effects of climate change on the daily expected inflow for the HES and the effects that change may have on robustness of the selected design and operational parameters. It will be necessary to set those changes in runoff in the context of other performance risks such as upstream land-use changes and water abstractions, energy price fluctuations, and development scenarios. Extreme flood and drought must also be considered as their likelihood increases as the climate changes. The analysis will complement CIWA support provided to both the ZRA and ZAMCOM as it will also investigate the role of the Barotse Wetlands in attenuating the hydrological variability in the Zambezi basin and will provide an initial examination of hydrological boundary conditions or trigger points for financial products that could be used to offset hydrological risk.

OUTCOME AREA 2. Coordinated investment planning and inclusive stakeholder engagement ensures equitable benefit sharing and effective risk management

Design Coordination:Through CIWA's support, the ZRA is facilitating coordination between engineering design and the ESIA teams to conclude the two studies in a harmonized manner. In this way, trade-offs can be considered under different design options to jointly achieve a 'shared design plan' that presents an agreed design solution balancing engineering, social, economic, and environmental aspects.

Institutional Arrangements: CIWA-supported Technical Assistance and Transaction Advisory Services for Batoka Gorge HES have helped the ZRA evaluate options for structuring ownership and finance of the Batoka Gorge infrastructure and plan for required resource mobilization. This builds on earlier World Bank-executed analytical work to explore a range of options for institutional evolution of the ZRA and alignment with the changing nature of institutions in the basin with the establishment of the Zambezi Watercourse Commission. In close collaboration with the ZRA and the two governments, transaction advisers facilitated the evaluation of options for the dam and two power plants based on finance-ability, risk management, cost over lifetime, innovation capacity, economies of scale, and competitive tension. Future work on financial structuring will be led by the AfDB, appointed by the two governments as the Lead Financial Arrangers. Environmental Stewardship: CIWA-supported work in the Zambezi Basin is providing the foundations for future developments. This includes a US\$10 million proposal to GEF, to be administered by the World Bank and executed by Zambezi Watercourse Commission (ZAMCOM) and the World Wildlife Fund (WWF), for an environmental stewardship program. This program would complement parallel investments to bring together government, academia, and the private sector to conduct a series of analytical and capacity-building exercises that aim to assess needs in unregulated reaches of the basin and comprehensively assess environmental flows across the basin. The proposal has been endorsed by the Member States through the ZAMCOM Technical Committee, and the Secretariat is continuing to engage the GEF focal points to secure endorsement. In addition, a series of large-scale infrastructure investment preparations and basin-wide disaster risk management and emergency response mechanisms are being explored as part of the broader engagement for future phases.