



The IUCN-IGAD BRIDGE Project: A Situation Analysis

Final Report



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June 18, 2015



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Disclaimer

The views expressed in this report are those of the two independent regional consultants and do not necessarily reflect the views of IUCN or IGAD.

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Acronyms and abbreviations

AfDB	African Development Bank
AMCOW	African Ministerial Council on Water
AMIS	Agricultural Market Information System
amsl	Above mean sea level
AWF	African Water Facility
BRIDGE	Building River Dialogue and Governance
CETRAD	Centre for Training and Integrated Research in ASAL Development (CETRAD)
CFA	Cooperative Framework Agreement
COMESA	Common Market for Eastern and Southern Africa
CSO	Civil Society Organisation
EAC	East African Community
ENSAP	Eastern Nile Subsidiary Action Program
ENTRO	Eastern Nile Technical Regional Office
EU	European Union
FAO	Food and Agricultural Organisation of the United Nations
GEF	Global Environmental Facility
GIEWS	Global Information and Early Warning System
GIZ	<i>Deutsche Gesellschaft für Internationale Zusammenarbeit, GmbH</i> (German Society for International Cooperation, Ltd.)
GLiPHA	Global Livestock Production and Health Atlas
GWP	Global Water Partnership
HIV/AIDS	Human Immunodeficiency Virus Acquired Immunodeficiency Syndrome
ICPAC	IGAD Climate Prediction and Applications Centre
ICPALD	IGAD Centre for Pastoral Areas and Livestock Development
ICRC	International Committee of the Red Cross and Red Crescent
IDA/GEF	International Development Association/Global Environment Facility
IGAD	Intergovernmental Authority on Development
IGADD	Intergovernmental Authority on Drought and Development
IGAD-HYCOS	IGAD Hydrological Cycle Observing System
INWRMP	Inland Water Resources Management Programme
IPCC	Intergovernmental Panel on Climate Change
ISDR	International Strategy for Disaster Reduction (UNISDR)
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resources Management
LVBC	Lake Victoria Basin Commission
LVEMP	Lake Victoria Environment Management Program

LVFO	Lake Victoria Fisheries Organization
MW	Megawatts
NBI	Nile Basin Initiative
NELSAP	Nile Equatorial Lakes Subsidiary Action Programme
NELSAP-CU	Nile Equatorial Lakes Subsidiary Action Programme Coordination Unit
NGO	Non-Governmental Organisation
Nile-RAK	Nile River Awareness Kit
Nile-TAC	Nile Technical Advisory Committee
NORAD	Norwegian Agency for Development Co-Operation
RBO	River Basin Organisation
REC	Regional Economic Community
RLBOS	River and Lake Basin Organisations
SADC	Southern African Development Community
SAP	Subsidiary Action Programme
SDC	Swiss Agency for Development Cooperation
SIDA	Swedish International Development Cooperation Agency
SMM	Sio-Malaba-Malakisi
STAP	Short Term Action Plan
SVP	Shared Vision Programme
SWALIM	Somalia Water and Land Information Management
TAC	Technical Advisory Committee
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change (UNFCCC)
UNICEF	United National Children's Fund
UN-WATER	An inter-agency entity of the United Nations that coordinates UN agencies working on all aspects of freshwater and sanitation, and support states in their water-related efforts to reach the Millennium Development Goals.
USAID	United States Agency for International Development
WASH	Water, Sanitation and Hygiene
WB	World Bank
WMO	World Meteorological Organisation
WRM	Water Resources Management
WRMA	Water Resources Management Authority

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1. Introduction

1.1 The IGAD Region

1.1.1 Features of the Greater Horn of Africa

The Intergovernmental Authority on Development (IGAD) is one of eight Regional Economic Communities (RECs) in Africa established to foster regional co-operation and promote peace and stability so as to achieve sustainable economic development. IGAD currently comprises of eight members, namely Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda. Four of the IGAD countries – Eritrea, Ethiopia, Djibouti and Somalia – occupy a part of the African continent known as the **Horn of Africa**. Of the remaining four member countries, two are from the Nile Valley (South Sudan and Sudan) and two from the African Great Lakes Region (Kenya, Uganda). The area covered by the Horn countries and their immediate neighbours from the Nile Valley and African Great Lakes Region is known as the **Greater Horn of Africa**. This region has a land area of 5.2 million km² and a population of about 227 million people.

The IGAD region is a geographical area plagued by chronic water scarcity and recurring drought. Over 60% of the region is covered by arid and semi-arid drylands in which water availability is a key factor limiting development. These lands receive between 100 - 300 mm and 300 - 600 mm of rainfall per annum respectively (FAO, 1989), and are among the most vulnerable areas to climate variability and drought in Africa. Almost all major development problems of the region are either due to water shortage or have a potential to further aggravate the water scarcity problem. These include rapid population growth, recurrent droughts, low crop production, disastrous floods, deterioration of basic natural resources, and inappropriate land use and land tenure systems.

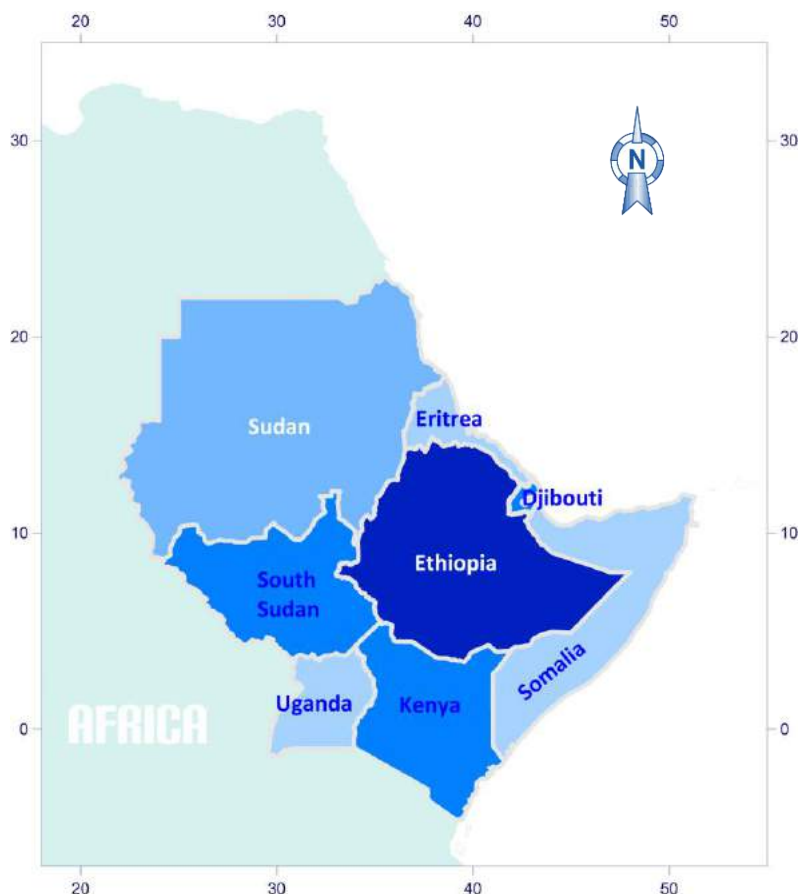


Figure 1: Map showing the IGAD Region¹

Given the above characteristics, it is not surprising that the IGAD region includes some of the world’s poorest countries. The per capita income of the region was estimated at US dollars 754 in 2011, which was far below the per capita income for sub-Saharan Africa in that same year, estimated at US dollars 1,446 (Abdi and Seid, 2013).

In recognition of the great bottleneck to development posed by water, there has been a growing effort in the region to find a lasting solution to the water problem. One outcome of such an effort is the development and implementation of IGAD’s Inland Water Resources Management (INWRM) Program whose objectives include the strengthening of national and regional capacities for water resources management, facilitation of regional dialogue, and improvement of national and regional frameworks for water resources management.

¹ Map has been prepared under this study.

1.2 IUCN-IGAD BRIDGE

1.2.1 The IUCN BRIDGE Programme

The International Union for Conservation of Nature (IUCN) has since 2011 been implementing the BRIDGE (Building River Dialogue and Governance) Programme that aims to strengthen water governance capacities in transboundary river basins across the world through learning, demonstration, leadership and consensus-building. The BRIDGE Programme is funded by the Swiss Agency for Development Cooperation (SDC) through its Water Diplomacy Programme.

1.2.2 Water Governance

Water governance is defined as the “*range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society*” (GWP, 2002). Water governance may also be viewed as “*the political, economic and social processes and institutions by which governments, civil society and the private sector make decisions about how best to use, develop and manage water resources*” (UNDP, 2004). These definitions marry the broader concepts of governance with the sector-specific concepts of integrated water resources management and service delivery (Lautze *et al.*, 2014).

1.2.2 Building water governance capacity

IUCN views ‘*water governance capacity*’ as a measure of the ability of society to manage water resources effectively through the development and application of transparent, coherent and cost-effective policies, laws and institutional systems. Interventions to build water governance capacity under the BRIDGE programme are in five key areas as summarised in the textbox below.

Box 1: The BRIDGE Programme Implementation Strategies²

- **Demonstration** - demonstration of tangible benefits at local, national and transboundary levels to support confidence and trust building for transboundary water cooperation
- **Learning** - broadening knowledge and understanding through training, capacity building and greater data sharing and information exchange
- **Dialogue** - building consensus, fostering social learning and enhancing stakeholder participation through establishing and operating multi-stakeholder dialogue platforms
- **Leadership** - supporting confidence and trust building, empowering champions of transboundary cooperation and facilitating conclusion and implementation of agreements amongst riparian states
- **Advice and support** - providing advice and technical support to support reform of national policy, legal and institutional frameworks.

² Modified from BRIDGE brochure downloaded from: http://cmsdata.iucn.org/downloads/bridge_brochure.pdf on November 22, 2014.

1.2.3 BRIDGE Projects

There are two batches of BRIDGE Projects under implementation in different parts of the world as summarised below.

Table 1: First Batch Projects (From 2011)

Region	River/Lake Basin	Participating Countries
South America	Zaramilla River	Ecuador, Peru
	Catamaya-Chira River	Ecuador, Peru
	Lake Titicaca	Bolivia, Peru
Mesoamerica	Coatan River	Guatemala, Mexico
	Goascoran River	El Salvador, Honduras
	Sixaola River	Costa Rica, Panama
Mekong (Southeast Asia)	Sekong River	Cambodia, Lao PDR, Vietnam
	Sre Pok River	Cambodia, Vietnam
	Sesan River	Cambodia, Vietnam

Table 2: Second Batch Projects (from 2014)

Region	River/Lake Basin	Participating Countries
Central and West Africa	Mano River	Liberia, Sierra Leone
	Lake Chad	Cameroon, Chad, Niger, Nigeria
East and Southern Africa	Pungwe River	Mozambique, Zimbabwe
	Lake Malawi/Niassa/Nyasa	Malawi, Mozambique, Tanzania
Greater Horn of Africa	Regional support and pilot basin to be identified	Eight (8) IGAD Member States Specific basin level countries to be identified

1.2.4 The Proposed BRIDGE Project in the Greater Horn of Africa

IUCN, through its Eastern and Southern Africa Regional Office (IUCN-ESARO), intends to implement a component of the BRIDGE Programme in the Greater Horn of Africa Region in close collaboration with IGAD. IUCN has initiated the process by launching a study to assess the prevailing situation in the Greater Horn of Africa Region and identify opportunities and challenges that will inform the design of the IGAD BRIDGE Project.

This Report is the first deliverable of the above study and has been prepared to facilitate preliminary consultations between IUCN and IGAD on the proposed IGAD BRIDGE Project.

1.3 Scope and Objectives

This report was prepared through a consultancy study commissioned by IUCN as part of the preparatory activities for formulation of the IGAD BRIDGE Project. The purpose of the Situation Analysis study is to evaluate the prevailing conditions in the IGAD region with respect to water governance with a view to drawing lessons to inform the design of the IGAD BRIDGE Project.

The study was carried out through desk work supplemented by interviews and groups discussions and was executed in close consultation with staff of IUCN-ESARO and IGAD. Specific tasks implemented under the study were the following:

1. Reviewing the existing institutional mechanisms for coordination of transboundary water management in the IGAD region;
2. Reviewing the existing information exchange protocols and mechanisms within the IGAD region;
3. Analysing and providing an overview of transboundary basins in the IGAD region;
4. Developing and applying a set of criteria to select the pilot basin for the IGAD BRIDGE project;
5. Reviewing and preparing a summary of on-going programmes and projects in the IGAD region that are relevant to BRIDGE;
6. Carry out stakeholder analysis and identification of stakeholder capacity building needs;
7. Providing a synthesis of opportunities, threats and challenges in the IGAD region with respect to water governance and;
8. Making recommendations on potential entry points for BRIDGE in the IGAD Region.

A separate chapter has been prepared for each of the key tasks listed above.

2. Regional coordination mechanisms

2.1 Existing coordination mechanisms within IGAD

2.1.1 Overview

Compared to other RECs in Africa, IGAD is relatively young with respect to coordinating regional water resources activities. Among other things, IGAD does not have a specialised unit to manage water affairs. Within IGAD, the function of coordinating water related initiatives falls under the Directorate of Agriculture and Environment. Despite being relatively young in the coordination of water activities, many water initiatives have been launched in IGAD, and the Authority's water portfolio is rapidly changing. The noteworthy initiatives and coordination mechanisms are the following:

1. IGAD Inland Water Resources Management Programme (INWRM Programme);
2. IGAD Hydrological Cycle Observation System Project (IGAD-HYCOS);
3. IGAD Internationally Shared Aquifer Resource Management Project (IGAD-ISARM);
4. IGAD Drought Disaster and Sustainability Initiative (IDDRSI);
5. IGAD Climate Prediction and Application Centre (ICPAC);
6. IGAD Centre For Pastoral Areas And Livestock Development and;
7. Mapping, Assessment and Management of Transboundary Water Resources Project (MAMTWR Project).

These initiatives are briefly discussed below.

2.1.2 IGAD INWRM Programme

The Inland Water Resources Management Program is a response of the IGAD Member States, with the support of the international community, to the region's chronic water related calamities. The Programme is being implemented with a funding of 14.7 million Euros from the European Union

and focuses on strengthening and consolidating the institutional basis and operations of IGAD in the area of water.

The Programme's overarching objective is to promote peace, security and stability through regional integration and improved governance of the water sector. Specific objectives are to strengthen national and regional capacities in water resources management, foster regional dialogue and deepen regional cooperation so as to achieve sustainable management of the surface and groundwater resources of the region.

Key achievements of the INWRM Programme are the following:

1. *Water Dialogue Platform* – The establishment and institutionalization of regional cooperation through the development and operation of an IGAD Water Dialogue Forum (WDF) is one of the key result areas of the INWRM Programme. The first Water Dialogue Forum was held from 8-10th December 2014 in Nairobi, Kenya under the theme “*Water for Regional Cooperation*” and was attended by close to 500 delegates from the IGAD region. The WDF is expected to contribute to the process of development of a shared regional vision for water management and to the prevention, diffusion, mitigation and resolution of water-related conflicts. It is also expected to facilitate dialogue on technical water-related issues. A WDF Secretariat has been set up within IGAD to manage dialogue events. Initially hosted under the INWRM programme, the Secretariat is expected to be mainstreamed in the IGAD structure on closure of the Programme.
2. *Regional networking/Exchange of best practices* – the Programme organised regional workshops for water experts to identify relevant regional institutions and solicit best practices in different aspects of integrated water resources management.
3. *Improving national policy and legal frameworks* – The Programme carried out an analysis of existing water-related policy and legal frameworks, identified gaps and weaknesses and made recommendations for strengthening the frameworks.
4. *Regional Water Resources Policy* – based on a synthesis of national policy frameworks, the INWRM programme prepared a Regional Water Resources Policy. The policy addresses ten policy areas, namely: (a) regional cooperation in water resources management; (b) water for socio-economic development and poverty eradication; (c) water and water-related environmental resources protection and preservation; (d) security from water-related disasters; (e) water resources information management; (f) water and climate change; (g) approaches for water resources planning, development and management; (h) institutional framework for national, transboundary

- and regional water resources management; (i) stakeholder participation, gender mainstreaming and capacity building and; (j) financing water resources development and management. The Regional Water Resources Policy was endorsed by the IGAD Ministers of Water in their first meeting that took place on 21st January 2015 in Addis Ababa. The Water Ministers urged the IGAD Secretariat to set up a unit to follow up the implementation of the policy including finalisation of the Water Resources Protocol and continuing the general coordination of water issues.
5. *Regional Water Resources Protocol* – a draft IGAD Regional Water Resources Protocol has been prepared under the INWRM Programme. The Protocol incorporates the provisions of customary international water law and draws lessons from existing international and regional treaties such as the UN Watercourses Convention (1997), the Cooperative Framework Agreement on the Nile (2010), and the SADC Revised Protocol on Shared Watercourses (2000). The Protocol is still under development but when completed is expected to include provisions such as the obligation to use shared surface and ground water resources in a reasonable and equitable manner; obligation not to cause significant harm to co-basin states; the obligation to cooperate, share and exchange data and information on the state of the water and environmental resources of the basin; prior notification of co-basin states concerning planned measures; the regular exchange of data and information on the state of the water and environmental resources of the basin; the establishment and operation of water quality and quantity monitoring networks; the harmonisation of methods for data collection, processing and reporting; the implementation of collaborative studies and research; and fostering public participation in all activities related to shared waters. The Protocol is unique from other regional legislation in providing for cooperation on shared surface as well as ground water resources.
 6. *Draft policy and protocol on data sharing* – A draft regional policy on collection, processing, sharing and exchange of water related data and information has been prepared under the INWRM Programme. The policy contains seven policy statements relating to: (a) strengthening of regional policy and legal framework; (b) strengthening of regional institutional framework for data management; (c) national level data collection and processing; (d) national level sharing and exchange of water related data and information; (e) sharing and exchange of water related data and information at regional level amongst the Member States; (f) public access to water related data and information; and (g) preparation and dissemination of water related data and information and knowledge

products. A draft protocol on sharing and exchange of water related data and information has also been prepared to support the implementation of the above policy. The Protocol contains 20 articles that focus on setting up and operationalising a regional data exchange system.

7. *Regional water resources monitoring and information systems* – the major achievements under this component include the strengthening of Member States' capacity in water resources monitoring, and establishment of a regional water resources monitoring network under the IGAD-HYCOS Project. These achievements are expounded upon under sections 2.1.3 and 3.1.3 below.

2.1.3 IGAD-HYCOS Project

The IGAD-HYCOS Project, which is a component of the INWRM program, is financed to the tune of Euros 6.627 million by the European Union with counterpart funding from the Member States. The IGAD-HYCOS program covers the eight Member States and two other East African countries (Rwanda and Burundi). Implementation (of the present project phase) commenced in 2011 and is expected to end in 2015. The objective of the IGAD-HYCOS Project is to contribute to sustainable and integrated water resources management and development in the IGAD region through the enhancement of regional cooperation in the collection, analysis, dissemination and exchange of hydrological and hydrometeorological data and information. The World Meteorological Organisation (WMO) is the implementing agency for the Project.

Activities under the Project include the design of a regional water resources monitoring network comprising of hydrological, meteorological and water quality monitoring stations (the system was designed nationally and aggregated at regional level); procurement and installation of equipment at monitoring stations (including Data Collection Platforms) and; establishment of a regional database with national nodes to facilitate regional data sharing.

The National Hydrological and Meteorological Services were the main beneficiaries of the Project and participated directly in the design, installation and rehabilitation of the monitoring networks and design and operation of the regional database. A project team supervised by WMO was recruited from the region to implement the project. For the future, it is expected that a water unit will be established within the IGAD Secretariat to, among other things, continue the coordination role of the regional monitoring network and data exchange system.

2.1.4 IGAD Integrated Shared Aquifer Resource Management Project (IGAD-ISARM)

There are no known regional initiatives to address the joint management and development of transboundary aquifer systems in the Greater Horn of Africa. The IGAD Internationally Shared Aquifer Resources Management (IGAD-ISARM) Project is a response to the above situation, and is part of a worldwide initiative led by UNESCO and the International Association of Hydrogeologists (IAH), aimed at improving the understanding of scientific, socio-economic, legal, institutional and environmental issues related to the management of transboundary aquifers. The regional ISARM are designed to delineate and analyse transboundary aquifer systems and to encourage riparian states to work cooperatively toward mutually beneficial and sustainable aquifer development studies. These studies aim to evaluate the potential and vulnerability of groundwater and assess how they might be exploited to meet the region's socio economic needs. The IGAD-ISARM was launched in 2010 with the establishment of the IGAD ISARM Policy and Science Forum. The forum convenes regular meetings of groundwater experts and policy makers from the IGAD region to dialogue on the management of shared aquifers in the region.

2.1.5 IGAD Drought Disaster and Sustainability Initiative (IDDRSI)

The idea of an IGAD initiative on drought disaster and sustainability was mooted at a summit of the IGAD and EAC Heads of State and Government that was held in 2011 in Nairobi, Kenya. The need for a new approach arose from growing concern in the region on the severity and frequency of drought disaster emergencies and failure of past drought response approaches. Under the Initiative, the Members States of IGAD and EAC committed to do things differently: to employ preventive (rather than reactive or emergency); regional (rather than individual member state); twin-track (relief and development rather than humanitarian operations alone) and; holistic and multi-sectoral (rather than silos) approaches.

Following the Nairobi Summit, the IGAD Secretariat established an IGAD Regional Drought Resilience and Sustainability Platform as the mechanism for coordinating the Initiative's implementation. The Platform brings together partners and stakeholders including Member States, the IGAD Secretariat, Development Partners and implementing partners (who include UN agencies, Civil Society and specialized research and training institutions in the region). The organs of the Platform are a General Assembly comprising of participating stakeholders, a Platform Steering Committee and a Platform Coordinating Unit. The Platform Coordination Unit is hosted by the IGAD Secretariat. Guidelines have been prepared under the Initiative for improving coordination mechanisms at national and regional levels. An

IGAD Drought Disaster Resilience and Sustainability Strategy has also been prepared to guide the implementation of the Initiative.

IGAD has received a pledge of US \$ 300 million from the African Development Bank to support IDDRSI activities while several Development Partners (notably BMZ/GIZ; USAID; JFA; UNDP; FAO and AfDB) have provided support towards the building of the capacity of the IGAD Secretariat to among other things, coordinate the implementation of the IDDRSI Initiative.

2.1.6 IGAD Centre for Pastoral Areas and Livestock Development (ICPALD)

Recognizing the great social and economic importance of the livestock sector in the IGAD region, the IGAD Centre for Pastoral Areas and Livestock Development (ICPALD) was established by the IGAD Council of Ministers in July 2012 to serve as a regional policy reference institution for livestock and drylands development.

The overall objective of ICPALD is to promote and facilitate sustainable and equitable dryland and livestock development. It works to complement efforts of the IGAD Member States in sustainable employment and wealth creation in drylands of the IGAD region. The specific objectives of the Centre include to:

- (a) Promote and facilitate the development and harmonization of policies and development initiatives in dryland and livestock development in member states; develop and promote an IGAD regional policy framework on livestock and drylands with a focus on conflict resolution, gender and environment sensitive responses and advocacy for people-centred sustainable development
- (b) Facilitate appropriate research and technology development, and the domestication, adoption and transfer of appropriate technology in drylands and livestock development;
- (c) Develop networks linking institutions in the IGAD Member States with regional and international institutions concerned with drylands and livestock development; serving as an interface between research, extension, policymaking and policy execution
- (d) Establish linkages and synergies with other specialized institutions of IGAD like ICPAC, ISSP and CEWARN with the aim of promoting drylands and livestock development.
- (e) Facilitate demand driven capacity building of drylands and livestock development institutions in the Member States.

Under ICPALD, IGAD is preparing to implement a project aimed at managing disasters resulting from twice-yearly flooding of the Daua River,

and harmonizing water resources developments on the river planned by the three riparian countries (Ethiopia, Kenya and Somalia). The Daua, which is one of the tributaries of the Juba River, originates in mountains near Aleta Wendo in southeast Ethiopia. From there, it flows southeastwards to meet with the Ganale Dorya River on the Ethiopia-Somalia border thereby forming the Juba River. From the confluence, the Juba River continues to flow in a southeast direction and eventually empties in the Indian Ocean.

The Daua experiences torrential flooding at least twice in a year that causes immense loss of lives and damage to property. Paradoxically, large parts of the basin are semi-arid and arid drylands that are characterized by recurrent drought, crop failures, flood disaster and long-standing inter-clan conflicts over natural resources (mainly water and pasture). The river is presently underutilized but there are plans to utilize its waters by all three riparian countries. These plans, if left uncoordinated, are likely to create water demands that are far in excess of the available water resources and foment tensions and conflict amongst the communities and states.

The interventions of the project are focused in three areas (a) rationalizing and harmonizing investment plants in the basin; (b) development of strategies for flood, drought and conflict management and; (c) adoption of disaster risk management approaches by riparian communities. The last output area will include the development of strategies and promotion of investments that will address flood, drought and conflict disasters while strengthening the resilience (food and economic security) of vulnerable smallholder farmers, agro-pastoralists and pastoralists in the trans-boundary areas of Mandera County (Kenya), Gedo region (Somalia) and Dollo Odo and Dollo Bay areas (Ethiopia) in line with the IGAD Drought Disaster and Sustainability Initiative (IDDRSI) programme.

2.1.7 The IGAD Climate Prediction and Application Centre (ICPAC)

The IGAD Climate Prediction and Application Centre (ICPAC) is a specialized institution providing climate information, prediction and early warning for applications in support of environmental management. The centre is responsible for eleven countries: the eight IGAD Member States as well as Burundi, Rwanda and Tanzania.

The Centre is currently implementing a program titled “The African Monitoring of the Environment for Sustainable Development (AMESD)” funded by the European Development Fund. AMESD activities in the Horn of Africa are focused on supporting sustainable land management through the assessment and monitoring of the degradation of land and natural habitats of the region.

Major ICPAC achievements include the following:

1. Timely production and dissemination of climate early warning information; successful networking with users of climate information, climate scientists, as well as gender and media groups in dissemination of weather information and products.
2. Enhanced institutional capacity of the Centre through augmentation of human resource capacity and equipment, including computing and Geographical Information Systems (GIS) for regional climate modelling; prediction and applications.
3. Improvement of knowledgebase and development of new empirical models for seasonal forecasts; establishment of a continuously updated data bank for development of baseline statistics and hazards maps.
4. Improved networking and collaboration between ICPAC and advanced regional diagnostics centres.
5. Enhanced collaborations with sector specific users in the IGAD Region through pilot application projects for development of new application tools for agriculture and food security, livestock, health, water resources, conflict early warning, hydropower risk management, environment management, etc.
6. Enhancement of the capacity of climate scientists and climate information users within the IGAD Region on use of climate and weather information and products
7. Improved research collaboration including hosting of PhD and MSc students that have led to new tools and applications.
8. Several recognitions and awards at regional and global levels, including contribution to UNFCCC, UNCCD, ISDR and IPCC among others. The centre contributed to the IPCC 2007 assessment that won the 2007 Nobel Prize.

2.1.8 Mapping, Assessment and Management of Transboundary Water

Resources (MAMTWR) Project

The Mapping, Assessment and Management of Transboundary Water Resources (MAMTWR) Project was developed and implemented by the Sahara and Sahel Observatory (OSS) at the request of IGAD. The Project, which was implemented between 2007 and 2011, was funded by the African Water Facility to a tune of € 1.8 million. The purpose of the project was to provide an overview of prevailing water resources situation in the region, and inform the process of development of a regional water resources management strategy.

The primary focus areas of the study were six, namely:

- (a) Assessment of the physical potential and development needs of transboundary water resources in the region with an emphasis on resource potential assessments at transboundary river basins scale.
- (b) Assessment of water demand for major water use sectors including domestic water supply, agriculture, livestock, recreation, industry and environment/ecology;
- (c) Identification of leading environmental issues of national, regional and global concern such as drought and flooding, climate variability, land degradation and biodiversity, water pollution and quality and design of coping strategies and action plans;
- (d) Production of thematic maps (e.g. on topography, geology, geomorphology, climate, water quality, surface and ground water, soil, land use/land cover and risk zones) and preparation of a regional knowledgebase from the collected data;
- (e) Building capacity of IGAD Secretariat and national agencies in the use of the regional knowledgebase; and
- (f) Development of a roadmap for sustainable water resources management and establishment of transboundary river basin organisations.

2.2 Lessons learned from other regions

2.2.1 Coordination mechanisms in SADC

For comparison purposes and lesson-learning, the coordinating mechanisms for transboundary water management in two RECs – the Southern African Development Community (SADC) and the Economic Commission for West African States (ECOWAS) – are reviewed and summarised below.

The Southern African Development Community (SADC) is an inter-governmental organization created in 1992 with headquarters in Gaborone, Botswana. Its goal is to further socio-economic cooperation and integration, and promote political and security cooperation amongst 15 Southern African states. SADC has 27 legally binding protocols in diverse areas such as defense, development, illicit drug trade, free trade and movement of people and transboundary water management.

The SADC Secretariat based in Gaborone consists of Directorates of Food, Agriculture and Natural Resources; Trade, Industry, Finance and Investment; Infrastructure and Services; and Social and Human Development. Within the SADC Directorate of Infrastructure and Services is the SADC Water Division, which is tasked with overall coordination and management of the SADC Water Programme. The SADC Water Division itself is made up of three units: a technical unit (responsible for technical

activities of the Division), a support unit (responsible for monitoring and evaluation, information and communication, and data management) and administrative unit (supports the operations of the two other units).

The policy and legal framework for water resources management in the SADC region includes the SADC Declaration and Treaty (1993), Revised Protocol on Shared Watercourses (2000), Guidelines for the Development of National Water Policies and Strategies to Support IWRM (2004), SADC Vision for Water, Life and Environment in the 21st Century (2006), Regional Water Policy (2006), Regional Water Strategy (2006), a series of Regional Strategic Action Plans for the Water Sector (1, 2 and 3), Regional Awareness and Communication Strategy (2010), Guidelines for Strengthening RBOs (2010) and Regional Climate Change Adaptation Strategy (2011).

The Revised Protocol on Shared Watercourses (2000) aims to promote cooperation among SADC Member States that share river/lake basins and supports the establishment of shared watercourse agreements and institutions. The protocol further upholds and has specific provisions for the principles of equitable utilization; no significant harm; planned measures and prior notification; environmental protection and preservation; and data and information exchange.

There are fourteen international transboundary river basins in the SADC region, namely the Congo, Cuvelai, Incomati, Kunene, Limpompo, Maputo-Ussulu-Pongola, Okavango, Orange-Senqu, Pungwe, Ruvuma, Save/Sabi, Buzi and Zambezi basins. Cooperative management frameworks have been developed on twelve of the fourteen transboundary rivers. River basin organisations on these rivers are of varying capacity.

SADC's Regional Strategic Action Plans provide the mechanism for realisation of the objectives of the Revised Protocol on Shared Watercourses (2000), and the Regional Water Strategy (2006). The implementation arrangement for the Action Plans includes, amongst others, a Water Strategy Reference Group that comprises of the SADC Secretariat and all International Cooperating Partners (ICPs) active in the SADC Water Sector. The inclusion of the Reference Group in implementation allows specific tasks under the Strategic Plan to be assigned to members of the group, and helps to avoid overlaps and duplication amongst International Cooperating Partners. A similar arrangement would improve the mobilization of development partners' input to the implementation of IGAD programmes. A major weakness with the Strategic Plans is that the bulk of the funding is going to infrastructure development, with environmental programmes receiving little consideration. The SADC countries also lament that so much effort has gone into putting in place an enabling policy and legal framework, but this effort has not been accompanied with sufficient investment projects to demonstrate tangible benefits of transboundary water cooperation.

2.2.2 Coordination mechanisms in ECOWAS

The main mechanism for coordination of water affairs in the Economic Commission for West African States (ECOWAS) is through the Water Resources Coordination Centre (WRCC). This specialized agency that operates from Ouagadougou in Burkina Faso falls under ECOWAS' Directorate of Agriculture, Environment and Water Resources and is still under formation. The Centre was initiated in 2004 to promote integrated water resources management and ensure that there is a balance between economic development, social equity and water resources and environmental conservation.

The work of the Centre is focused on three priority areas that are contained in the West Africa Water Resources Policy (WAWRP) and WAWRP Implementation Plan, namely (a) reforming water governance; (b) promoting water sector investment and; (c) strengthening regional cooperation and integration. The water resources policy and its implementation plan were prepared in consultation with, and have been endorsed by all RBOs in the region and by UEMOA (French acronym for *Union Economique et Monétaire Ouest Africaine* which translates to West African Economic and Monetary Union) and CILSS (French acronym for *Comité Inter-Etate pour la Lutte contre la Sécheresse au Sahel* which translates to Permanent Inter-State Committee for Drought Control in the Sahel). CILSS is a specialized agency of ECOWAS.

One of the important contributions of the WRCC is in promoting water-related data and information exchange in West Africa. ECOWAS is at advanced stages of negotiating funding from the African Water Facility (AWF) for established of a Regional Water Observatory that will assist RBOs and member countries in strengthen information systems, promoting the standardization of data and information collection, reporting and disseminating amongst the Member States (Brachet and Haener, 2012). In 2010 the WRCC produced an atlas of regional water resources in West Africa.

One of the mechanisms chosen by WRCC in achieving its goals is the preparation and promotion of use of Good Practice Guides on various themes of Integrated Water Resources Management. Two such guides are on Optimization of Water Resources Monitoring Systems (Brachet and Haener, 2012) and Development of Water Infrastructure (WRCC, 2012). The guidelines have provided the basis for preparation of a draft regional directive on large scale infrastructure and draft protocol on shared waters.

2.3 Analysis of relevant models for IGAD

A regional water resources coordination mechanism that could work for IGAD could have the following characteristics:

1. *Lean secretariat* – The IGAD Member countries include some of the world's poorest countries. They will have difficulty supporting a large Secretariat. The proposed Water Unit in the IGAD Secretariat need to be maintained as a lean structure.
2. *Engage international cooperating partners* – the model in SADC – of assigning implementation roles to international cooperating partners – and the example of the successful operation of the SWALIM programme in Somali by FAO – go to illustrate the positive role international cooperating partners could play in a situation of weak in-house capacity in the regional institutions. Such a model could be borrowed for the IGAD region.
3. *Maximise synergies; minimise duplication* – There is high potential for overlap and unhealthy competition between IGAD and the activities of more mature regional institutions such as the East African Community (EAC) and regional river/lake basin organisations such as the Nile Basin Initiative (NBI) and Lake Victoria Basin Commission (LVBC). Such duplicity has several drawbacks, including: fragmented approaches to regional integration; inconsistent objectives and conflicting operational mandates; contradictory obligations and loyalties for partner states; increased financial cost of country membership; duplication of programs and efforts; unhealthy rivalry for donor funds; and consequently reduced ability to pursue coherent and effective integration programs. This could be minimised through signing of Memoranda of Agreement with these organisations that promote synergy and cooperation between them. Other mechanisms could include periodic coordination meetings, regular exchange of information, joint programming, joint review of programs, and joint implementation committees.
4. *Supporting emergence and maturation of transboundary basin organisations* – The model in SADC, where the regional secretariat actively promotes and champions the establishment of transboundary river basin organisations throughout the region could be borrowed for the IGAD Region. The SADC Water Division does this through developing and coordinating the implementation of a regional water resources policy, protocol and strategy; mobilisation of international development partners to fund transboundary RBO development; supporting capacity building in the basin, amount others through training and development of best practise guides. The IGAD

Secretariat could play a similar support role for nurturing development of RBOs in the greater Horn of Africa.

5. *Supporting provision of information regarding the costs and benefits of cooperation and integration at basin level (AU, 2003).* Uncertainty regarding whether and to what extent IGAD member states may benefit from regional initiatives could in some cases lead to reluctance by states in adopting and committing sufficient resources and authority to regional arrangements. This is particularly true for weaker countries, which may have valid reason to fear losses in regional trade. To overcome such apprehension, it may be important for IGAD to conduct a cost-benefit analysis and to make sure that compensation mechanisms are in place for weaker member states that share specific basins.

3. Information exchange protocols & mechanisms

3.1 Existing mechanisms for information sharing within IGAD

3.1.1 Information exchange under IGAD water programme

IGAD launched an Inland Water Resources Management (INWRM) Programme in 2012. The Programme, which has been described in the previous Chapter, is IGAD's first major programme on water. It contains several interventions related to data and information sharing key among which are the following: (a) the establishment of the IGAD-HYCOS Program; (b) the development of a policy and protocol on regional water resources management; and (c) development of a policy and protocol on water related data and information exchange. In addition to the INWRM Program, IGAD operates a climate prediction and applications Centre (ICPAC) which has close relationship to water related data sharing and information exchange. Prior to the INWRM Program, there were several efforts to collect and share water related data, the most notable being under the project titled Mapping, Assessment and Management of Transboundary Water Resources (MAMTWR) in the IGAD Region Project. The above initiatives have been described in the previous Chapter but relevant features related to data sharing and exchange is briefly reviewed below.

3.1.2 Mapping, assessment and management of transboundary water resources (MAMTWR) Project

The MAMTWR Project, which was implemented between 2009 and 2011, represented the first major effort within IGAD to collect and analyse regional water resources data. The project had five components, including components on data management and on preparation of maps and a GIS system. Under the Project, available water resources data was collected from the countries, data quality checks were performed and the data organised into a database. Data types collected included groundwater points (boreholes and shallow wells) and meteorological and hydrological data.

The project experienced multiple challenges in its lifetime. With regard to data compilation, the main challenges were the following:

1. *Multiple and incompatible formats* – the records collected from the countries had multiple formats under which data was stored, different measurement methods, different reporting units and, different terminology and classification systems. On the latter issue, some countries used classification systems that had no parallel or equivalent in the other countries. Examples are the use of the term “source” in Djibouti, and “First Class Water Point” in Eritrea with no parallel in the other countries.
2. *Wrong or missing coordinates* – Close to 30% of the data points had wrong or missing coordinates.
3. *Missing unique identifiers* – many data points did not have unique identifiers.
4. *Duplicate records* – The data provided by the countries had a lot of duplication in terms of records that share the same unique identifier, source name, source code or coordinates.
5. *Data gaps and quality issues* – the data collected was heterogeneous in its spatial and temporal coverage: there were many areas in the region without data, and the climatic and hydrological records of the observation stations had long episodes with no measurements. Few groundwater points had comprehensive information (such as on about aquifer type, aquifer thickness, depth to water table, yield, etc.). Stream flow data had problems of poor rating curves for conversion of river stage data into discharge.

The database used in the project was adapted from the OSS 2007 software while the mapping system was based on ARCGIS 9.3. At project completion, the database held 83,064 data records. At present the status of the database (i.e. whether or not in used and populated with new data) is unclear.

3.1.3 IGAD-HYCOS

Ten countries of the Greater Horn of Africa Region have since 2011 been cooperating in the implementation of the IGAD-HYCOS (IGAD Hydrological Cycle Observing System) Project. Key achievements under the project include the following (WMO, 2014):

1. A strategic regional hydrological observation network has been established consisting of 100 observation stations across 10 participating countries.
2. An assortment of hydrological, meteorological and water quality equipment has been procured and distributed to participating countries. Equipment include staff gauges, mechanical current

meters, canoes with outboard engines, ADCPs, level instruments, portable multiparameter water quality probes, tipping bucket rain gauges, standard rain gauges, automatic water level sensors, GSM/GPRS for Data Collection Platforms (DCPs) and METEOSAT Data Collection Platforms.

3. Staff of National Hydrological Services have been trained in the installation, operation and maintenance of the various instruments and equipment, and an introduction to concepts of Integrated Water Resources Management (IWRM).
4. The IGAD-HYCOS web portal has been created for information dissemination.
5. An office building to house a 'Regional Centre for Water Management' that was offered by the Government of Kenya was renovated and occupied.
6. Temporary staff (Hydrologist, Field Hydrologist and IT/Database Expert) have been recruited to man the 'Regional Centre for Water Management'.
7. Technical specifications for the regional and national databases have been prepared and procurement of hardware and software initiated.

By the closure of the IGAD-HYCOS Project in March 2015, it is expected that the regional database will be operational and exchange of data between the countries underway.

3.1.4 IGAD Protocol for Regional Water Resources Management

The draft IGAD Regional Water Resources Protocol is a modern legal instrument that incorporates the provisions of customary international water law and draws lessons from existing regional treaties such as the Cooperative Framework Agreement on the Nile (2010), and the SADC Revised Protocol on Shared Watercourses (2000).

The Protocol provides for the regular exchange of data and information amongst co-basins states on the state of shared surface and groundwater resources. The data types under the protocol include hydrological, meteorological, hydrogeological, water quality and ecological data. The Protocol also provides for public participate in the formulation of policies, legislation, programmes and plans relating to water resources. The processes for the review and eventual adoption of the protocol by the countries are expected to continue after the closure of the INWRM Programme.

3.1.5 IGAD Protocol on Water Related Data and Information Exchange

The draft IGAD Protocol on Water Related Data and Information Exchange provides for data and information exchange on the water resources lying within the territory of Member States, including water resources not shared with other countries. The purpose of the Protocol is to facilitate planning and management of water resources at regional scale. The Protocol provides for Member States to carry out joint assessments and operate joint knowledgebases. Like the Regional Water Resources Protocol, the processes for the review and adoption of the Protocol are expected to continue after the closure of the INWRM Programme.

3.1.6 IGAD Climate Prediction and Applications Centre (ICPAC)

The IGAD Climate Prediction and Applications Centre (ICPAC) is a Nairobi-based specialized institution of IGAD that supports the countries of the Greater Horn of Africa to cope with risks associated with extreme climate variability and change through the provision of timely climate early warning information and knowledge products and technical support in sector-specific applications of climate early warning information. Among other things, ICPAC supports the IGAD countries in developing and maintaining national and regional climate data banks and training of national staff in the generation and applications of climate information and products.

ICPAC regularly produces several different kinds of knowledge products including bulletins on the current state of climate and recent past climate at decadal, monthly and seasonal time intervals. The Centre also produces vulnerability and impact assessments of observed and projected climate anomalies at decadal, monthly and seasonal intervals. ICPAC faces a number of challenges in implementing its mandate among which are the limited technical and human capacity of the focal point institutions in the IGAD Countries.

3.2 Lessons learnt from other regions

3.2.1 Data sharing protocols and procedures in the EAC and Nile Basin

Convention for the establishment of the Lake Victoria Fisheries Organisation

The Convention for the Establishment of the Lake Victoria Fisheries Organisation (1994) gives the organisation the responsibility of serving as a clearing-house and data bank for information on Lake Victoria fisheries, and promoting the dissemination of such information. To this end, Member States are required to “provide the Organization with access to all laws, regulations and all documents, data and reports, pertaining to fish landings, stock assessments, living resources of Lake Victoria...” and other related data

and information. To a large extent, the Convention is being implemented although weaknesses in data collection remain. The countries collect fisheries statistics which they share annually with the LVFO. The Organisation organizes joint framework surveys on the lake every three to five years and has set up a number of web-based information platforms to support its clearing house and data bank functions.

Protocol for the Sustainable Development of the Lake Victoria Basin

The Protocol for the Sustainable Development of the Lake Victoria Basin (2003) provides, among other things, for the: (a) exchange of data and information on planned measures, and on the state of the water and environmental resources of the basin; (b) establishment of water quality and quantity monitoring networks, and water quality laboratories; (c) exchange of water quality and water quantity data; (d) harmonisation of water quality standards; (e) establishment, harmonisation and improvement of information and communication technologies; (f) execution of collaborative research and; (g) promotion of public participation in planning and decision making.

Despite the wide ranging provisions of the protocol, data sharing and information exchange amongst co-basin states continues to be weak. Two of the reasons for this situation are thought to be the lack of technical tools to promote and facilitate data and information sharing among the countries, and the low level of data and information collection, sharing and exchange at national level.

A new LVBC Protocol on Data, Information and Knowledge Sharing is under preparation. It is expected to address the above challenges by (a) operationalizing data and information exchange among the five LVBC partner states; (b) enhancing public access to data and information; and (c) promoting cooperation among the LVBC member states in a constructive and mutually beneficial manner to ensure the sustainable development of the Lake Victoria Basin.

As part of the measures to strengthen, regional and national institutions in the Lake Victoria Basin, the LVBC has developed and deployed a Water Resources Information System (WRIS) for monitoring surface water, groundwater and water quality. The system includes a GIS-based database for land-use, hydrology and biodiversity in the basin. The WRIS provides a technical platform for collection, storing, evaluating, analysing and disseminating information by LVBC. As part of its establishment, a hydro-meteorological monitoring network has been designed, by the LVBC and once implemented by partner states, will be used as the source of data for the WRIS. The WRIS will improve and facilitate Data, Information and Knowledge Sharing based on an agreed Protocol on.

The EAC Protocol for Environment and Natural Resources Management

The Protocol for Environment and Natural Resources Management (2006) is a general instrument that covers all activities, matters and areas of management of environment and natural resources of the Partner States. The Protocol provides for data and information exchange in many activities, including in the management of water, environment and natural resources, and in relation to combating desertification, mitigating effects of drought, and managing environmental disasters. There are also provisions for countries to cooperate in establishing hydrological, meteorological and water quality observation systems, and establishing early warning systems to predict drought in order to reduce the vulnerability of society and natural systems to drought as it relates to rangelands. The Protocol also has an Article on Public Participation and the right of the public to information held by public authorities. Despite the wide ranging provisions of the EAC Protocol, little progress has been made in implementing it as it is still in draft form.

Agreement on the Nile River Basin Cooperative Framework

After close to ten years of negotiations under the framework of the Nile Basin, the countries of the Nile Basin signed a new agreement on the Nile at Entebbe in 2010. Among other things, the Agreement provides for regular and reciprocal data and information exchange on existing measures and the condition of the water resources of the basin. The CFA has not yet come into force and, therefore, its provisions are not in force. To address the need for data and information exchange in the period leading up to the full ratification of the agreement, an interim instrument on data and information sharing and exchange has been agreed by the NBI member countries and is reviewed below.

Nile Basin Data and Information Sharing and Exchange Interim Procedures

The Nile Basin Data and Information Sharing and Exchange Interim Procedures (2009) and the Operational Guideline for Implementation of the Nile Basin Interim Procedures (2011) are intended to provide the Nile Basin Initiative with unrestricted access to data and information held by the countries, which it needs to implement projects and programmes. The Interim Procedures provide for establishment of a shared regional knowledgebase to facilitate the organisation, storage and exchange of the water-related data compiled under the agreement. A Monitoring Strategy for the Nile River Basin (2010) has been prepared and a hydro meteorological monitoring network (2015) designed as part of measures to enable member states to generate and provide data for the shared knowledge base. The Interim Procedures do not provide for access by third parties to the shared regional knowledgebase. Presently, requests for data and information

originating from third parties are considered and granted or denied on a case-by-case basis by the Nile Technical Advisory Committee (Nile-TAC).

NBI Information Disclosure Policy

Pursuant to good governance principles that the NBI is committed to, this policy was introduced mainly to give the public access to the data and information in the possession of the NBI, and to introduce a transparent process of classifying information into types that can be freely accessed, and others that are to be treated as confidential. To avoid overlap with the Interim Procedures, the Disclosure policy does not cover the data and information types exchanged under the Interim Procedures. Thus, it covers project progress and completion reports, technical consultancy reports, water resources assessment reports, newsletters, policy documents, and maps and other GIS-related products, to mention but a few.

Nile River Awareness Kit

The Nile River Awareness Kit (Nile RAK; NBI, 2008) is an interactive CD-ROM based tool designed to promote sustainable management of water resources within the Nile River Basin. The kit provides training materials for regional, national and local stakeholders in different aspects of environmental and water management and is currently being used by educators, students, Non-Governmental Organizations, and Governments across the Nile River Basin member countries.

3.2.2 Data sharing in South and West Africa

Data sharing at sub-regional level

The SADC and ECOWAS sub-regional coordination mechanisms for water resources management have been reviewed under Chapter 2. In SADC, the coordinating mechanism includes a web-based SADC Water Sector International Cooperating Partners (ICP) coordination portal (<http://www.icp-confluence-sadc.org>). The portal provides information on the International Cooperating Partners of the SADC water sector and their projects and programmes. The portal also provides links to the webpages of the SADC river basin commissions and allows for download of key documents generated under the numerous transboundary river basin organisations and the SADC water division. The types of downloadable documents include consultancy study reports, good practices guides, policies and agreements. Operation of water resources monitoring networks and inter-country data exchange takes place under the framework of the existing River Basin Commissions (ORASECOM, OKACOM, ZAMCOM, etc.).

In West Africa, regional coordination is carried out under the Water Resources Coordination Unit (WRCU). The Unit does not operate an ICP

portal as in SADC. However, it maintains a website (<http://www.wrcu.ecowas.int>) under which it provides information on the Unit's programmes and projects. As under SADC, the operation of water resources monitoring networks and data exchange between riparian countries takes place under the framework of River Basin Commissions.

Data sharing under two relatively mature transboundary river basins – the Orange-Senque and Senegal River Basins – in two sub-regions of Africa is briefly reviewed below to draw lessons for BRIDGE.

South Africa: Orange-Senque River Basin

The Orange-Senqu River Basin, which is shared by four countries (Botswana, Lesotho, Namibia and South Africa), is one of the largest and most developed river basins in Southern Africa. It is cooperatively managed under the Orange-Senqu River Commission (ORASECOM) established in 2000. The Agreement establishing the Commission includes provisions for data and information sharing and exchange.

The riparian states of the Orange-Senqu river basin have not yet established a joint water resources monitoring programme. At present, each country is responsible for collection of hydrological, hydrometeorological and water quality information within its territorial jurisdiction. There is currently no standardization with respect to the design and operation of the different observation systems.

The National Hydrological and Meteorological Services of the four countries carry out the operation and maintenance of the hydrological and hydrometeorological observation systems. The national services have variable capacity but face common challenges including inadequate staff, declining government budgetary allocations; declining size of monitoring networks, vandalism of field equipment, poor data quality, frequent draining of logger batteries, difficulty of reaching remotely located stations and instrument software malfunctions (ORASECOM, 2013).

The countries are also implementing water quality monitoring programs that differ in complexity, density of monitoring points, frequency of sample collection, range of water quality parameters tested, and method of data storage. Analytical quality problems are common to all except for South Africa.

While the countries operate independent observation systems, they frequently exchange and share data on 'as needed' basis. They also cooperate in conducting joint studies and joint training and capacity building programs.

The Orange-Senque Commission has set up two public information systems, namely: the Water Information Systems (WIS; <http://wis.orasecom.org>) and

River Awareness Kit (RAK; <http://www.orangesenqurak.com>). The WIS is a central repository for ORASECOM information and knowledge products and is currently populated with data and information generated under various projects. The RAK is a public awareness tool intended to support public awareness raising, capacity development and the sustainable management of the water and environmental resources of the river basin. It comprises of self-learning resources supported by interactive visualisation tools, maps, documents and Google Earth layers.

West Africa: Senegal River Basin

The Senegal River Basin is shared by four West African States: Guinea, Mali, Mauritania and Senegal. The river basin organization in the basin is the *Organisation pour la Mise en Valeur du fleuve Sénégal* (OMSV) created in 1972. OMVS operates an Environmental Observatory whose primary function is to monitor trends on the state of the environment and report its findings to the countries to enable them take appropriate measures to avoid, mitigate or reduce negative impacts from water resources developments or land use changes in the basin. The Environmental Observatory regularly collects information on a range of parameters covering 18 data types falling under four groups, namely: (a) hydrology and meteorology; (b) water quality; (c) biodiversity and ecosystems and; (d) socio-economics.

Actual field measurements are not made by the Observatory but by different national agencies. Individual national agencies pass on the data they collect to a national focal point institution, which in turn consolidates and uploads the data onto the Observatory's regional database. On receiving the data, the Environmental Observatory carries out data quality checks and then proceeds to analyze the data and produce knowledge products which are disseminated to the countries. Advice drawn from monitoring results is communicated to the countries via a Permanent Technical Committee. The database that holds the data is part of a regional Management Information System (MIS). This system includes a GIS portal, public information portal and water resources model. Countries share data and information through the regional MIS.

3.3 Recommendations and practical steps

3.3.1 Main observations

The Table below summarises the salient points from the above review.

Table 3: Key observations about data sharing and exchange

No.	Observation
1.	Data sharing and exchange is a common principle and provision under many regional legal frameworks in the Greater Horn of Africa. This reflects a growing awareness and general appreciation of the importance of data sharing and exchange in management of international transboundary water and environmental resources.
2.	The actual implementation of data and information sharing policies and protocols lags far behind the provisions of the numerous policy and legal instruments in the region.
3.	Detailed procedures and guidelines to guide data and information sharing and exchange are lacking except under the NBI.
4.	In IGAD, the necessary tools and systems to allow for data sharing at national and regional levels are at infancy stage of development.
5.	There are multiple challenges and obstacles involved in establishing and operating efficient transboundary data sharing systems that IGAD needs to be aware of.
6.	There have been several past (and ongoing) IGAD-led efforts at initiating data sharing systems at regional level, but none at transboundary river/lake basin level
7.	Most legal instruments in the IGAD region provide for public participation and the right to access data and information held by public authorities. However, most of the data portals operated by regional and transboundary bodies have not been set up to facilitate public download of data held in the systems.

3.3.2 Recommendations

Possible areas where the BRIDGE Project could intervene are many. Below are some suggestions.

1. *Setting up transboundary cooperative frameworks on shared river/lake basins in the IGAD Region* – Once the IGAD Protocol for Regional Water Resources Management is promulgated, IGAD Member States will need assistance to set up joint river/lake/aquifer frameworks on the water resources that they share. The BRIDGE project could facilitate the process of negotiations and offer technical advice in the drafting of agreements on one or more basins.
2. *Keep it small*: Mandates for data sharing under institutional mechanisms established under BRIDGE need to match the finances, human resources and other logistics that the implementing

institutions can realistically mobilise. The mandates of most of the existing institutions (with respect to water-related data sharing and exchange) are greater than what they can effectively manage.

3. *Operationalising data sharing under IGAD-HYCOS* – The IGAD-HYCOS Project will come to a close at a time when the regional system for data sharing and exchange will have just been put in place. The countries will need continued support towards staff training and operation of the new system. Potential intervention areas for BRIDGE include supporting training of national staff, and facilitating the preparation of consolidated regional reports.
4. *Building capacity and facilitating dialogue around data sharing amongst key stakeholders at regional level* - this could help to explain the importance and reasons for data exchange, and support the process for adoption of a data sharing policy and protocol.
5. *Building capacity and providing support on knowledge management and dissemination* – this could include the establishment of systems to improve the management of existing information and knowledge that has accumulated from IGAD’s programme and projects on trans-boundary water governance.
6. *Implementing the IGAD Protocol on Water Related Data Exchange* – Implementing the IGAD Protocol on Data and Information Sharing (when promulgated) will call for actions that go beyond the operation and maintenance of the IGAD-HYCOS. New interventions required to facilitate their application include the establishment of national and regional coordinating mechanisms (National Focal Points, National Working Groups and Regional Technical Committee), broadening the range of data types regularly collected, conducting joint assessments, and preparing guidelines for implementation of the Protocol (such as guidelines for data access by third parties). The process of finalisation and adoption of the protocol and providing technical support and advice to the above processes could be supported by BRIDGE.

4. Transboundary water basins of the Greater Horn of Africa

4.1 Transboundary water basins of the IGAD Region

Ten out of fifteen river/lake basins in the Greater Horn of Africa are transboundary in nature. The ten transboundary basins (Table 3; Figure 3) cover about 75% of the land area of the Greater Horn of Africa region. Some of the basins are subdivided into several distinct sub-basins that are separately managed (as in the Nile Basin) while others are managed as single entities. A profile of these basins is presented in the Table below.

Table 4: *The major transboundary basins of the IGAD Region³*

River/Lake Basin	Catchment area (km ²)	Population (million)	Riparian Countries ^a
Nile River	3,176,543	238	Burundi, Democratic Republic of Congo, Egypt, Ethiopia , Eritrea , Kenya , Rwanda, South Sudan , Sudan , Tanzania, Uganda
Lake Victoria (a Nile River sub-basin)	184,000	25	Burundi, Kenya , Rwanda, Tanzania, Uganda
Barka (Baraka) (Rift Valley basin)	66,177	2.03	Eritrea , Sudan
Gash (Mareb) (Rift Valley basin)	39,892	3.688	Eritrea , Ethiopia , Sudan
Awash-Lake Abbe (Rift Valley basin)	112,700	10.5	Ethiopia , Djibouti
Lake Turkana - Omo River (Rift Valley basin)	206,216	18	Ethiopia , Kenya , South Sudan , Uganda
Lotagipi Swamp (Rift Valley basin)	38,687	0.329	Ethiopia , Kenya , South Sudan , Uganda
Lake Natron (Rift Valley basin)	55,189	1.513	Kenya , Tanzania
Lake Chala, Lake Jipe, Uмба River	8,200 ^b	0.435 ^b	Kenya , Tanzania
Juba-Shabelle River	805,100	18.361	Ethiopia , Kenya , Somali
Ogaden	207,363	3.05	Ethiopia , Somali

^a IGAD Member countries are presented in bold blue font.

^b Combined statistic for all three basins.

³ Statistics obtained from: <http://aquapedia.waterdiplomacy.org/>

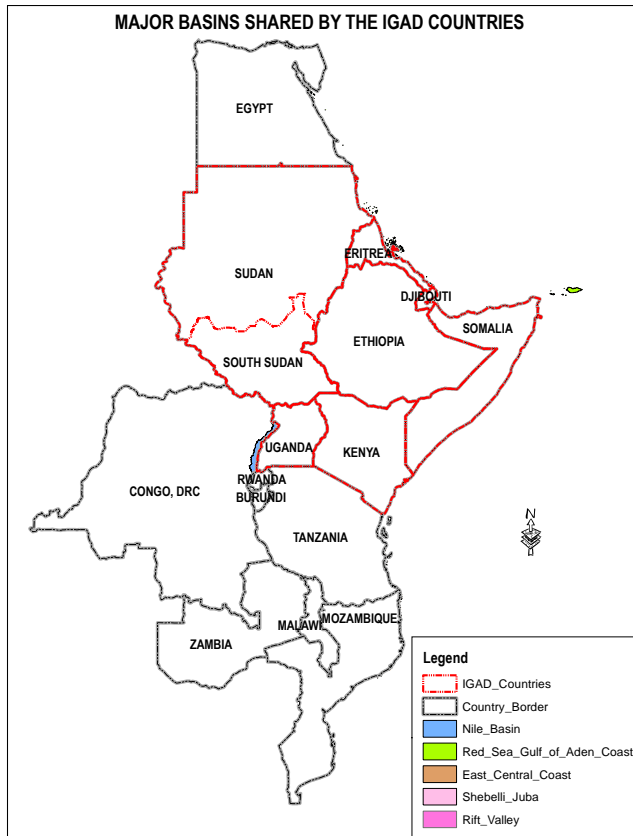


Figure 2: The major surface water basins in the Greater Horn of Africa (prepared under this study)

4.2 River Nile Basin

The Nile River, with a total length of 6,695 km is the world’s longest river. The Nile Basin has an area of 3.18 million km² (about 10% of the land area of Africa) shared by 11 Nile riparian countries six of whom (Ethiopia, Eritrea, Kenya, South Sudan, Sudan and Uganda) are members of IGAD. The land area in the six countries that falls within the Nile Basin is estimated at about 2.7 million km² which corresponds to 51.9% of the entire IGAD area⁴. The combined population of the 11 riparian countries is 437 million (NBI, 2012). The population in the parts of the Basin lying within the IGAD region is 130.4 million, which corresponds to 57.3% of the population of the IGAD countries⁵.

Despite the long length of the river and its expansive basin area, the flow in the Nile is a small fraction of the flow in other large rivers of the world. This is partially explained by the low runoff coefficient of the Nile (below 5%) and the fact that about two-fifths of the basin area contributes little or no runoff as it comprises of arid and hyper-arid drylands (NBI, 2012). Potential evaporation rates in the Nile region are high, making the basin particularly

⁴ Obtained from the statistics provided in the State of Nile River Basin Report 2012.

⁵ Estimated from the statistics provided in the State of Nile River Basin Report 2012 and the CIA World Factbook 2014.

vulnerable to drought. Mean annual precipitation in the basin, which is estimated at 1,046 mm/annum, shows high spatial variability. Mean annual discharge is estimate at 84 billion cubic metres. The Nile has two main tributaries – the While and Blue Niles.

The finite Nile flows are now fully utilized for agricultural, domestic, industrial, and environmental purposes, while water demand continues to rise steadily due to population growth and economic development. Agriculture is the main water user, and accounts for 78% of consumptive water use in the basin.

The Nile Basin has many unique aquatic and terrestrial ecosystems, and is home to thousands of species of plants and animals, many of them endemic to the basin. The Nile's system of waterways and wetlands constitutes an important flight path for migratory birds. Seventeen aquatic and wetland ecosystems within the basin have been designated as international Ramsar sites (NBI, 2012).



Figure 3: *The Nile at Jinja, Uganda as it flows out of Lake Victoria (photo: Nicholas Azza)*

The Nile Basin has numerous challenges, the mains one being the following:

- (a) Rapid population growth and widespread poverty;
- (b) Civil war and insecurity that have affected different parts of the basin at different times;
- (c) Widespread deforestation and soil erosion especially in the Ethiopian highlands and Nile Equatorial Lake Region, leading to river, lake and reservoir siltation;
- (d) Lack of a legal framework for transboundary water cooperation (the CFA is still at the stage of ratification);

- (e) Weak policy, legal and institutional frameworks for transboundary water management in the countries;
- (f) A history of conflict, tension and war rhetoric over Nile waters by basin states;
- (g) A fixation by the countries on volumetric water allocations as opposed to benefit sharing; and
- (h) Low levels of stakeholder involvement and public participation in Nile Basin activities especially following the closure of the projects under the NBI Shared Vision Programme (SVP).

4.3 Lake Victoria Basin

Lake Victoria, which has a surface area of 68,800 km², is the largest freshwater lake in Africa. The lake occupies a shallow, saucer shaped depression on the African plateau sandwiched between the eastern and western arms of the Great African Rift Valley. It has a maximum depth of 84 m and an average depth of 40 m, and acts as a natural reservoir for the White Nile.

The catchment area of the lake, which measures about 184,000 km², is one of the most densely populated regions in the world. It is shared by five countries (Burundi, Kenya, Rwanda, Tanzania and Uganda) and has an estimated population of 35 million.

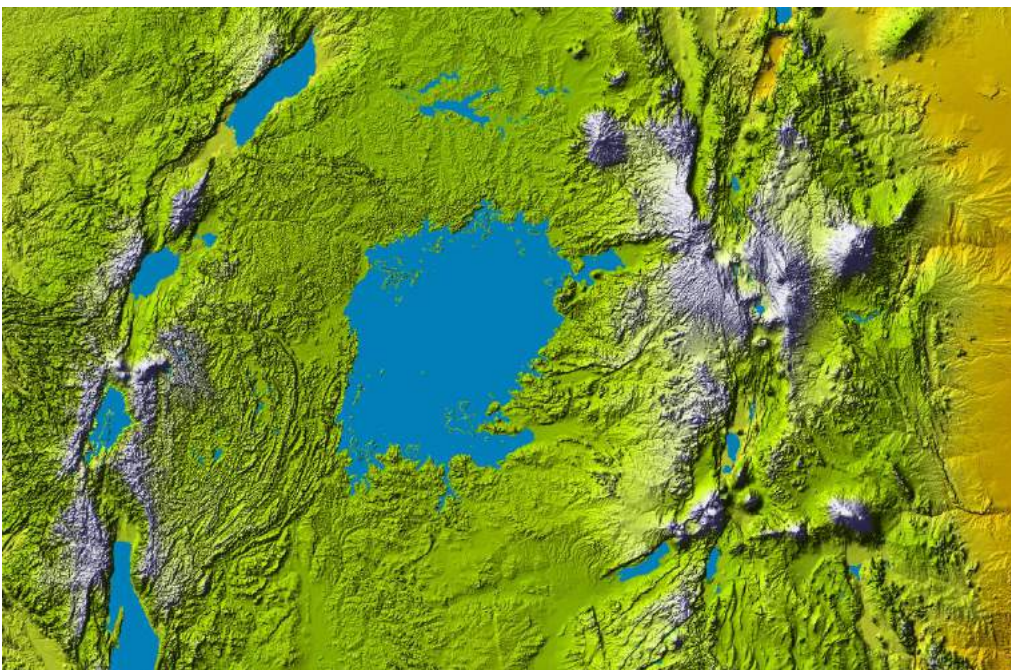


Figure 4: *The topography of the Lake Victoria region showing the lake at the centre of the eastern and western arms of the Rift Valley*⁶

⁶ Obtained from: http://en.wikipedia.org/wiki/Lake_Victoria#mediaviewer/File:Topography_of_Lake_Victoria.png



Figure 5: *Cormorants on Lake Victoria* (photo: Nicholas Azza)

Lake Victoria is of great importance to the region and has been designated by the East African Community as an economic growth zone. Among other things, it is used as a source of drinking water for many large towns and villages and cheap animal protein (fish). It also serves as a habitat for diverse aquatic flora and fauna, and is used for navigation, hydropower generation, tourism, recreation, domestic water supply and irrigation.

The Lake has multiple environmental challenges that include:

- (a) overfishing and use of illegal fishing gear leading to decline in fish stocks;
- (b) widespread deforestation in the catchment;
- (c) drainage of wetlands and destruction of littoral habitats
- (d) organic and microbial pollution from discharge of untreated municipal wastewater from coastal towns and cities;
- (e) eutrophication leading to frequent and severe algal blooms (including toxic species of blue-green algae);
- (f) deteriorating water quality due to increased sediment transport from the watershed, pollution and eutrophication;
- (g) lake infestation by aquatic weeds (mainly *Eichhornia*),
- (h) climate change leading to prolonged thermal and physico-chemical stratification and hypolimnetic anoxia;
- (i) Declining lake levels due to a combination of falling river inflows, excess water releases from the lake and climate change;
- (j) alien fish species introductions leading, in combination with eutrophication, to extinction of some endemic fish species; and

(k) Widespread poverty and deprivation.

The above challenges are being addressed under the different transboundary institutions set up in the lake region that include the Lake Victoria Fisheries Organisation, Lake Victoria Basin Commission, Kagera Integrated River Basin Management Project, Mara Integrated River Basin Management Project and Sio-Malaba-Malakisi Integrated River Basin Management Project.

4.4 Juba–Shabelle River Basin

The Juba and Shabelle Rivers both originate in the Ethiopian highlands at elevations above 3000 m amsl and flow southeastwards to discharge into the Indian Ocean close to the Port City of Kismayo. The Shabelle has one main tributary while the Juba has three – the Daua, Genale and Gesiro Rivers. The two rivers have a catchment area of 805,100 km² shared by Ethiopia (45.7%), Kenya (26.8%) and Somalia (27.5%) (Wold *et al.*, 1999; Houghton-Carr *et al.*, 2011). The Shabelle has a total length of about 1,700 km while the Juba has a total length of 1,100 km (Thiemig *et al.*, 2010).

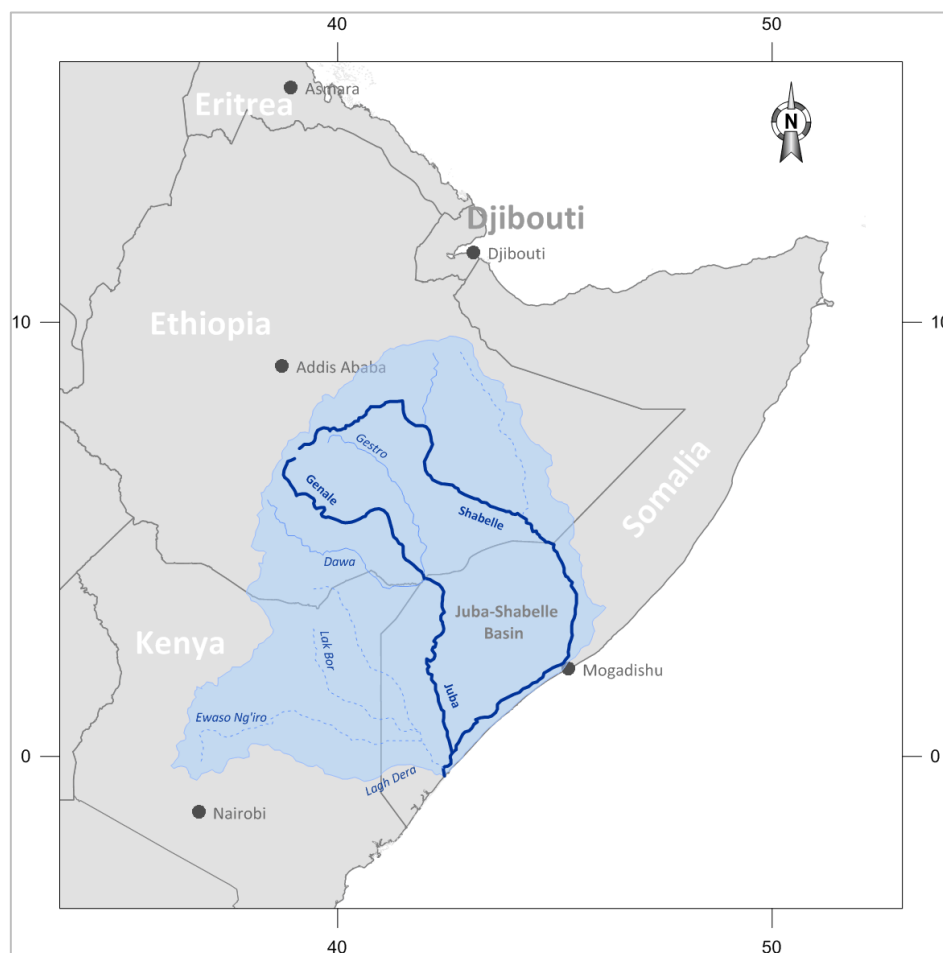


Figure 6: Map of the Juba-Shabelle River Basin (map created under this study)

The basin experiences bi-modal rains, with the main rains falling in April-June and the short rains falling in October-November. The average annual rainfall in the Juba and Shabelle sub-basins is 550 mm and 455 mm respectively but the rainfall shows considerably spatial variation (Houghton-Carr *et al.*, 2011). Evapotranspiration is high (between 1500 to 2000 mm/annum) in most parts of the basin (UNEP, 2010).

The Shabelle has the larger catchment area of the two rivers, but the Juba receives much more rainfall. Both rivers are prone to seasonal flooding. Inter-annual variability in rainfall is high, and severe droughts recur every 7 to 10 years (SWALIM, 2007). Both rivers lose discharge as they progress towards the Indian Ocean, due to a lack of rainfall in downstream areas, high evaporation and significant infiltration and withdrawals. In most years, the flow of the Shabelle does not reach the Ocean, disappearing in some wetlands upstream of the junction with the Juba River.

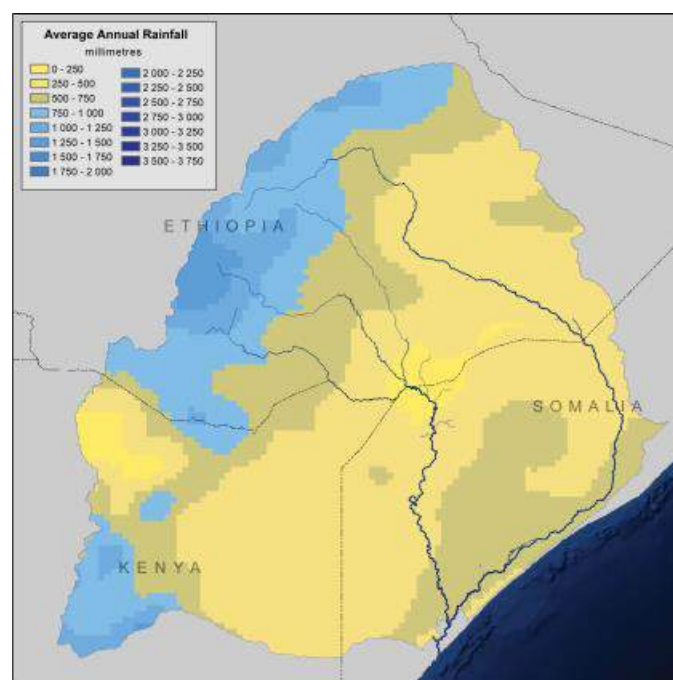


Figure 7: Annual rainfall distribution in the Juba-Shabelle River Basin (UNEP, 2010)

The basin has a population of 18.3 million, distributed between Ethiopia (65%), Somalia (22.5%) and Kenya (12.5%). The river is used as a source of drinking water for the population and for watering of their livestock. Transhumance pastoralism is the dominant land use and livelihood activity in the basin (SWALIM, 2007). The common types of livestock kept are cattle, goats, sheep and camel. Collection of wood for firewood and charcoal is another important economic activity but that has big and negative impacts on the fragile ecosystems of the two rivers.

Agriculture practiced in the basin is mostly rainfall-dependent. The main crops grown from rainfed agriculture include sorghum, millet, maize, groundnuts, cowpeas, mung beans and cassava. The seasonal flooding of the Juba and Shabelle rivers supports flood recession agriculture in natural depressions known as *deshek* occurring along the river courses. The main crops grown in the *desheks* are maize, sesame, tobacco, beans and vegetables. Small and large scale irrigation is also practiced in the basin. The total irrigation potential of the two basins is 5,000 km² (Houghton-Carr *et al.*, 2011). The area currently equipped for irrigation in Ethiopia, Kenya and Somalia is 48,783 ha, 7134 ha and 142814 ha respectively. Water resources in the Juba-Shabelle basins are already quite stretched. During the dry months, the water resources are not sufficient to meet the current water demands.⁷ Given the increasingly erratic nature of rainfall and associated impacts on rainfed agriculture, irrigation water use is projected to increase in the future.



Figure 8: Camel – one of the livestock reared in large numbers in the Juba-Shabelle Basin⁸

The only major infrastructure in the basin is the Melka Wakena Dam and hydropower station (has an installed capacity of 153 MW) in the Oromiya Region of Ethiopia in the headwaters of the Shabelle River. This situation is about to change drastically as Ethiopia plans major infrastructure developments in the Basin. Under the Genale-Dawa River Basin Master Plan Study, Ethiopia is planning to build 93 medium to large scale irrigation schemes to irrigate over one million hectares of agricultural land. This is expected to consume large volumes of water from the two rivers. The Genale-

⁷ Mapping, Assessment & Management of Transboundary Water Resources in the IGAD Sub-Region Project Report.

⁸ Obtained from: www.demo.tare2.com on November 25, 2014

Dawa Master Plan has further identified 9 large hydropower dam projects to be implemented from 2013 to 2035 to generate 1300 MW of firm energy (Abdullahi, 2014). The electricity will be exported to neighbouring countries to earn much needed foreign currency. Like Ethiopia, Kenya has developed investment plans to develop the water resources of the Daua River to support multiple sectors (domestic water supply, irrigation, livestock production, fisheries production, etc.). Somalia's heavy reliance on the Juba and Shabelle Rivers makes water development in the upstream countries a matter of great concern to the country.

Under the IGAD Centre for Pastoral Areas and Livestock Development (ICPALD), the three riparian countries of the Daua River Basin are implementing a project that is promoting the rationalization and harmonisation of proposed investments in the River Basin. One of the ultimate goals of the project is to prepare the ground for development of a joint integrated river basin development plan that provides for equitable utilisation of the shared water resources of the basin among the co-basin states.

The Juba-Shabelle basin faces a number of challenges, the main ones being:

- (a) Lack of a legal framework for cooperative management and development of the shared water resources by all co-basin states; There are a number of interim arrangements between Ethiopia and Kenya in the form of Joint Border Administrators'/Commissioners' meetings; Joint Border Inter-Ministerial Committee on Security and Joint Ministerial Commission. No similar arrangements exist between Somalia and her upstream neighbours.
- (b) The continuing civil war in Somalia, which has put to halt many development initiatives in the basin;
- (c) High land degradation due to cutting down of trees for firewood, charcoal and building poles;
- (d) Breakdown in hydrological and meteorological monitoring networks, which makes water resources planning difficult due to lack of data; to some extent this is being addressed under the SWALIM Project.
- (e) Lack of investment (in Somalia) in infrastructure to harness water and increase its utilisation for domestic water supply and irrigation; and
- (f) Due to the civil war, weak or lacking national institutional frameworks for Integrated Water Resources Management, including water rights administration.

4.5 Ogaden Basin

The Ogaden drainage basin is found in the northeastern part of the Horn of Africa occupying an area of 207,363 km² covering parts of Ethiopia and Somalia. The dominant landform in the basin - the Ogaden Plateau - rises

from 300 m amsl in the southern parts of the basin to 1,500 m amsl in the northwest peripheries of the basin.

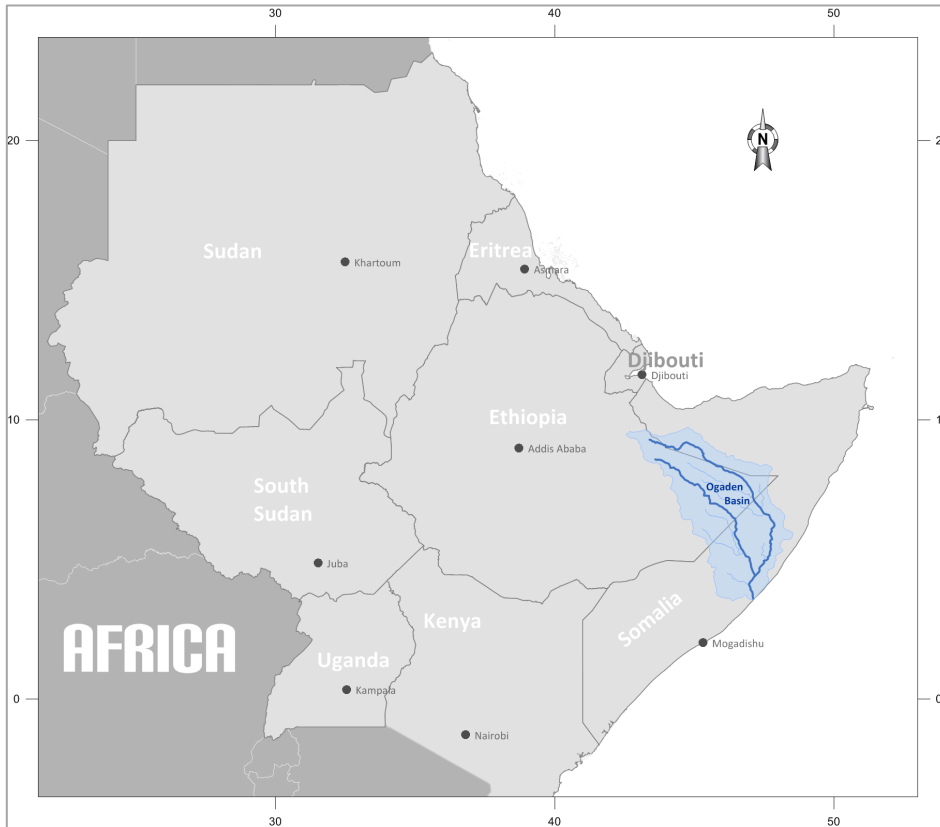


Figure 9: Map of the Greater Horn of Africa showing the Ogaden Basin⁹

The Ogaden is a dry basin with negligible surface water resources. Rainfall in the basin is low and erratic. The northwestern and southern parts of the basin are classified as humid to semi-arid and receive an average of 400 – 500 mm/year of rainfall. The rest of the basin is classified as arid (desert) and receives an average of 350 mm/year or less of rainfall. The erratic nature of rainfall and frequency of severe droughts has intensified in recent years. Average daily temperatures range from 25°C to 39°C.

The drainage network in most of the Ogaden region is sparse and ill defined. The only reasonably well defined water course is in the Bokh Valley in northern Somalia which has a total length of about 180 km. In other areas, there is occasional, localized runoff generated in the poorly developed seasonal streambeds, but this disappears quickly through evaporation and infiltration. No water reaches the Indian Ocean. Available surface water in the

⁹ Map prepared under this study

basin is estimated at 14.1 BCM, while groundwater, which is part of the regional Ogaden-Juba aquifer, is estimated at 6.5 BCM (IGAD, 2011).

The Ogaden Basin has relatively low population density due to the harsh environment, scarcity of water, remoteness and poor economic and social infrastructure. The basin landscape is dominated by dense shrublands, bush grasslands and bare hills. The population in the basin, estimated at 3.05 million in 2011, is predominantly comprised of nomadic pastoralists, and is nearly equally distributed between Ethiopia (46%) and Somalia (54%). There has been an influx of people and livestock into the basin in recent years due to the war in South Somalia.

Pastoralism in the basin ranges from pure nomadism, characterized by long-distance migration in perpetual search of pasture and water, to seasonal nomadism, characterised by movements over shorter distances. Scarcity of water and grazing lands and increasing occurrence of climate-related droughts pose serious threats to the pastoralist livelihoods. There is a low level of agricultural irrigation being practiced, with the irrigated lands in Ethiopia estimated at 1,721 ha while that in Somalia is estimated at 23,429 ha¹⁰. Water resources are inadequate to meet the water demand under reference conditions. The water demand deficit has been projected to rise from 83 million m³ in 2011 to 99 million m³ by 2031 (IGAD, 2011).

The Ogaden region is endowed with large oil and natural gas deposits, the discovery of which has been responsible for violent conflicts in the region. In Ethiopia where oil exploration is underway, the Ogaden National Liberation Front (ONLF) has intensified a guerrilla war seeking autonomy for the ethnically Somali Ogaden Region (van de Giessen, 2011).

The Ogaden Basin faces multiple and serious challenges, key among which are the following:

- (a) Geo-political tensions and lack of cooperation between the two riparian states of the basin; lack of a common platform to bring together Ethiopia and Somalia to address the common environmental and socio-economic challenges of the Ogaden region; lack of a legal framework for the cooperative management and development of the shared water resources of the Ogaden basin by the riparian countries;
- (b) Pollution (including toxic waste) of ground water as a result of oil prospecting; lack of a framework for transboundary EIA with respect to oil exploration;
- (c) Lack of an agreed framework for oil exploration, which has precipitated violent conflicts;

¹⁰ Extracted from the global map of irrigated areas of FAO (2007)

- (d) High food, water and energy insecurity due to natural factors acting in combination with poor governance;
- (e) Severe and worsening impacts of climate change and variability, and high vulnerability of pastoralist livelihoods to water-related natural disasters.
- (f) Overgrazing leading to loss of vegetation, land degradation and soil erosion;
- (g) A serious paucity of data and information, which thwarts efforts to plan projects to develop the region; and
- (h) Low stakeholder involvement in planning and development processes of water-related initiatives.

4.6 Awash River – Lake Abbe Basin

The Awash River Basin is an internal drainage basin that occupies the floor of the Rift Valley in the section stretching from the Central Ethiopian Highlands to the border with Djibouti. The basin is bound on either side by high rising escarpments. Elevation in the basin ranges from close to 4,200 m amsl in the highlands around Addis Ababa, to 210 m amsl in the Afar depression.

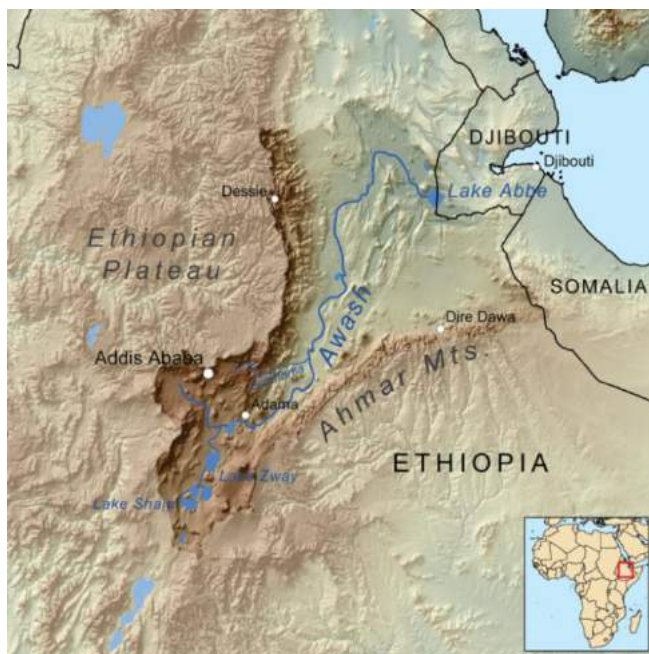


Figure 10: Map of the Awash River Basin¹¹

The Awash River has a total length of 1,200 km (CSA, 2008) and a basin area of 112,700 km² covering parts of Afar, Amhara, Oromia and Somali Regions. The Awash River has no outlet to the Sea: it empties in a system of six

¹¹ Obtained from: http://en.wikipedia.org/wiki/Awash_River#mediaviewer/File:Awashrivermap.png on November 24, 2014

interconnected lakes that start with Lake Gargori and end with Lake Abbe – a transboundary lake straddling the Ethiopia-Djibouti border. All six lakes are Rift Valley salt lakes. The six lakes receive water from surface runoff as well as ground springs. Lake Abbe - the last of the chain of lakes - is a small (180 km²), shallow and highly saline lake. As is characteristics of Rift Valley areas, the basin has a large number of hot springs and considerable geothermal energy potential.



Figure 11: *Satellite image of Lake Abbe*¹²

Rainfall is bimodal and ranges from 1,400 to 1,800 mm/annum in the Ethiopian Highlands to below 200 mm in the lowlands on the northeastern part of the basin. The short rainy season is from March to April while the long rains are from June to September. The Awash River and its tributaries frequently flood in the months of August and September following heavy rains. Its main tributaries are the Majo, Akaki, Germama, Kebene and Mile Rivers. The annual runoff of the Awash River is estimated at 4.6 billion cubic metres. Potential evapotranspiration ranges from 1800 mm/annum in the Upper Awash (i.e. about twice the annual rainfall in the area) to 2348 mm/annum in the Lower Awash (about 10 times the annual rainfall of the area).

The Awash River is an important source of drinking water, and provides water to the cities of Addis Ababa and Dire Dawa, and the towns of Nazrét, Metehara, Awash, Gewane and Asaita. The Basin has a population of 10.5 million, 85% of who are engaged in agriculture, both rainfed and irrigated. Agriculture is the largest consumptive water user in the basin. The river is also an important source of water for livestock, with traditional pastoralism being widely practiced in the basin, particularly in the Upper Awash Sub-basin.

¹² Obtained from http://en.wikipedia.org/wiki/Lake_Abbe

Agricultural water use in the Awash River Basin is the highest in Ethiopia, accounting for 48% of the total agricultural water consumption of the country. The high level of agricultural water development has been supported by a number of factors including the flat and gently sloping topography, fertile alluvial soils of large parts of the Awash Valley, and availability of all-year flow in the Awash and its main tributaries. The irrigation potential of the basin is estimated at 200,000 ha about 45% of which is currently equipped for irrigation (Zerfu, 2012). The main crops grown on the commercial farms (most are state owned) are sugarcane, cotton, bananas, cereals and vegetables.

The Awash River Basin is also used for hydropower production. The first dam – Koka dam was commissioned in 1960. The Koka dam created a 255 km² lake called Lake Gelila that is also being used for agricultural irrigation. Two additional power stations have been built at Awash Melkasa (Awash II and Awash III). Construction of two dams for irrigation is ongoing at Kesem and Tendaho.

Ethiopia's oldest wildlife reserve – the Awash National Park – is located in the Basin. The park has an area of 720 km² and sizeable populations of large mammals that include the Oryx, bat-eared fox, caracal, aardvark, colobus monkey, green monkeys, Anubis baboons, Hamadryas baboons, klipspringer, leopard, bushbuck, hippopotamus, Soemmering's gazelle, cheetah, lion and kudu. The park also has about 450 species of birds. The Awash valley has the last surviving population of the Somali Wild Ass (*Equus asinus somalicus*).



Figure 12: The bat-eared fox: one of the large carnivores in Awash National Park¹³

¹³ Obtained from http://en.wikipedia.org/wiki/Bat-eared_fox on November 25, 2014

The basin is faced with a number of challenges, the main ones being (Tadesse *et al.*, 2003):

- (a) Rapid population growth increasing pressure on land, forest, water and other natural resources;
- (b) Deforestation, cultivation on marginal lands and general land degradation. These factors combine with torrential rains and high slopes to produce widespread soil erosion, bulk sediment transport and river and reservoir sedimentation. The Koka Dam is said to have lost 30% of its active storage to siltation; Lake Gelila is equally silting up;
- (c) High livestock stocking rates contributing to land degradation;
- (d) Drainage of wetlands for agriculture leading to loss of dry season grazing lands for livestock;
- (e) High infection rate of bilharzia from spread of intermediary host snails in irrigation canals of sugar plantations;
- (f) Heavy water pollution from discharge in the Awash River of untreated municipal and industrial effluent from the City of Addis Ababa;
- (g) Excessive consumptive use of surface waters leading to development of saline groundwater, and salinization of some soils and farmlands;
- (h) Desertification in the Lower Awash basin exacerbated by cutting down of trees for firewood and charcoal;



Figure 13: High sediment loading in the Awash River (Source: Zerfu, 2012)

- (i) Excessive water withdrawals for agriculture leading to reduced water reaching the system of saline lakes, and resulting in their progressive desiccation.
- (j) Poor groundwater quality from naturally occurring high salinity, high fluorides and high nitrates;
- (k) The continuous expansion of the highly saline Lake Beseka from 3 km² in the 1960s to 45 km² in 2013, leading to inundation of grazing lands, residential areas, farmland and part of the Addis Ababa – Djibouti highway; the lake is located a short distance from the Awash River. If it continues to grow, it will eventually spill into the Awash River and destroy the commercial agriculture in the Awash Valley (Zerfu, 2012).
- (l) The challenge of developing institutions of the Awash Basin Authority to be in position to competently undertake integrated management and development of the water resources of the basin and ensure the effectiveness of the existing water policy and legislative framework (Hemel and Loijenga, 2013).

The Awash River Basin is one of three basins in Ethiopia that has a River Basin Organisation. The Basin Organisation comprises of two organs – a policy organ – the Awash River Basin High Council – and a technical arm – the Awash River Basin Authority. The functions of the Basin Organisation include the development and review of Integrated Water Resources Management and Development Plans for the Basin, the operation and maintenance of the hydrometric and water quality monitoring networks, water allocation and water right administration, and stakeholder engagement. The Basin Organisation is only four years old and facing many challenges including inadequate skilled manpower.

4.7 Lake Turkana Basin

The Lake Turkana Basin has a catchment area of 206,216 km² shared by four countries, namely Ethiopia (54.8%), Kenya (43.3%), South Sudan (0.7%) and Uganda (1.2%). Like the Awash River Basin, the Lake Turkana Basin is an internal drainage basin located in the trough of the East African Rift Valley. The population in the basin is estimated at 18 million, with 81.7% located in Ethiopia. There is also a considerable population concentration in the basin's southern-most limits in Kenya (UNEP, 2010).

Precipitation is highly variable in the basin, being high in the highlands on the northern and southern edges of the basin, and low in the lowlands in the central parts of the basin. Rainfall is high over the Ethiopian part of the catchment, approaching a peak of 2000 mm/annum in the Shewan highlands (UNEP, 2010). Rainfall is also high in the southern parts of the basin, especially the highlands between Nakuru and Eldoret, and the slopes of Mt.

Elgon on the Kenya-Uganda border. The Mt. Elgon areas receive up to 1500 mm/annum in rainfall. The rainfall in Ethiopia makes up 75% of the precipitation over the entire basin, and contributes 90% of the annual flow to Lake Turkana (Avery 2010). Most of the runoff from Ethiopia is conveyed by the Omo River while surface runoff from the southern catchments is conveyed to Lake Turkana by two rivers – Turkwel (Suam) and Kerio – that travel through arid drylands before reaching the lake losing much of their water to evaporation in the process.

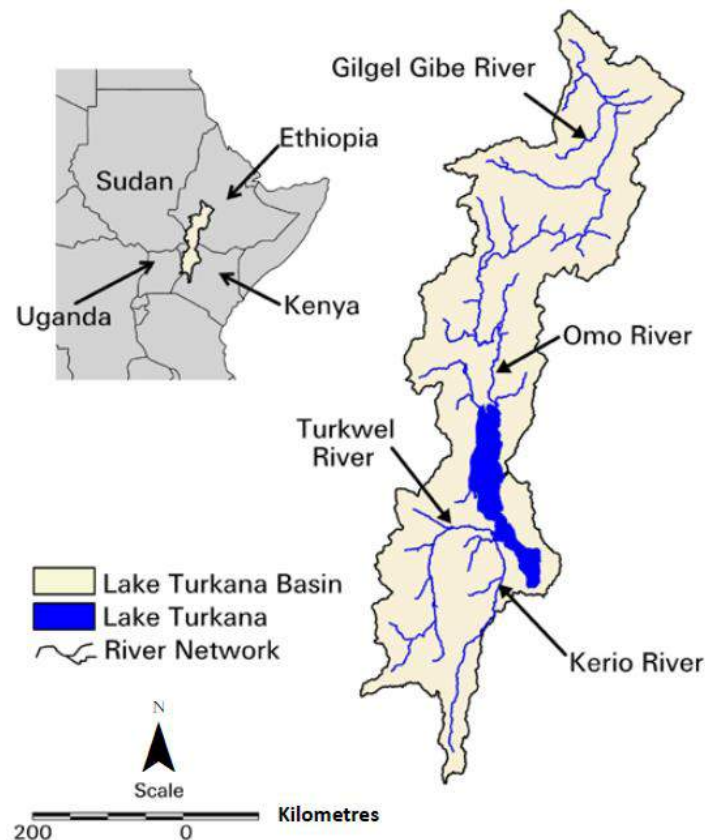


Figure 14: Location and extent of the Lake Turkana basin, East Africa (UNEP, 2013a)

A key feature of the Lake Turkana Basin is the lake itself. The lake occupies an elongated depression on the floor of the Rift Valley towards which all the rivers of the Turkana basin flow. Lake Turkana is the largest desert lake in the world. It has an average depth of 35 m, maximum depth of 125 m and a surface area of 7,000 km². The lake measures 250 km long by 15–30 km wide.

The central part of the Turkana basin – where the lake lies – has an arid climate characterised by high temperatures and evapotranspiration rates. The average daily temperature ranges from 24 to 38°C while relative humidity ranges from 40 to 60 percent. The annual water loss through evaporation is estimated to be in the region of 2400 mm (Velpuri and Senay, 2012). As a closed lake, the influx from rivers and evaporation over the lake's surface are

key determinants of lake level fluctuations. The lake experiences seasonal variations in its water level of 1–1.5 m over the year, and has a long term natural variability of 5–10 m. Although its water level declined considerably over the last century—by more than 10 m—the trend shows a slight increase over 1992–2010 (UNEP 2012).

The Lake Turkana basin is an economically impoverished region. Pastoralism characterised by occasional large livestock losses from drought and cattle rustling, is the dominant livelihood activity. Petroleum deposits were recently discovered near the lake, but are yet to be commercially exploited. The lake, as is typical for endoheic Rift Valley Lakes, is saline and unfit for human consumption or agricultural irrigation. However, it has a thriving and diverse fish population that provides a means of livelihood to local communities. The lake is also habitat to many species of reptiles, mammals and birds, including the Nile crocodile, hippopotamus, turtles, flamingos, cormorants, ibises, skimmers and sandpipers. Migratory birds plying the Eurasia- Eastern Africa route frequently make stopovers at the delta area of the Lake and the basin's system of interconnect seasonal wetlands. The vegetation in the basin is characterised by forests in the highlands in Ethiopia and the southern tips of the basin in Kenya, and arid and semi-arid type vegetation in the lowlands. Galleries of forests occur along the main watercourses, which are dominated by Acacia species.



Figure 15: *River Kerio flowing during the wet season*¹⁴

¹⁴ Obtained from: <http://en.wikipedia.org/wiki/> on November 25, 2014



Figure 16: *Lake Turkana*¹⁵

River Omo, which has a total length of 760 km and an annual flow of 17.9 billion cubic metres, is the second biggest river in Ethiopia, and the most important river in the Turkana Basin. It is the only perennial river entering the lake: all the other rivers are dry for most of the year and flow for only a few days or even hours after rains. The Turkwel River, which flows for several months in a year, is the only exception among the seasonal rivers of the basin.

The course of the Omo River has several falls making it unnavigable. From its source to the point of discharge in Lake Turkana, the Omo drops over an altitude of 1,829 m. This makes it a fast flowing river, and ideal basin for hydropower production. The Omo's main tributary is the Gibe River while smaller tributaries are the Wabi, Denchya, Gojeb, Mui and Usno rivers.

The Omo River plays a key role in maintaining the levels of Lake Turkana and supporting the fishing industry on the lake. The river also supports flood recession agriculture practiced by ethnic communities of the Omo Valley, maintains edaphic grasslands that provide dry season pasture for livestock and wildlife, provides water for wildlife in the Omo National Park and Mago National Park in the Omo Valley, and recharges shallow groundwater aquifers used, among other things, for domestic drinking water. The most important use of the River Omo, however, is with regard to hydropower production.

¹⁵ Obtained from: <https://issetdirectorblog.wordpress.com/tag/lake-turkana/> on November 25, 2014



Figure 17: *A man fishing on Lake Turkana*¹⁶

Ethiopia plans to build a cascade of hydropower facilities along the Omo-Gibe River. The first facility, the Gilgel-Gibe I consists of a dam and 184 MW power station. It has been completed and filled. The second hydropower facility, Gilgel-Gibe II, is a 420 MW power station fed by a 25 km tunnel from the Gilgel-Gibe I Reservoir. This tunnel project (Gibe II) does not impound water and has no substantial impact on Lake Turkana water levels. The third facility, the Gilgel-Gibe III dam, is still under construction and is scheduled for commissioning in June 2015. When completed, the Gilgel-Gibe III will be the largest hydroelectric power plant in Africa (before completion of the Ethiopian Grand Renaissance Dam) with a power output of 1870 MW. The dam will create a reservoir with a surface area of 210 km² and a storage capacity of 14 billion cubic metres of water at maximum capacity. Two additional dams are planned in the Omo Valley: the Gibe IV (1472 MW) and the Gibe V (560 MW).

The main benefits of the water resources developments in the Omo Valley are the production of clean and cheap electricity to meet growing energy demands in Ethiopia and the wider IGAD region, as well as revenue to Ethiopia from export of electricity to neighbouring countries (potentially Kenya, Sudan, Djibouti and Tanzania). Kenya has already signed a Memorandum of Understanding to purchase electricity from the Gibe III Power Station, and the EAC countries are in the process of interlinking their national power grids so as to benefit from power surpluses in Ethiopia. Financing for a transmission line to Kenya was approved by the World Bank in July 2012. Beyond electricity sales and imports, the Gibe III has the potential to promote closer ties and regional integration in the IGAD Region.

¹⁶ Obtained from: www.worldfortravel.com on November 25, 2015

Environmental groups have widely criticised the Gibe III project, pointing out that ethnic groups in the Omo Valley that are heavily dependent on the river for survival were not consulted over the project. The critics believe that the Environmental and Social Impact Statement of the project is fundamentally flawed and written in such a manner as to justify the project. It does not, they point out, take into consideration potential transboundary impacts, is silent on planned irrigation development, and was commissioned when construction was already underway. They cite likely environmental and social impacts as reduced inflow to Lake Turkana, risk of earthquakes, loss of floods and flood recession agriculture, and loss of gallery forests (UNEP, 2010; Avery, 2010). Furthermore, planned agricultural irrigation associated with the dam has the potential to cause a drop in the level of Lake Turkana.

Project proponents argue that the dam will be operated in such a way as to allow flooding to be maintained, and for flood recession agriculture and flood-dependent ecosystem functions to be sustained into the future. Preliminary studies have further shown that, except for the time of filling of the dam, the impacts of the Gibe III Dam on the levels of Lake Turkana will be minimal or within the natural variability of the lake, assuming, that is, that water is only used for hydropower generation (UNEP, 2010; Avery, 2010; Velpuri and Senay, 2012; UNEP, 2013a).



Figure 18: A Turkana woman with her grandchildren. Many indigenous communities reside in the basin and are heavily dependent on the basin's natural resources for their survival¹⁷.

¹⁷ Obtained from: <http://www.loe.org/shows/segments.html?programID=13-P13-00020&segmentID=4> on November 25, 2015.

Key challenges in the basin include:

- (a) The lack of a legal framework for the cooperative management of the shared water resources by the co-basin states, including the lack of a framework for transboundary EIA;
- (b) The lack of a monitoring system for post-construction monitoring of the impacts and benefits of the Gibe cascade of power stations;
- (c) High population growth putting increasing pressure on the fragile natural resources;
- (d) Overgrazing leading to loss of vegetation, land degradation and soil erosion;
- (e) Strong impacts of climate change and variability, and high vulnerability of Lake Turkana indigenous communities, both pastoralists and fisher folk, owing to the intimate ways in which they use and live off natural resources, and their high dependence on cultural cohesion; and
- (f) Low stakeholder involvement, especially of local communities residing with the basin.

There are several ongoing efforts to address the above challenges and minimise the human induced pressure on the fragile natural resources of the Lake Turkana Basin. Among these is the transboundary project titled “Support to Sustainable Development of the Lake Turkana and its River Basins (UNEP, 2013b)” which is being funded by UNEP with initial focus on Ethiopia and Kenya (which between them cover over 90% of the basin area). The project is expected to put in place a policy, legal and institutional framework for cooperative management of the basin by Ethiopia and Kenya, and collect wide ranging water resources and ecosystem data and information to enhance the knowledgebase for science-based policy and decision making on the management and development of the basin.

4.8 Gash (Mareb) River Basin

The Gash River has a total length of 440 km and catchment area of 31,000 km² shared by Eritrea, Ethiopia and Sudan. The river has its source in the Ethiopian Plateau in central Eritrea about 25 km southeast of Asmara, and from there travels westwards along the border between Eritrea and Ethiopia before re-entering Eritrea. It exits Eritrea and enters Sudan west of the town of Teseney and travels towards the city of Kassala and ends up in a flat delta in northeastern Sudan. Its mean annual runoff is estimated at 0.26 billion cubic metres but varies considerably from year to year. Its main tributaries are the Sarana, Balasa, 'Engweya, Gala and Obel Rivers.

The Gash River is dry for much of the year but is subject to sudden torrential floods during the rainy season between June and October. In years of extreme

rains, the Gash River connects with the Atbara River and joins the Nile system.



Figure 19: *The dry bed of the Gash River during the dry season in Kassala, Sudan¹⁸.*

The Gash is important as a source of drinking water to local communities and livestock. It is the main source of water supply for the towns of Teseney (Eritrea) and Kassala (Sudan) where it is also used for irrigation. The largest irrigation effort is in the Gash Delta where an area of 50,000 ha is under irrigation. The River flows close to the Gash-Setit Wildlife Reserve in Eritrea and provides an important source of water for the wildlife there.

There are a number of challenges being faced in the river basin, the main one being:

- (a) Lack of a legal framework for the cooperative management of the transboundary river resources by the co-basin states;
- (b) A history of war, destruction, mistrust and bitter rivalry between two of the riparian countries (Ethiopia and Eritrea)
- (c) General land degradation leading to widespread soil erosion and large exports of sediments through the river. The sediment load of the river (which is predominantly suspended sediment load) is estimated at 5.5 to 13 million cubic metres/annum.
- (d) Disturbance of agricultural irrigation activities by the high sediments loads. Among other things, the huge silt loads cause frequent blockage of intake canals.
- (e) Excessive water abstractions for domestic use and irrigation. In the Sudanese town of Kassala where this problem is most pronounced, it is

¹⁸ Obtained from: <http://ar.wikipedia.org/>. on November 25, 2014

leading to a drop in the groundwater table and drying up of springs and wells.



Figure 20: An irrigated field in the Gash Delta in Kassala, Sudan ¹⁹.

The northern border between Ethiopia and Eritrea, which is traversed in parts by the Gash River, was the scene of heavy fighting between the two countries in the late 1990s. Relations between the two countries have since improved but tensions remain. This may, therefore, make the Gash basin a poor choice for piloting the BRIDGE Project.

4.9 Barka (Baraka) River Basin

The Barka River has a total length of 640 km and catchment area of 66,200 km² lying in Eritrea (62%) and Sudan (38%). The river has its source in the Eritrean highlands in the centre of Eritrea just outside Asmara and flows in a westward direction through the town of Agordat before turning to flow northwestwards to the Eritrea-Sudan border. The Barka has one major tributary, the Anseba, and a minor tributary, the Shet'. The main tributary Anseba has a length of 346 kilometres and also rises in the Eritrean Highlands outside Asmara before flowing in a northwestern direction through the town of Keren. It joins with the Barka River near the border town of Sala and the combined river (called the Baraka River in Sudan) flows into Sudan ultimately draining into marshes close to the town of Tokar near the Red Sea.

The Barka is a seasonal river, and is dry for much of the year. The main rains in the basin known as the '*kremti*' fall in the months from June to August. During these months, the river swells its banks and has torrential floods.

¹⁹ Downloaded from <http://cluelessinkrt.blogspot.com/2014/05/kassala-for-beginners.html> On November 25, 2014



Figure 21: *The Barka River shared by Eritrea and Sudan.*

There are a number of riverine forests and aquatic ecosystems along the Barka and Lower Anseba rivers that have been identified for protection as biodiversity hot spots. There are also existing gazetted wildlife reserves such as the Yob Wildlife Reserve in Eritrea and Tokar Game Reserve in Sudan, which hold populations of common large African game.

The Barka together with the Gash basins are the main agricultural region of Eritrea. Fruit farming is practiced in many areas of the Barka Basin especially in the two towns of Agordat and Keren. Agordat (Akordat) lies on the southwestern lowlands of the Barka River and is known for its fruit and nut production. Many of the 25,000 inhabitants of the town own or work on banana plantations. Doum palms, also known as *Akat* trees, grow along the river's bank and bear an oval, red-orange fruit known as gingerbread fruit.

The town of Keren (Cheren), another major agricultural town, is located northwest of the city of Asmara in the central highlands of Eritrea. The city is a major agricultural and dairy centre for the region, and has a population of approximately 75,000. A variety of fruits and vegetables are produced on its numerous small farms, and it is especially known for its potent chili peppers. Keren's dairy herds produce milk, butter, and cheese.

Livestock keeping by traditional pastoralists is widely practiced in the basin and is another important economic activity in the region. Main types of livestock kept are cattle, sheep, goats, donkeys, horses, and camels. During the dry season the pastoralists migrate with their livestock to graze in areas close to the banks of the Barka and Anseba rivers.



Figure 22: *Doum palms growing along the banks of the Barka River*

The main challenges facing the basin are the following:

- (a) Lack of a framework for the cooperative management of the river basin by the two co-basin states.
- (b) Environmental degradation resulting from overharvesting of trees for firewood and timber. This is the main challenge in the basin. The thirty years of war for the liberation of Eritrea had a major contribution to the present degraded state of the basin. During the war, there was a scorched-earth policy practiced by the Ethiopian army to deny camouflage to rebel fighters. Additional destruction during the war came from the cutting down of forests to provide timber for building soldiers accommodation and fortifications.
- (c) Strong impacts of climate change and variability on the arid lands; and
- (d) Widespread poverty in the basin.

4.10 Lake Natron Basin

The Lake Natron Basin straddles the Kenya-Tanzania border and is an internal drainage basin that occupies the floor of the East African Rift Valley. The basin has a catchment area of 55,189 km² about two thirds of which lies in Kenya (in the Ewaso Ng'iro South Catchment) and one third in Tanzania (in the Internal Drainage Basin)²⁰. The basin has a mean elevation of about 800 m amsl and is bounded on the eastern and western margins by high rise escarpments and hills. The basin comprises of arid to semi-arid drylands (that receive about 800 mm/annum of rainfall) that experience high inter-annual variability in the rainfall. Temperatures in the basin frequently reach 40 C.

²⁰ Obtained from: http://aquapedia.waterdiplomacy.org/wiki/index.php?title=Lake_Natron_Basin



Figure 23: Map showing the Lake Natron Basin²¹

Lake Natron, the largest water body in the basin, is a shallow and highly alkaline soda-lake lying on the floor of the Eastern Rift Valley at an elevation of 610 m amsl. It is located in Arusha region, Tanzania with its northern tip close to the Kenya-Tanzania border. The lake has a maximum length of 58 km, mean width of 15 km and mean depth of 0.5 m. The surface area of the lake fluctuates seasonally and from year to year depending on rainfall. In wet years the surface area reaches a maximum of 850 km².

The lake is fed principally by the perennial Ewaso Ng'iro South River, which has its source in the southern Mau Forest in central Kenya. From the Mau Escarpment, the river travels southwards through the rift valley to the east of the Nguruman Escarpment and eventually crosses the Kenya-Tanzania border to empty in Lake Natron. In the wet season, the lake receives water from several seasonal streams originating in the surrounding hills and mountains. The total volume of freshwater conveyed by the rivers is estimated at 10 BCM per year. The lake also receives water from mineral-rich hot springs at the bottom of the lake. A large wetland comprising of a permanent 40 km² swamp (the Engare Ng'iro swamp) and 80 km² seasonal floodplain lies on the northern margins of the lake. Seasonal wetlands also fringe the eastern shoreline of the lake²².

Lake Natron is among the most saline of the East African Rift Valley Lakes. Chloride concentrations in the lake reach 65,000 mg/litre making it totally unsuitable for human and livestock consumption. Runoff rich in soda from the

²¹ Obtained from: <http://www.google.maps>

²² Southern Ewaso Ng'iro obtained from: http://en.wikipedia.org/wiki/Southern_Ewaso_Ng%27iro

nearby Ol Doinyo Lengai volcano has led to extremely high concentrations of sodium carbonate in the lake. The alkalinity of the lake fluctuates from a pH of 10.5 in the rain season to a pH of greater than 12 at the peak of the dry season. As water evaporates during the dry season, salinity levels increase to the point that salt-loving microorganisms begin to thrive. Dense growths of the *Spirulina* (a blue-green algae with red pigments) give the lake's open waters a pink to deep red colour and shallow waters an orange colour. High levels of evaporation over the years have left behind *natron* (sodium carbonate decahydrate) and *trona* (sodium sesquicarbonate dihydrate) in the lake.



Figure 24: The Ol Doinyo Lengai volcano seen from Lake Natron during the dry season²³

Lake Natron has been designated as an international Ramsar site. The salt marshes and freshwater wetlands around the edges of the lake support a variety of plants, some invertebrates, a few fish species and large flocks of birds. The lake, with a breeding population of 1 million Lesser Flamingo (*Phoeniconaias minor*), has the largest single stock of the Lesser Flamingo in East Africa. This population of Lesser Flamingo is classified by IUCN as “*near threatened*” because they depend on this single location for breeding. The caustic environment of Lake Natron makes it a safe breeding ground for the Lesser Flamingo as predators are unable to reach the flamingo nests, which are built on islands of seasonally-formed evaporite.

²³ Obtained from: <http://upload.wikimedia.org>



Figure 25: Lake Natron with a red colour from a bloom of salt-loving algae²⁴

The Greater Flamingo has been seen to breed on the mud flats of the lake. Other notable birds found in Lake Natron area include Fischer's lovebird (also near-threatened), buff-crested bustard, white-bellied go-away bird, sombre nightjar, long-tailed fiscal and red-rumped waxbill²⁵. Two endemic fish species, the alkaline tilapias *Alcolapia latilabris* and *A. ndalalani*, also thrive in the waters at the edges of the hot spring inlets.



Figure 26: Lesser flamingos on Lake Natron²⁶

The Lake Natron Basin is not highly developed. The land surrounding Lake Natron is dry bush dominated by Acacia thorn-trees and inhabited by pastoralist Masai. There is some seasonal cultivation along the riverbanks

²⁴ Obtained from: <http://www.strangedaze.doomby.com>

²⁵ Lake Natron and Engaruka Basin from: <http://www.birdlife.org/datazone/sitefactsheet.php?id=6994>

²⁶ Obtained from: <http://www.flightnetwork.com>

and a small settlement in the south associated with a minor soda-extraction plant and a few small tourist camps. Other than these settlements, the general area is sparsely populated, the lack of fresh water in the dry season controlling the populations of man and livestock. The total population in the basin is estimated at 1.5 million, most of whom (61%) live on the Kenyan side of the basin.

Key challenges in the basin include:

- (a) The lack of a legal framework for the cooperative management of the shared water resources by the riparian countries;
- (b) Plans to dam the Ewaso Ng'iro for hydroelectric power generation and for irrigation of the marshlands north of the lake. The plans include the creation of a variable freshwater lagoon with an area of about 50 km². If implemented, these plans could reduce the salinity of the lake and wipe out the blue-green algae on which the Lesser Flamingo is dependent.
- (c) Plan to build a soda ash plant on the shores of Lake Natron, which would further threaten the breeding of the Lesser Flamingo.
- (d) Increased logging and deforestation in the Mau Forest complex and other highland forests that are important water catchments for the Ewaso Ng'iro and the seasonal streams feeding Lake Natron.
- (e) Increasing impacts of climate change and variability, manifesting mainly as increasing droughts and greater desiccation of the lake.

4.11 Lake Chala, Lake Jipe and River Umba

4.11.1 Lake Chala

The governments of Kenya and Tanzania are cooperating in managing Lake Chala, Lake Jipe and River Umba - three of several water bodies that straddle their common border.

Lake Chala (altitude 800 m amsl.) is a crater lake in a caldera on the borders of Tanzania and Kenya. The lake has a surface area of 4.2 km² and an average depth of 81 m and receives water mainly from groundwater flows originating in the nearby Mount Kilimanjaro. The lake is home to the endemic Lake Chala Tilapia (*Oreochromis hunteri*), which due to over fishing by local fishermen, now features on the IUCN Critically Endangered list of species. The stunning views of the Lake have made it a popular tourist destination.



Figure 27: Lake Chala²⁷

4.11.2 Lake Jipe

Lake Jipe (altitude 710 m amsl) is another international transboundary lake shared by Kenya and Tanzania. Jipe is a narrow and elongated small lake measuring 19 km long by 5 – 6.5 km wide. It has a surface area of 30 km² and mean depth of 3 m. The littoral zone of the lake, especially in the eastern and western parts, is covered by dense growths of emergent macrophytes dominated by *Typha* and *Papyrus*.

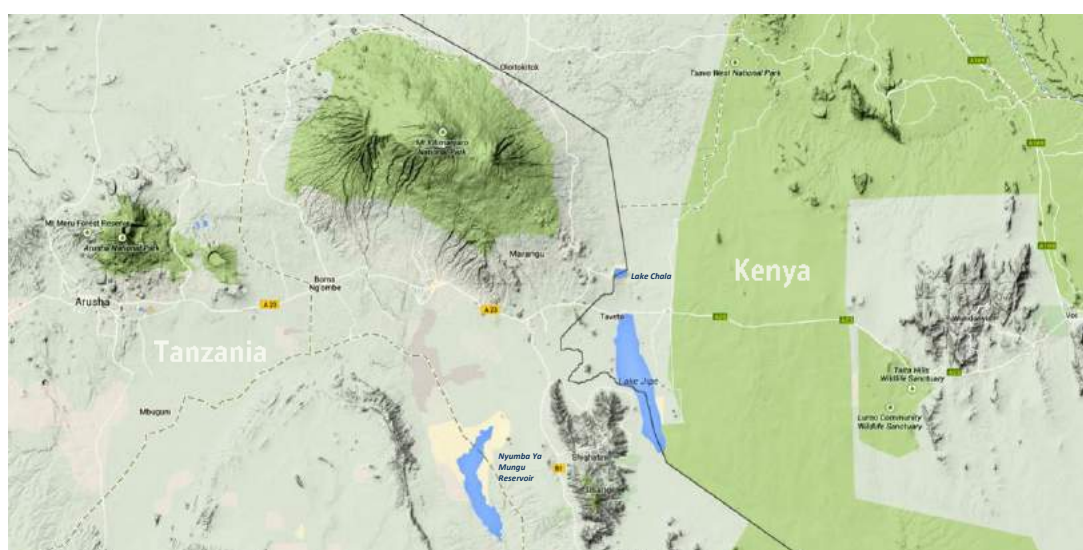


Figure 28: Map showing Lake Chala and Jipe on the Kenya-Tanzania border

The level of Lake Jipe is maintained by runoff from two high rainfall areas: the Mount Kilimanjaro and the North Pare Mountains. The lake drains via

²⁷ Obtained from: www.flickr.com on November 25, 2014

the Ruvu River into the Nyumba Ya Mungu Reservoir, which is part of the Pangani River Basin in Tanzania.

The Lake is home to hippopotami and the Nile crocodile and is occasionally visited by wildlife from the surrounding national parks (the Tsavo West National Park in Kenya and Mkomazi National Park in Tanzania) especially during the dry season.

The lush growth of fringing wetlands has created favourable conditions for aquatic fowl which frequent the lake. Common birds found on the lake include the knob billed geese, Egyptian geese, pied kingfisher, white backed night heron, black heron, Madagascar squacco heron, great white pelican, palm-nut vulture, African skimmer, African darter, spur-winged plover, lesser jacana and the purple gallinule. This rich birdlife and scenic surroundings are attracting increasing numbers of tourists to the lake



Figure 29: Great white pelicans on Lake Jipe. In the background is the Kenyan town of Taveta²⁸.

About 120,000 people live in the Lake Jipe Basin and depend on the lake for drinking water, food (fish), dry season pasture for livestock and agricultural irrigation.

The Lake Jipe is experiencing a number of challenges, the main one being:

- (a) Increase in population leading to rising pressure, degradation and habitat destruction in the lake's catchment;
- (b) Rapid siltation and shallowing of the lake accompanied by rapid expansion in the area of fringing wetlands. The shoreline wetlands are believed to have doubled in area over the last 30 years. The rapid

²⁸ Obtained from: <http://www.enajasafaris.com/About%20us.html> on November 25, 2014

siltation is attributed to heavy deforestation and poor farming methods on the slopes of Mount Kilimanjaro leading to high soil erosion and sediment transport

- (c) Reduced inflow into the lake possibly due to increased water abstraction in the catchments
- (d) Declining water quality (especially turbidity) due to catchment degradation; and
- (e) Overfishing leading to declining catches and outmigration of fishermen.
- (f) Lack of a cooperative framework for transboundary water management.



Figure 30: *Fishermen preparing their nets at the wetland-fringed Lake Jipe*²⁹.

4.11.3 River Umba

The River System

River Umba is an international transboundary river with a catchment area of 8,070 km² shared by Tanzania (69.3%) and Kenya (31.7%) (IUCN, 2009). The River has several sources, the highest being the Shagayu Forest Reserve (2000 m amsl) on the West Usambara Mountains in Tanzania. From the Usambara Mountains the river flows in a southwest direction roughly parallel to the Tanzania-Kenya border and crosses into Kenya just before it discharges into the Indian Ocean near the coastal town of Vanga.

²⁹ Obtained from: www.bestaroundtheweb.com on November 25, 2014



Figure 31: *The West Usambara Mountains – source of the Umba River*³⁰

Rainfall in the Umba Basin is strongly seasonal, with most rain falling in the months of December and January. Average rainfall in the basin is 600 mm/annum. The Umba has several tributaries, the main ones being the Mglumi, Bombo and Mbalamu Rivers. The discharge to the ocean from the basin is about 1 billion cubic meters/annum.

The Umba basin is sparsely populated, with the total population estimated at 407,100. The main land use in its northern part is wildlife conservation, while cattle grazing is the main land use in the south. Agriculture, both rainfed and irrigated, is also practiced. The area under irrigation in the basin is estimated at 1,475 ha (IUCN, 2009). Water from the river, besides supporting the above uses, is used as a source of drinking water for the communities residing in the basin.

The headwater areas of the River Basin are covered by forests, some of which, like the Shagayu Forest Reserve, are very old natural forests with diverse species of native trees and forest-dwelling small animals. The high altitude areas in the upper basin are covered by Afromontane forests. Lying at the foot of the West Usambara Mountains is the Umba Game Reserve an area measuring 450 km² that used to be part of the Mkomazi National Park, and is contiguous with the Tsavo National park in Kenya. The reserve has a cover of sparse, dry, savannah-type bush and low trees. The reserve is home to a number of large mammals, including buffaloes, elephants, lions and various antelopes.

³⁰ Obtained from: www.en.wikipedia.org on November 26, 2014

The Uмба Valley located in the headwater regions of the basin has rich deposits of precious stones including sapphires, spessartine and ‘*umbalite*’ garnet. Mining is carried out by small-scale miners.

The Uмба river faces multiple challenges, the main ones being (Lerise, 2007; IUCN, 2007):

- (a) Lack of a framework for cooperation on the management and development of the shared water resources of the Uмба River Basin;
- (b) Poaching of the wildlife in Uмба River Game Reserve by surrounding communities and hunters from neighbouring Kenya;
- (a) Heavy and Illegal logging in the upstream forests leading to near disappearance of highly valued tree species such as *Brachylaena hulensis* and *Albizia vesicular*;
- (b) Drying up of streams where riverbeds have been encroached upon and converted to farmland;
- (c) Heavy siltation of the river causing frequent flooding in the lower parts; and
- (d) Water pollution from human settlement along stream and poor solid and liquid waste management.

Efforts are underway to develop a cooperative framework for the management of the transboundary water resources of the Lake Chala, Lake Jipe and River Uмба. The Governments of Kenya and Tanzania signed a Memorandum of Understanding in 2013 to cooperate on the joint management and development of three transboundary water systems. The cooperation is expected to be coordinated under, and facilitated by, the Lake Victoria Basin Commission. Under the MoU, the two countries agreed to set up a legal and institutional framework for the joint management and development of the three water systems. They further committed to cooperating in water supply and sanitation, Integrated Water Resources Management (IWRM), natural resources management, environmental and ecosystems management, land use management, joint research, capacity building, and data and information sharing and exchange.

4.12 Lotagipi Swamp Basin

The Lotagipi swamp basin is located in East Africa wedged between the Lake Turkana and River Nile Basins. The swamp basin has a catchment area of 38,687 km² shared by Ethiopia (8.4%), Kenya (52.4%), South Sudan (34.1%) and Uganda (5.1%). The basin lies in a semi-arid area and is sparsely populated, with a total population of 328,500 most of who (63.3%) live in the Kenya part of the basin. Traditional nomadic pastoralism is the dominant economic activity carried out by the ethnic communities that roam the area. Due to scanty information, it was not possible to prepare a detailed profile for this basin.



Figure 32: Map showing location of Lotagipi Swamp Basin³¹

4.13 Summary

The above review of the transboundary watercourses in the Greater Horn of Africa has revealed a number of common challenges faced in the river/lake basins. The main challenges are the following:

- (a) Lack of a policy, legal and institutional frameworks for cooperation among co-riparian countries in the management and development of the shared water resources;
- (b) Weak or absent water resources monitoring networks;
- (c) Absence of data and information sharing and exchange mechanisms;
- (d) Weak or absent water right administration systems;
- (e) Low stakeholder involvement in water resources management;
- (f) Low rainfall, large areas of arid and hyper-arid lands; high water scarcity;
- (g) A dominance of traditional pastoralism and recession agriculture as economic and livelihood activities;
- (h) High vulnerability to, and large impact of, climate change and variability on water resources and;
- (i) High watershed degradation, deforestation, cultivation on steep slopes, cultivation on marginal lands and high stocking rates leading to widespread soil erosion and transport; river, lake and reservoir siltation; and destruction of habitats and ecosystem.

³¹ Obtained from: <http://www.swedishwaterhouse.se/transboundarywaters/?basin=388>

5. Selection of the BRIDGE pilot basin

5.1 An objective process

An objective and transparent process was pursued in selecting the river/lake basin under which to pilot the IUCN-IGAD BRIDGE Project. This was done by developing and applying a set of criteria to the candidate basins, and selecting the basin that emerged with the highest scores for the selection criteria. The criteria were chosen in such a way as to address a wide range of desirable attributes for establishment of cooperative frameworks on transboundary river/lake basins.

5.2 List of criteria

The Consultant Team initiated the process of development of the criteria by generating a long list of criteria based on their knowledge of the key issues concerning the governance of transboundary waters. The criteria were further refined through consultations with key stakeholders (including IUCN and IGAD staff) and reduced to 10 criteria before they were applied. The final list of criteria used in this study is presented below.

Table 5: *Criteria for selection of a pilot basin for IUCN-IGAD BRIDGE Project*

Criterion	Significance for success of transboundary cooperation	Weight
<i>1. Absence of legacies of mistrust</i>	This is a critical criterion that signals the existence of conducive conditions for cooperation amongst co-basin states Trust is of utmost importance in transboundary cooperation. Transboundary initiatives are doomed to fail, or will not take off, where there exists a history of war, tension, bitter rivalries, disputes, frictions or generally cold relations between co-basin states. Unfortunately for the IUCN-IGAD BRIDGE Project, a lot of mistrust exists between the nations of the Greater Horn of Africa.	★★★★★
<i>2. Popular and political concern for regional cooperation</i>	The criterion is used to signal the existence of public and official support for transboundary cooperation This is an important issue as no interventions will stand the test of time without the endorsement, support and goodwill of the general population and of politicians at local to national levels.	★★★★★

Criterion	Significance for success of transboundary cooperation	Weight
<i>3. Existence of water scarcity or water-related risks such as floods, droughts, famine, disease or pollution that can only be effectively addressed through transboundary cooperation</i>	<p>This criterion assesses whether or not there are issues that require transboundary intervention and, therefore, whether or not there is justification for the IUCN-IGAD BRIDGE Project in the candidate basin</p> <p>This criterion is important because it provides an opportunity to demonstrate the added value of transboundary cooperation. There will be no motivation to engage in transboundary cooperation if the scope of cooperation is limited to things that can be adequately addressed at national level such as the provision of drinking water and promotion of hygiene and sanitation.</p>	★★★★★★
<i>4. Presence of important ecosystems or biodiversity resources of regional or global significance that are under pressure from anthropogenic activities</i>	Beyond promoting cooperation on improved water resources management, the IUCN-IGAD BRIDGE Project will be of greater value if it can contribute to protection of important regional ecosystem and biodiversity resources that are under pressure from numerous natural and man-made causes. The presence of such threatened ecosystems, and opportunity for the IUCN-IGAD BRIDGE Project to contribute to their protection, should be one of the considerations in pilot basin selection.	★★★★★★
<i>5. Potential of transboundary cooperation to act as a catalyst for improving relations between upstream and downstream riparians</i>	<p>In situations where there are historical tensions between upstream and downstream riparians over the use of common water resources, establishing a cooperative management frameworks through which upstream and downstream riparians can get to derive benefits on an equitable basis, may provide a unique opportunity for trust building and improving relationships between the upstream and downstream states.</p> <p>The existence of such potential needs to be evaluated and incorporated in the project design.</p>	★★★★★★
<i>6. Compatibility of needs for management and development of the common basin water resources</i>	<p>This criterion examines the extent to which the objectives of each riparian state in a given basin are compatible with the objectives of the other co-basin states</p> <p>There will be no interest, and quite possibly open opposition, to transboundary cooperation by one or more riparian countries if they perceive their interests to be incompatible with those of neighbouring co-basin states. As an example, an upstream state may be interested in expanding agricultural irrigation whereas downstream countries may be keen on developing hydropower and conserving ecosystems. These uses of water are incompatible.</p> <p>Incompatible needs present both a challenge and opportunity for transboundary cooperation: a challenge because getting all parties to cooperate will be difficult, and an opportunity because it provides a chance to demonstrate the potential of transboundary cooperation to produce win-win outcomes for co-basin states.</p>	★★★★★★
<i>7. Absence of political instability, insecurity or war</i>	<p>Safety of project personnel and stakeholders should come above everything else. The IUCN-IGAD BRIDGE project should not be launched in a basin where there is risk to the safety of project and national staff from war, insecurity or organised crime.</p> <p>Assessment of such risks should form part of the process of selection of the project area.</p>	★★★★★★

Criterion	Significance for success of transboundary cooperation	Weight
<i>8. Potential value that the BRIDGE could add to basin processes</i>	This criterion examines the potential value or complementary role that BRIDGE could add to ongoing initiatives in a basin. Bridge is designed to promote dialogue and cooperation beyond the existing regional frameworks and to complement and create synergies between existing regional frameworks. Thus, basins with actors implementing similar initiatives to BRIDGE would score low on this criterion. Conversely, basins with a clear gap for BRIDGE to fill would score highly on this criterion.	★★★★★
<i>9. Presence of ethnic minorities, indigenous peoples and vulnerable or marginalised communities that are heavily dependent on the shared water resources</i>	IWRM best practices call for the protection of minorities and vulnerable communities. Existence of such communities could provide an opportunity for the IUCN-IGAD BRIDGE Project to demonstrate an important principle of transboundary water governance.	★★★★☆
<i>10. Existence of agreements on the shared resources</i>	<p>This criterion examines the existence or absence of an enabling environment for transboundary cooperation on the selected river/lake basin.</p> <p>The existence of various types of treaties is important in providing legitimacy to project activities and a supportive framework under which they can be executed. But their absence also represents an opportunity for IUCN-IGAD BRIDGE to play a role in developing a legal framework for the basin and thus contribute to the strengthening of water governance in the IGAD region.</p>	★★★☆☆

5.3 Application of the selection criteria

After consultations on the list of criteria were completed, the criteria were applied to the transboundary basins in IGAD region to identify the pilot basin for the BRIDGE Project.

For each criterion, a rating ranging from 0 to 5 was assigned to each basin assessed, based on the Consultant Team's assessment of the prevailing situation in the basin. The rating for each criterion was multiplied by its weight to obtain the score for the criterion, and the scores for individual criterion were summed up to give the total score of each basin. The total scores were divided by the maximum possible score and multiplied by 100 to translate them into percentage scores (normalization). The results of the assessment are presented and discussed below.

5.4 Results of the scoring method

5.4.1 Testing reliability of the method

The reliability of the selection method was tested by applying them to transboundary basins that already have cooperative frameworks and

therefore are not candidate basis for the BRIDGE Project. The two basins are Lake Victoria Basin and the Nile Basin. The existence of cooperative frameworks on these basins is an indication of existence of strong justification for their establishment. If the selection method is reliable, it should pick up on these factors and return a high score for the two basins.

The scores obtained from application of the selection criteria are summarised in Table 6 below. The selection method returned high scores for the two basins: 78.4% of the maximum possible score for Lake Victoria; and 77.1% of the maximum possible score for the Nile Basin. The Nile Basin scores slightly slower due to the legacies of mistrust amongst upstream and downstream countries. These results suggest the scoring method to be reasonable.

Table 6: Total scores of the evaluated candidate basins

Candidate Basin	Score	Comments/Recommendation
Test Basins		
1. Lake Victoria Basin	78.4%	Do not consider the basin because it already has a comprehensive legal and institutional framework
2. River Nile Basin	77.1%	Do not consider basin because there are ongoing efforts to improve water governance and diplomacy in the basin through the Nile Basin Initiative.
Candidate Basins		
3. Lake Turkana Basin	86.7%	Do not consider on the premise of value addition. UNEP is already supporting the Member states, in undertaking interventions, similar in scope to BRIDGE
4. Lake Natron Basin	86.1%	Do not consider; the basin involves only one IGAD Member State; is more appropriate for management under the EAC framework
5. Lake Chala, Lake Jipe and River Uмба Basins	77.8%	Do not consider the basin because the co-basin states (Kenya and Tanzania) have signed an MoU to manage the three systems under the LVBC framework; the basin also involves only one IGAD Member State.
6. River Juba-Shabelle Basin	77.0%	First choice for pilot basin
7. Awash-River – Lake Abbe Basin	76.8%	Second choice for pilot basin
8. Lotagipi Swamp Basin	69.6%	Involves four IGAD Member States but is a remotely located and poorly defined drainage system
8. River Barka (Baraka) Basin	68.4%	Involves two IGAD Member States but is a seasonal river which is dry for much of the year
9. Ogaden Basin	67.7%	Involves two IGAD countries but is an active conflict zone
10. River Gash (Mareb) Basin	64.6%	Involves three IGAD Member States but river is highly seasonal.

5.4.2 Recommended first choices: Juba-Shabelle Basin

The recommended first choice for the pilot basin is the Juba-Shabelle Basin. The points in favour of this basin are the following:

1. The existence of water scarcity and water-related risks such as floods, droughts, famine, soil erosion and river siltation that can only be effectively addressed through transboundary cooperation and strengthened water governance.
2. The lack of a transboundary legal and institutional framework for management of the shared water resources of the basin. The Juba-Shabelle basin is the largest and most populous transboundary river basin in the IGAD region that still has no comprehensive agreement and transboundary river basin organisation to allow for cooperative management of the shared water resources.
3. Growing concern over planned water resources development in upstream reaches of the river basin that have a potential to cause significant impact on downstream water availability.
4. The potential for transboundary cooperation to act as a catalyst for improving relations between upstream and downstream riparians both between Ethiopia and Somalia, and between Kenya and Somalia.
5. The potential of transboundary cooperation in the basin to contribute to enhancement of regional peace, security and socio-economic development;
6. There are ongoing efforts under the ICPALD to establish a mechanism for cooperative management for one catchment (Daua); these initiatives could be complemented by BRIDGE.
7. There are large disparities in human and institutional capacity for water governance among the riparian countries. This presents an opportunity to support capacity development in the country (Somalia) with very weak systems;
8. All three co-basin states (Ethiopia, Kenya and Somalia) are IGAD countries.

5.4.3 Recommended second choice: Awash River - Lake Abbe Basin

The recommended second choice for the pilot basin is the Awash-River - Lake Abbe Basin. The points in favour of this basin are the following:

1. Absence of legacies of mistrust and good relations between the co-basin states Ethiopia and Djibouti;
2. Selecting this basin will allow BRIDGE to build upon and consolidate progress made under the IUCN Project – “The Lower Awash - Lake

Abbé Land and Seascape: Enhancing biodiversity conservation in transboundary ecosystems and seascapes”;

3. There are ecosystems of regional significance that need protection, including Awash National Park and Lake Abbe ecosystem.
4. There is a problem of excessive agricultural water use leading to reduced water reaching the system of saline lakes, and resulting in their progressive desiccation. This can only be effectively addressed under a transboundary framework.
5. The basin has no formal cooperative legal framework and no transboundary river basin organisation.
6. The two riparian countries are both member states of IGAD.

The final choice of the pilot basin is expected to be made by key stakeholders of the IGAD water sector guided by the above analysis.

6. Ongoing programmes and projects

6.1 Ongoing programmes and projects

A compilation of programmes and projects in the IGAD region has been prepared and is separately provided as an Excel file. Projects and programmes with a relevance to BRIDGE being implemented directly by IGAD Secretariat and International Cooperating Partners were sixteen in number. They are summarised in the Table Below.

Table 7: Ongoing and recently completed IGAD projects and programmes

Name	Thematic Area/ Type of Project	Partners/ Implementing Agencies	Has Large Governance Component
IGAD Inland Water Resources Management (INWRM) Programme	Water resources assessment	EU IGAD Secretariat	Yes
IGAD - Hydrological Cycle Observing System (HYCOS) Project - IGAD-HYCOS	Water resources monitoring	EU IGAD Secretariat	No
Mapping, Assessment and Management of the Trans-boundary Water Resources of the IGAD sub-region Project	Water resources assessment	African Water Facility; IGAD Secretariat	No
IGAD Internationally Shared Aquifer Resource Management Project (IGAD-ISARM)	Water resources assessment	UNESCO IGAD Secretariat	No
Support to sustainable development in Lake Turkana and its River Basins	Transboundary water resources management	UNEP, Govt. of Ethiopia; Govt. of Kenya	Yes
Sustainable management of water resource in the East-African Rift system	Water resources assessment	AFD CiFEG	No
Biodiversity Management Programme in the Horn of Africa	Transboundary biodiversity management	European Commission International Centre for Research in AgroForestry (ICRAF)	No
Drought Disaster Resilience and	Water resources	IGAD Secretariat	No

Name	Thematic Area/ Type of Project	Partners/ Implementing Agencies	Has Large Governance Component
Sustainability Initiative (IDDRSI)	planning	Bilateral and multilateral partners	
Horn of Africa Initiative	Water resources development	EU IGAD Secretariat	No
Pilot Project on Water Harvesting in the IGAD region	Water resources development	AfDB IGAD Secretariat	No
Management of Flood Disaster and the Rational Joint Utilization Of The Dauwa (Daua) River Waters	Water Resources Management/ Water Resources Planning	ICPALD	Yes
Availability Assessment Methodology for Land and Water Related Interventions in the Wabi-Shebele, Genale-Dawa-Juba and Ewaso Ng'iro Basins	Water Resources Assessment/Water Resources Planning	CETRAD	No.
Integrated Drought Management Program (IDMP-HOA)	Strengthening water governance	GWP-EA	Yes
IGAD - Drought Resilience & Sustainable Livelihood Program in the Horn of Africa (PHASE I)	Capacity Building	AfDB IGAD Secretariat; Djibouti, Ethiopia and Kenya	No
Regional Food Security and Risk Management Programme	Food security	European Commission IGAD Secretariat	No
IGAD Livestock Policy Initiative	Livestock management	FAO IGAD Secretariat	Yes
Regional Pastoral Livestock Livelihood Resilience Project	Livestock and pasture resources management	World Bank IGAD Secretariat; Kenya, Uganda	No
Management Of Flood Disaster And The Rational Joint Utilization Of The Dauwa (Daua) River Waters	Water Resources. Climate change and variability	IGAD Centre For Pastoral Areas And Livestock Development (ICPALD)	Yes
Support to Mainstreaming Land Governance in the IGAD Programmes	Land use management	Swiss Agency for Development and Cooperation IGAD Secretariat	Yes
IGAD Regional HIV/AIDS Partnership Program (IRAPP) Support Project	Health protection	World Bank IGAD Secretariat; UNAIDS, UNHCR, WHO, UNICEF, IOM	No

As can be seen from the Table above, the recurring themes for IGAD projects have been water resources assessment, water resources development, drought resilience and livestock management. Many of them

also had a water governance component, although in most projects it was a minor component.

As well as projects and programmes being implemented by IGAD, there are many regional programmes being implemented by the Lake Victoria Basin Commission and Nile Basin Initiative that have relevance to BRIDGE. The scope of existing projects and programmes in the Lake Victoria and River Nile basins is broad, encompassing watershed management, water resources monitoring and assessment, water supply and sanitation development, agricultural irrigation development, hydropower development, power transmission infrastructure development, development of information systems and decision support tools, navigation and maritime safety, and policy development and harmonisation. A summary of the LVBC and NBI projects and programmes is presented in the Annex.

6.2 Gaps

The obvious gaps so far, some of which could be addressed by BRIDGE, are the following:

1. Lack of programs supporting the establishment of transboundary water organisations (for the river/lake/aquifer systems that presently have no legal frameworks;
2. Few projects providing demonstrations of tangible benefits at local, national and transboundary levels to support confidence and trust building for transboundary water cooperation amongst neighbours that have a history of mistrust;
3. Lack of programmes actively promoting benefit sharing amongst co-basin states;
4. Lack of projects providing advice and technical support to facilitate reform of national policy, legal and institutional frameworks following the adoption of the IGAD Regional Water Resources Policy and expected promulgation of two protocols;
5. Lack of catchment afforestation and soil and water conservation programs to manage degraded watersheds;
6. Lack of a programme supporting IGAD to produce good practice manuals/guides and;
7. Weaknesses in the data and information sharing and exchange framework within Member States.

7. Stakeholder analysis

7.1 Stakeholder involvement

A stakeholder is defined as any individual, group, network, organization or institution with a vested interest, stake or investment in the subject of a decision-making or problem-solving process, and who potentially stands to be affected negatively or positively by the outcomes of the decision or problem-solving process. In the context of a river basin, stakeholders include the local communities (organized or unorganized) whose livelihoods are dependent on the water resources as well as commercial farmers, water utilities, industries, government agencies, water recreation facility operators, conservationists, development partners, and many other groups.

Stakeholder involvement is a key characteristic of good water resources management practices, and features under the Dublin Principles. In general, stakeholder participation improves the quality and sustainability of decision-making by making processes transparent, inclusive and fair. It also leads to a greater diversity of perspectives thereby allowing for a better understanding of the needs of different communities and interest groups, and provides an opportunity to foresee and resolve potential obstacles, constraints, opposition and conflicts.

7.2 Stakeholder analysis

7.2.1 Importance

To effectively engage stakeholders and take advantage of the benefits associated with it, one has to first determine who the stakeholders are, the nature of their interest, who needs to be involved, at what level they need to be involved, and what issues they represent. Such a process is called stakeholder analysis.

Stakeholder analysis will enable IUCN and IGAD to decide who, amongst a large array of stakeholders, will be the most affected; have the most influence over the success or failure of the IUCN-IGAD BRIDGE Project; might be the most important supporters; or might be the most important opponents. This information will enable IUCN and IGAD to manage the various stakeholder groups. Specific strategies will be needed to mobilize the help of

those in support, involve those that are knowledgeable, and dialogue with or neutralize those with a potential to oppose or frustrate the Project.

Stakeholder analysis that has been carried out under this study involved three distinct steps, namely:

1. *Identifying*: listing relevant groups, organizations, and people;
2. *Analyzing*: understanding stakeholder perspectives and interests;
3. *Prioritizing*: ranking stakeholders based on relevance to the IUCN-IGAD BRIDGE Project.

7.2.2 Stakeholder identification

A list of project stakeholders was generated through literature review (as summarized in Chapters 2, 3, 4 and 6 of this report) supplemented by brainstorming and consultation of knowledgeable persons (IUCN staff, IGAD TAC and country stakeholders in the selected pilot basin).

7.2.3 Stakeholder analysis

For this study, the IUCN provided two matrices: one for assessment of stakeholder power and the other for assessment of stakeholder interest.

The dimensions used to assess stakeholder interest, which are taken from the matrix, are the following:

1. The level of actual or perceived threat to the stakeholder from the BRIDGE project;
2. The level of actual or perceived benefits to the stakeholder from the BRIDGE project;
3. The extent to which the stakeholder is willing and able to mobilize and contribute to water governance and diplomacy; and
4. The capacity of stakeholder (assessed in terms of the possession of skills/human resources and mandate) with respect to water governance and diplomacy;

For the assessment of stakeholder power, the dimensions evaluated were the following:

1. The degree to which a stakeholder is considered to be organized;
2. The extent to which the stakeholder is dependent on another; who the others are, and what things the stakeholder is dependent upon them for;
3. The control or influence that the stakeholder has on policy setting and definition in relation to water governance and diplomacy;

4. The extent to which the stakeholder has control or influence on policy enforcement with respect to water governance and diplomacy; and
5. The control that the stakeholder possesses over any water related information.

The above criteria were supplied by the Client and applied without modification in this assessment. A rating of low/poor, medium or high/well was assigned per stakeholder for each of the above dimensions. These ratings were converted into scores and summed up to give a total score for power and another for interest for each stakeholder.

The outcome of the power and interest assessment was used to graphically depict and categorise stakeholders using Mendelow's Power-Interest Grid (Mendelow, 1991). The appropriate way in which BRIDGE could relate with the different stakeholder groups along the participation continuum (i.e. information sharing; seek advice/listening and learning; joint assessment; shared decision making; collaboration and; empowerment) was then defined based on the characteristics of each of the cells of the Power-Interest Grid. Finally, the power-interest assessment of stakeholders (particularly information on ongoing initiatives they were involved in, and interest and capacity in water governance) was used to propose potential roles they could play in the different phases of the project (i.e. identification; design and planning; resource mobilization/financing and; implementation).

The results of stakeholder assessment are summarized in the sections below.

7.3 List of stakeholders

The textboxes below present a list of stakeholders based on the consultant's knowledge of actors in the IGAD region and a review of literature.

Box 2: Continental Bodies, Regional Economic Communities and International Transboundary Water Basin Organisations

- Intergovernmental Authority on Development (IGAD - Djibouti City)
- IGAD Climate Prediction and Application Centre (ICPAC - Nairobi, Kenya)
- Common Market for Eastern and Southern Africa (COMESA)
- East African Community (EAC - Arusha, Tanzania)
- Lake Victoria Basin Commission (LVBC - Kisumu, Kenya)
- Lake Victoria Fisheries Organisation (LVFO - Jinja, Uganda)
- Nile Basin Initiative (NBI - Entebbe, Uganda)
- Nile Equatorial Lakes Subsidiary Action Program Coordination Unit (NELSAP-CU - Kigali Rwanda)
- Eastern Nile Technical Regional Office (ENTRO - Addis Ababa, Ethiopia)

Box 3: Development Partners

- Active development partners and international financial institutions in the IGAD regional water sector:
 - European Union (EU) and European Commission
 - The World Bank, IDA/GEF
 - The African Development Bank (AfDB)/African Water Facility
 - German Federal Enterprise for International Cooperation (GIZ)
 - Swedish International Development Cooperation Agency (SIDA),
 - Swiss Agency for Development Cooperation (SDC)
 - Norwegian Agency for Development Cooperation (NORAD)

Box 4: List of stakeholders: United Nations Agencies

- United Nations Agencies active in the Water Sector in IGAD Region
 - World Meteorological Organisation (WMO)
 - Food and Agricultural Organisation of the United Nations (FAO)
 - United Nations Educational, Scientific and Cultural Organisation (UNESCO)
 - United Nations Development Programme (UNEP)
 - United National Children's Fund (UNICEF)
 - United National Human Commission for Refugees (UNHCR)
 - Joint United Nations Programme on HIV/AIDS (UNAIDS)

Box 5: List of stakeholders: International NGOs and Governmental Organisations

- International Organisations active in the Water Sector in the IGAD Region
 - Global Water Partnership (GWP)
 - World Agroforestry Centre (ICRAF)
 - International Association of Hydrogeologist (IAH)
 - Sahara and Sahel Observatory (OSS)
 - International Water Management Institute (IWMI)
 - Centre for Training and Integrated Research in ASAL Development (CETRAD)

7.4 Stakeholder mapping

7.4.1 Results of the power-interest rating

The matrices used to rate and score stakeholders are separately provided as MS Excel files. Based on the results, the list of stakeholders was split into four groups, namely (a) *promoters* (high interest – high power stakeholders; (b) *latents* (low interest – high power stakeholders); (c) *defenders* (high interest – low power stakeholders) and; (d) *apathetics* (low interest – low power stakeholders). The above terminology of the stakeholder groups is taken from the World Bank Participation Source Book (WB, 2005). The scores of the different stakeholders and the groups they belong to are summarized in the Table below.

Table 8: Results of stakeholder rating (regional-level stakeholders only)

Group	Group Characteristics	Stakeholder	Power Score (max = 25)	Interest Score (max = 20)
<i>Promoters</i>	Occupy the upper right grid cell of Mendelow's Power-Interest Grid. They have both great interest in the BRIDGE initiative and the power to help make it a success or failure.	MoW	25	12
		EAC	23	14
		LVBC	19	16
		UNEP	19	16
		AMCOW	19	12
		AfDB/AWF	19	12
		ICPALD	19	12
		GWP-EA	19	10
		WB/IDA/GEF	19	10
		IGAD	17	13
		GIZ	17	12
		LVFO	17	10
		NELSAP-CU	13	10
ENTRO	13	10		
<i>Latents</i>	Occupy the upper left grid cell of Mendelow's Power-Interest Grid. They have no particular interest, are largely unaffected or are unlikely to become involved, but have the power to influence it greatly, either positively or negatively, if they become interested.	WMO	23	3
		FAO	21	6
		ICPAC	17	4
		OSS	17	4
		EU	15	6
		UNESCO	13	4
		CETRAD	13	4
<i>Defenders</i>	Occupy the lower right grid cell of Mendelow's Power-Interest Grid. They have vested interests in the BRIDGE initiative and can voice their support but have little actual power to influence the outcome.	NBI	11	16
		AMCEN	11	12
<i>Apathetics</i>	Occupy the lower left grid cell of Mendelow's Power-Interest Grid. They have little interest in the BRIDGE Initiative and little power to influence it.	ANBO	5	8

The above results have been graphically depicted using Mendelow's Power-Interest Grid. Mapping is a tool that simplifies the often complex interplay of issues and relationships embedded in the Stakeholder Analysis Matrices. It further provides a convenient way to visualize key stakeholder characteristics and identify and draw attention to important stakeholders.

The graphical representation of the above results is shown in the Figure below.

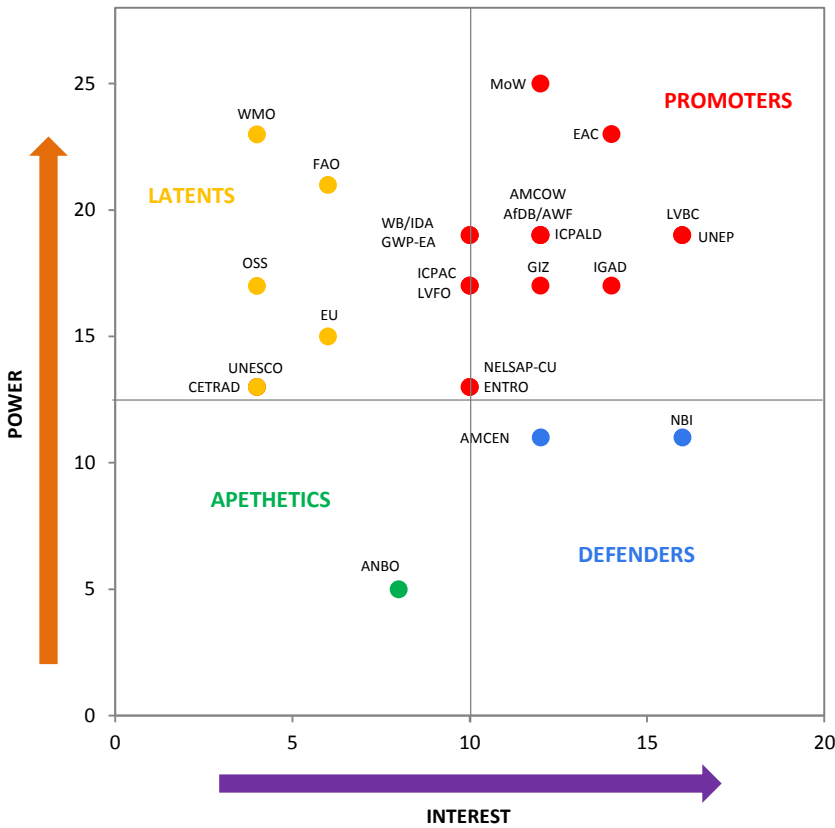


Figure 33: Mendelow's Power-Interest Grid for BRIDGE stakeholders (regional level)

This process of stakeholder analysis and mapping and is expected to be repeated during the preparatory phases of the BRIDGE Project in the selected pilot basin.

7.4.2 Stakeholder management strategy

The four groups of stakeholders in the above figure differ considerably from one another with respect to their characteristics. Each group, therefore, needs to be handled in a different way for effective participation in the BRIDGE Project. A general management strategy for the four groups is outlined in the Box below.

Box 6: Proposed management approach for the different stakeholder groups

Promoters (*high interest - high power group*): This is the most important group of stakeholders and needs close attention. The following management approaches are proposed for the group.

- A major effort should be made to capture and incorporate the opinions, objections, suggestions and observations of this group. Where their ideas cannot be used, explanations should be provided to them as to why alternative views are preferable.
- Promoters who exhibit a potential to cooperate should be cultivated, involved as much as possible, and made an integral part of the IGAD BRIDGE process.
- Tasks and responsibilities under the BRIDGE project should be identified and assigned to willing promoters (partnerships, collaboration, joint efforts and empowerment). Tasks assigned should match interests and capacities of the promoters.
- Focal point persons in promoter institutions and organisations should be incorporated on expert panels, management committees, task forces and working groups.
- The deepest levels of participation are expected at IGAD Secretariat/IGAD TAC level/Ministry of Water Level, and at local levels in the BRIDGE Pilot Basin.
- Some members of this group may be opposed to the initiative. Such members should be approached, and efforts made to convert them to allies. Where possible, concessions should be made to enlist their support but without compromising the goals of the BRIDGE project.

Latents (*Low interest - high power group*): This is another important group of stakeholders whose support should be courted. Suggested management approaches are the following:

- The major effort should be to shift this group to promoters as they could potentially be extremely helpful if they could be made interested in the BRIDGE Project.
- One way of arousing interest is to explain to the group potential roles they could take up in the process, and likely benefits that could accrue to them from such participation.
- The group needs to be kept well informed of the BRIDGE process as all times. Opportunities need to be created for them to voice opinions on the BRIDGE process.
- Some group members may be opposed to the BRIDGE process. Opposing stakeholders who are not very interested in the BRIDGE process can be left to be. Stakeholders who express opposition should be approached and conciliatory efforts made to convert them to supporters or neutralise them rather than confront them.

Defenders (*high interest - low power group*): This group will have high interest in the BRIDGE project but little ability to participate in a meaningful manner in the activities. The following management approaches are proposed for the group.

- The group should be kept informed of the BRIDGE process
- Useful outputs from the process, such as knowledge products and best practices should be shared with them.

Apathetics (*low interest - low power group*): This group needs little or no management. They are best left alone.

With regard to a possible role in the implementation of the BRIDGE project, the stakeholders could be split into the following four groups:

- (a) **Group 1** (*fully involve in the project*). This group consists of promoters and should be directly involved in all the phases of the BRIDGE Project (identification, planning/design, resource mobilisation/financing, implementation, monitoring and evaluation. The group at present (prior to identification of pilot basin stakeholders) comprises of the Ministries of Water (and relevant departments and units of the Ministry) in the IGAD Member States, the IGAD Secretariat (including TAC/Regional Technical Committee) and IGAD special institutions ICPALD and ICPAC.

- (b) **Group 2** (*seek partnership with, and involve in aspects of the project*). This group, the largest of the four, consists mainly of latents. Group members should be approached for possible partnership in undertaking parts of the project. They could be involved from the stages of design to monitoring and evaluation. Group members are The African Development Bank/AFD, Global Water Partnership, World Bank, UNEP, GIZ, World Meteorological Organisation, Sahel and Sahara Observatory, Food and Agriculture Organisation and UNESCO and CETRAD.
- (c) **Group 3** (*share lessons and exchange experiences with*). This group, comprising mostly of defenders, apathetics and marginal promoters, may not be in position to participate fully but could be interested in the achievements of BRIDGE and may have their own lessons to share with the BRIDGE team. They could be involved in Monitoring, Evaluation and Reporting activities. Group members are Nile Basin Initiative, NELSAP-CU, ENTRO and the African Network of Basin Organisations.
- (d) **Group 4** (*only keep informed*). The last group is a mixed group of high level institutions and organisations which may not be in position to participate directly in the BRIDGE but could still be interested in following the Project. They need only to be kept informed of project progress. Group members are AMCOW, AMCEN, East African Community, Lake Victoria Basin Commission, Lake Victoria Fisheries Organisation and the European Union.

7.4.3 BRIDGE Action

The BRIDGE Action or nature of relationship with individual stakeholders, which is consistent with the management strategy above is summarised in the Table below. In general, a low level of involvement can be expected for most of the stakeholders, while deeper levels of involvement will be limited to few stakeholders as illustrated by the figure below.

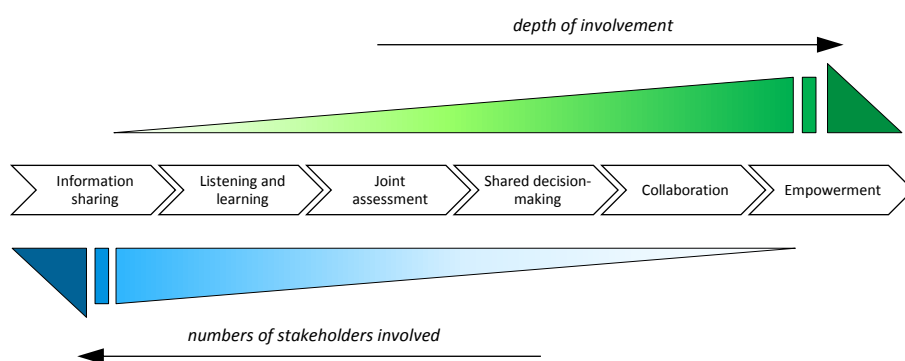


Figure 34: The stakeholder involvement continuum (adapted by the authors from the World Bank, *Participation Sourcebook* (1995))

Table 9: Stakeholder relationship matrix (regional-level stakeholders only)

Stakeholder group	Stakeholder	Level of Involvement (BRIDGE action/relationship)					
		Information sharing	Listening & learning	Joint assessment	Shared decision making	Collaboration	Empowerment
<i>Group 1: Keep fully involve</i>	MoW	●	●	●	●	●	●
	IGAD	●	●	●	●	●	●
	ICPALD	●	●	●	●	●	●
	ICPAC	●	●	●	●	●	●
<i>Group 2: Seek partnership with, and involve in aspects of the project</i>	AfDB/AWF	●	●	○	○	○	
	GWP-EA	●	●	○	○	○	
	WB/IDA/GEF	●	●	○	○	○	
	UNEP	●	●	○	○	○	
	GIZ	●	●	○	○	○	
	WMO	●	●	○	○	○	
	OSS	●	●	○	○	○	
	UNESCO	●	●	○	○	○	
	FAO	●	●	○	○	○	
	CETRAD	●	●	○	○	○	
<i>Group 3: Share lessons and exchange experiences with</i>	NBI	●	●				
	NELSAP-CU	●	●				
	ENTRO	●	●				
	ANBO	●	●				
<i>Group 4: Keep informed</i>	AMCOW	●					
	AMCEN	●					
	EAC	●					
	LVBC	●					
	LVFO	●					
	EU	●					

- Proposed BRIDGE relationship to stakeholder
- Potential BRIDGE relationship to stakeholder under a partnership/collaboration arrangement

7.4.4 Potential roles of stakeholders in the BRIDGE Project cycle

Based on the dissimilar levels of stakeholder involvement recommended above, the different groups of stakeholders are envisaged to play different roles in the various phases of the project (i.e. identification, planning & design, resource mobilisation, implementation, and monitoring and evaluation).

Group 1 Stakeholders deserve to be actively involved in all phases of the Project while Group 4 Stakeholders would more fittingly have a passive role in the entire Project. Group 2 Stakeholders could play an active role in selected phases of the project subject to a partnership being formed while Group 3 Stakeholders could be invited to play an active role only in monitoring and evaluation activities. The proposed levels of involvement in the different phases of the Project are graphically summarised in the Figure below.

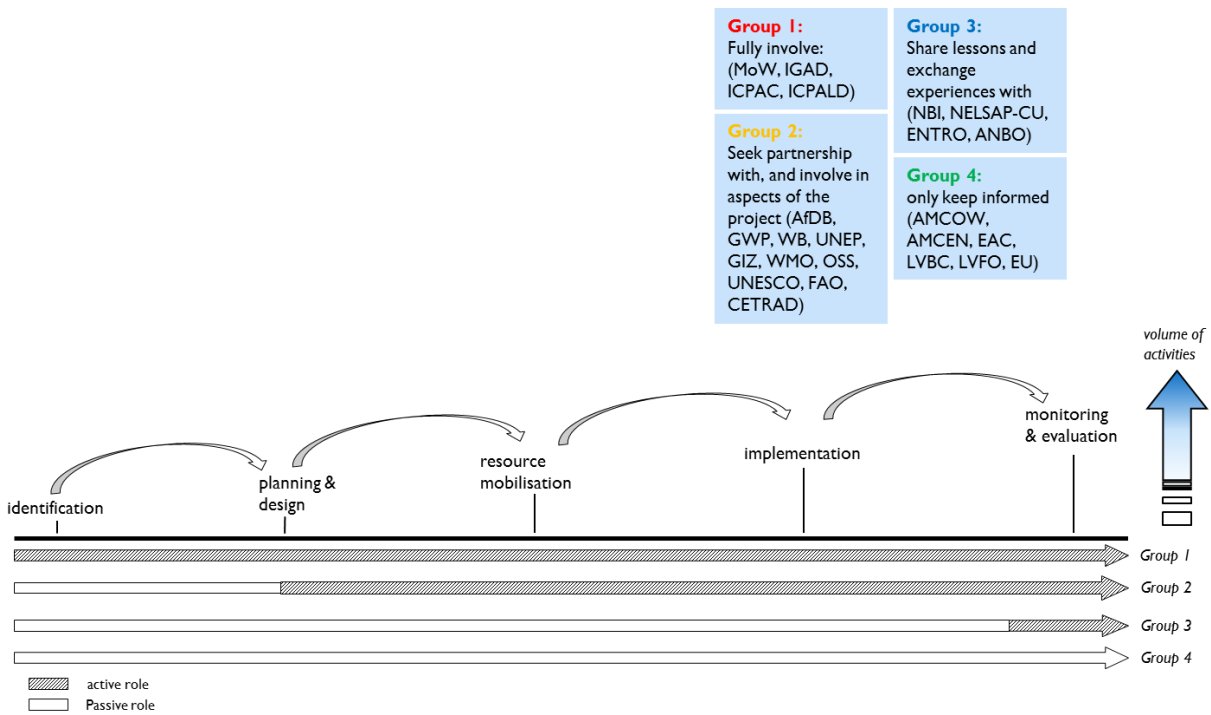


Figure 35: Potential role of stakeholders in the different phases of the BRIDGE Project

8. Opportunities threats and challenges

8.1 SWOT analysis

An analysis of strengths, weaknesses, opportunities and threats (SWOT) has been carried out and is presented in the tables below.

8.2 Strengths

The following is the list of strengths:

1. *Strong institutional policy and legal framework* – IGAD has a strong policy and legal framework that facilitates its work. The IGAD Agreement gives it a strong legal basis for existence and clear mandate, which extends to water. Specifically for water, an IGAD Regional Water Resources Policy was recently adopted. Also available, but still in draft form, are a Regional Water Resources Protocol, Regional Policy for Water Related Data Exchange and Protocol on Water Related Data Exchange.
2. *IGAD Water Dialogue Forum* – IGAD has established the Water Dialogue Forum (WDF) to provide an institutional mechanism for fostering cooperation through enhanced dialogue amongst stakeholders in the region.
3. *Considerable capacity within civil society in the Lake Victoria and Nile Basin* – the LVBC and NBI have over the years been building capacity of, and engaging in constructive partnerships with, many local civil society groups, including media groups, environmental conservation groups, women groups and water user associations. This has strengthened the capacity of civil society in the region. The capacity of civil society in the other transboundary basins, however, is weak.
4. *Regional water resources monitoring network* – A regional water resources monitoring network has been established and is under operation under the IGAD-HYCOS.
5. *Strong regional institutions* – A specialised institution (ICPAC) on climate related data management has been established under IGAD.

8.3 Weaknesses

The following is the list of weaknesses:

1. *Low funding:* The water sector, especially the water resources management sub-sector, is underfunded in all of the IGAD countries.
2. *Inadequate water infrastructure* – The IGAD countries, with the exception of Ethiopia and to some extent Kenya, have limited infrastructure for harnessing and promoting the use of water, and minimising risk from climate change and variability..
3. *Weak institutional and human resources capacity at national level:* the national level capacity for IWRM and transboundary water management is generally weak among IGAD countries. There has been a little improvement in capacity in recent years from the efforts of LVBC, NBI and GWP.
4. *Weak institutional capacity at regional level* – IGAD has a lean Secretariat with no dedicated unit to coordinate water matters. An IGAD Water Unit has only just been passed by the IGAD Council of Water Ministers. It is yet to be established. IGAD also suffers from inadequate funding from the Member States.
5. *Weak policy and legal frameworks in some countries.* In two IGAD countries – Eritrea and Somalia – the legal, policy and regulatory framework for water resources management is weak. Structures for transboundary water management do not exist or are weak in these two countries. At regional level, the other transboundary basins outside of the Lake Victoria Basin and Nile Basin (Awash, Juba-Shabelle, Gash, Barka, Lake Turkana, Lakes Chala and Jipe, River Uмба) do not have agreements to facilitate cooperative management by co-basin states. IGAD still does not have a policy or protocol for the management of shared lake/river basins.
6. *Weak policy and legal frameworks at transboundary level.* At regional level, the transboundary water basins outside of the Lake Victoria Basin and Nile Basin (Awash, Juba-Shabelle, Gash, Barka, Lake Turkana, Lakes Chala and Jipe, River Uмба, etc.) do not have agreements to facilitate cooperative management by riparian states. The IGAD Regional Water Resources Protocol that would promote management of shared lake/river basins is still in draft form
7. *Exclusion of groundwater in the existing regional water resources governance frameworks* – To date there is no river basin agreement in the IGAD region that deals with groundwater issues. The mandate of existing shared watercourse institutions is limited to the management of shared surface water resources. The draft IGAD protocol is the

only regional legal instrument providing a framework for management of shared groundwater resources.

8. *Low participation* - The level of participation of one country – Eritrea – in regional level activities is low.
9. *Transparency in data and information sharing and exchange.* At the regional level, IGAD lacks a legal framework for data and information sharing and exchange. This is still at development stage. Some of the river basin organisations like the Nile Basin Initiative and the Lake Victoria Basin Commission have data and information sharing and exchange procedures. However, their implementation falls short since the various processes and decisions are not open to scrutiny by the public. The IGAD Regional Water Database and Information System under IGAD-HYCOS is just being set up.
10. *Weak knowledgebase* – the knowledgebase on water resources that should form the basis for science-based decision making is poorly developed; databases exist in various stages of functionality but factual information and synthesized data is lacking, scanty, not well organised or not easily accessible;
11. *Constrained autonomy* – Most river basin cooperation within the IGAD region takes place within highly circumscribed institutional autonomy. This is a weakness, because a degree of autonomy can increase both the objectivity and legitimacy of institutions. Full autonomy over technical, administrative and financial decisions can make institutions more effective
12. *Low stakeholder involvement:* despite the adoption of IWRM principles, water resources management in the IGAD countries is still characterised by relatively low levels of stakeholder involvement and use of top-down approaches in the identification, planning, design, implementation and monitoring of projects and programmes.
13. *Low women's involvement:* the levels of participation of women in water sector activities are low despite water sector reforms in most of the countries.

8.3 Opportunities

The following is the list of opportunities:

1. *Cooperation* – There is strong political will for regional cooperation.
2. *Strong development partner support:* there is strong interest from governments in the developed world, international financial institutions and international non-governmental organisation (like the World Bank, Global Environmental Facility, European Union, African Development Bank. GIZ, SIDA, NORAD, USAID, FAO) in

supporting cooperation on regional integration and transboundary water management, and public participation in regional water governance processes.

3. *A continent-level water vision that is supportive of transboundary water governance* – The Africa Ministerial Council on Water (AMCOW) in 2000 adopted the African Water Vision 2025 that identifies “strengthening governance of water resources” and “developing and implementing institutional reform and capacity-building at local, national and trans-boundary water-basin levels” as key points in its framework of action. This water vision contributes to an enabling environment for the BRIDGE intervention.
4. *Increasing opportunities at continental level* – There are increasing opportunities for support to RECs (in the area of water management) arising from intensified activities of the AU and its organs like NEPAD, in water and sanitation, transboundary water resources management and environmental conservation.
5. *Existing RECs and River/Lake Basin Organisation – opportunities for partnership* – the existing RECs (EAC and COMESA) and lake and river basin organisations within the Greater Horn of Africa (LVBC, NBI) are institutions with a lot of experience and considerable resources. Among other things, they have strong policy and institutional frameworks. They represent an opportunity for mutually beneficially partnerships and learning to the BRIDGE Programme.

8.4 Threats

The following is the preliminary list of threats:

1. *Insecurity*: The Greater Horn of Africa is one of the most complex and conflict prone regions of the world. Most of the countries of the Greater Horn have suffered from protracted political strife, arising from local and national grievance and identity politics. It will be a challenge to initiate water resources management programs in these areas and between certain countries.
2. *Strong legacies of mistrust between neighbours* – There have been past and some ongoing inter-state conflicts and rivalries involving many of the Greater Horn of Africa countries. This makes it difficult for the countries involved in these conflicts to trust one another and cooperate fully in any development field.
3. *Disagreement on the Nile* – there is disagreement on the Nile Cooperative Framework Agreement, with some countries refraining from signing the Cooperative Framework Agreement. There is a threat of this disagreement growing into a full-fledged conflict and spilling over to cooperation under IGAD since many Nile riparians

are IGAD Member States. On a positive note, there appears to be a thawing in relations with Egyptian re-engaging with Ethiopia and Sudan on the Grand Ethiopian Renaissance Dam, and promising to re-join the Nile-Com dialogue platform.

4. *Overlaps with other RECs* – the Greater Horn of Africa has many RECs and transboundary river basin organisations with overlapping membership of IGAD countries with a risk of introducing confusion and duplication in activities. MoUs between IGAD and these RECs/transboundary water organisations to stream activities are not yet in place. Other measures to improve on synergies such as periodic coordination meetings, regular exchange of information, joint programming, joint review of programs, and joint implementation committees have not been considered.
5. *Rapid population growth* – The population of the IGAD countries is rising rapidly, at a rate much faster than the ability of the countries to provide various water services and conserve natural resources. This has led, among other things, to widespread environmental degradation. The transboundary river and lake basins are characterised by deforestation, soil erosion, river and reservoir sedimentation and water pollution.
6. *Climate change* – The IGAD region is one of the regions in Africa most affected by increasing frequency of extreme hydrological events (devastating droughts and floods) related to climate change and variability. Climate change has the potential to further exacerbate the water scarcity faced by the countries of the region.

9. Conclusions and recommendations

9.1 Conclusions

The main conclusions from the situation assessment are the following:

1. Institutional mechanisms for coordination of transboundary water management under IGAD are weak and still at infancy level. Activities under the INWRM Programme have taken place under a project framework. Proposals have been made to strengthen the capacity of the IGAD Secretariat in the coordination of regional water resources management, including the setting up of a unit specifically for coordinate water issues. These recommendations are yet to be implemented.
2. A system for information exchange among the countries participation in the IGAD-HYCOS has been set up and needs to be consolidated. IGAD is at advanced stages of drafting s protocol on data sharing and information exchange. These initiatives need support to reach fruition.
3. There are many transboundary river/lake/aquifer basins in the IGAD region. With the exception of the Lake Victoria Basin and Nile Basin Initiative, the other basins do not have frameworks to support cooperative management by shared water resources by co-basin states
4. Using a set of criteria developed under this study, the Lake Turkana – River Omo transboundary basin emerged as the most suitable basin for piloting the BRIDGE IGAD Project.
5. There are many ongoing projects and programmes in the IGAD Region. The projects and programmes are mainly focused on water resources assessment, water resources development, strengthening drought resilience and livestock management. Many of them also aim to strengthen water governance. Despite the existence of ongoing programmes, there are many gaps that could be filled by the BRIDGE project.
6. There are several stakeholders at regional and national levels. None of the stakeholders are likely to be strongly opposed to the BRIDGE project. The common recommended forms of engagement for the stakeholders are informing; listening and learning and; collaboration.

7. There are a few opportunities that could be tapped in the development of the BRIDGE Project. They include strong political will for regional cooperation in the IGAD region, and strong development partner support for regional processes. There are also threats and challenges that the BRIDGE project will have to contend with. They include the overlap in mandates between IGAD and other regional RECs and transboundary basin organisations, and the weak institutional capacity of IGAD to coordinate regional water resources management activities.

9.2 Recommendations

9.2.1 The potential intervention areas

The recommendations of the Situation Analysis (this report) aim to throw light on areas that could become intervention areas for the BRIDGE IGAD Project. In general, there are many suitable intervention areas, much more than can be handled by a single project. Therefore, careful prioritization is called for (which process should involve consultation of key stakeholders) to avoid being over swamped by the magnitude of the challenge in the region. Potential areas cover all five key focus areas of the BRIDGE programme (i.e. demonstration, learning, dialogue, leadership and advice and support). The recommendations are presented below organised according to the five focus areas.

9.2.2 Interventions relating to demonstration

In the key area of *demonstration*, it is recommended that the following actions be considered for inclusion in the BRIDGE IGAD Project and executed in the pilot basin:

1. Supporting small-scale investment projects that can demonstrate benefits of transboundary water cooperation and support confidence and trust building amongst local communities in shared river/lake basins. Such projects could include community water supply, restoration of communal rangelands, livestock watering/dipping infrastructure, recession agriculture, aquaculture production, crafts production, community ecotourism, etc.
2. Supporting pilot projects that aim to address critical watershed degradation issues like soil and water conservation, sustainable wetland management, watershed afforestation; river bank restoration, water catchment protection, etc.
3. Supporting local livelihood systems in adapting to impacts of climate change and variability.

9.2.3 Interventions relating to learning and data exchange

In the key area of *learning*, it is recommended that the following actions be considered for inclusion in the BRIDGE IGAD Project and executed both at regional level and within the pilot basin:

1. Building capacity of civil society organisations to be able to engage effectively with public institutions; supporting tailor-made capacity building for different stakeholder groups.
2. Supporting the preparation of good practice guides on water governance and transboundary water resources management.
3. Supporting the identification, documentation, appropriate packaging and wide dissemination of success cases on water resources management interventions at local to national level within the IGAD region.
4. Supporting regional data compilation, data analysis and preparation and dissemination of knowledge products on water related issues.
5. Supporting the establishment of a knowledge management system for IGAD to facilitate easy access to programmatic materials and other institutions records and archives. Such a system could typically include a documentation centre/library, archives, servers and databases for data storage and retrieval, and communication infrastructure.
6. Build capacity and facilitate dialogue around data sharing amongst key stakeholders at regional level; this intervention could help to explain the importance and reasons for data exchange and support the process for adoption of a data sharing policy and protocol;
7. Supporting the implementation of the IGAD Regional Policy on Water Related Data Exchange and IGAD Protocol on Water Related Data Exchange (when adopted) through such actions as:
 - a. Supporting the establishment, and operation and maintenance of the IGAD Regional Water Information System,
 - b. Supporting the harmonisation of procedures for data collection, processing and reporting;
 - c. Developing and providing training on guidelines for the establishment and operation of data sharing and exchange systems at national level;
 - d. Developing an *Information Disclosure and Data Access Policy for Water Related Data and Information* under IGAD;
 - e. Developing a public portal operated by the IGAD Water Unit to facilitate data and information access by the public and;

- f. Supporting the formation and facilitating the work of Standing Working Groups to assist the IGAD Member States in implementing various tasks regarding water related data collection, processing, archiving and exchange.

9.2.4 Interventions relating to dialogue

In the key area of *dialogue*, it is recommended that the following actions be considered for inclusion in the BRIDGE IGAD Project and executed both at regional level and within the pilot basin:

1. Supporting the IGAD Water Forum with the aim of deepen regional water dialogue and cooperation;
2. Carrying out institutional analysis; establishing basin-level fora/platforms for enhancing dialogue processes and social learning in water resources management;
3. Supporting science-policy dialogues on topics such as climate change and adaptation;
4. Supporting advocacy processes for relevant water issues in the pilot area – participation, service provision, gender mainstreaming, ecosystem conservation, equity, pro-poor protection, vulnerable and marginalised communities, etc.;
5. Supporting linkages of local issues to intergovernmental water treaty negotiations;
6. Supporting socio-economic and water resources assessments to identify critical water-related issues affecting riparian communities; supporting a multi-stakeholder participatory process for development of a shared basin vision; supporting the process for preparation of an Integrated River Basin Management and Development Plan in the pilot basin.

9.2.5 Interventions relating to leadership

In the key area of *leadership*, it is recommended that the following actions be considered for inclusion in the BRIDGE IGAD Project and executed both at regional level and within the pilot basin:

1. Supporting the process of establishment of an RBO in the pilot basin including supporting the process of negotiations and conclusion of water agreements between co-riparian countries.
2. Identifying, encouraging and facilitating work of water governance champions.
3. Raising awareness on the UN Watercourses Convention.

4. Supporting general capacity building in water governance and water diplomacy in the IGAD region.

9.2.6 Interventions relating to advice and support

In the key area of *advice and support*, it is recommended that the following actions be considered for inclusion in the BRIDGE IGAD Project and executed both at regional level and within the pilot basin:

1. Supporting the process of consultations, finalisation and adoption of the draft IGAD *Regional Policy on Water Related Data Exchange* and draft IGAD *Protocol on Water Related Data Exchange*;
2. Supporting the establishment of the IGAD Water Unit; supporting institutional and human resources capacity building for the IGAD Water Unit.
3. Supporting water policy review or strengthening aspects of national water policy in countries with weak water policy frameworks.
4. Supporting institutional and human resources capacity development in the institutions that will host the hub for national-level data exchange.
5. Supporting the conclusion of Memoranda of Understanding between IGAD and other regional institutions to promote synergy, enhance cooperation and reduce duplication and competition.
6. Developing tools and providing technical advice to support IGAD in coordinating the activities of International Cooperating Partners and facilitate information sharing amongst them.

9.3 Feedback from key stakeholders

9.3.1 The Entebbe Workshop

A 3-day workshop (6-8th May 2015) was organised by the BRIDGE project to brief members of the Technical Advisory Committee (TAC) of the IGAD Inland Water Resources Management Programme (INWRMP) on the BRIDGE Project. The workshop, which was held in Laico Lake Victoria Hotel in Entebbe, Uganda, was also used to discuss the draft IGAD policies and protocols on water related data exchange, and to train the TAC members on water diplomacy.

As part of the workshop, the Consultants presented the key findings of the Situation Analysis Report and recommendations of potential interventions for the BRIDGE project to the TAC. The TAC discussed the report and made decisions about the BRIDGE Project which are summarised below.

9.3.2 Regional-level focus areas for the IUCN-IGAD BRIDGE Project

Following deliberations in the course of the workshop, the TAC recommended the following as the areas for BRIDGE interventions at regional level.

Learning and Capacity Building

1. Build capacity of civil society organizations within the IGAD region to be able to effectively engaged with public institutions and participate in trans-boundary water governance processes;
2. Build capacity and facilitate dialogue around data sharing amongst key stakeholders at regional levels - these interventions, amongst other things, could help to explain the importance and reasons for data exchange, in support of the adoption of a data sharing policy and protocol;
3. Build capacity and provide support on knowledge management and dissemination which could include the establishment of systems to improve the management of existing information and knowledge that has accumulated from IGAD's programme and projects on trans-boundary water governance and;
4. Support general capacity building in water governance and water diplomacy including awareness raising on the UN Water Convention in the IGAD region.

Dialogue

1. Support the preparatory processes related to the next IGAD Water Forum (2016) that aims to deepen regional water dialogue and cooperation;
2. Support the development of institutional frameworks for cooperative river basin management through such actions as facilitating the preparation of guidelines for the trans-boundary river basin institutions establishment and learning from other regions like SADC;
3. Support to the development of science-policy dialogues around shared water resources in the IGAD region;

Leadership

1. Encouraging and facilitating the work of water governance champions from local through national to regional levels

9.3.3 Selection of a pilot basin for the IUCN-IGAD BRIDGE Project

The TAC considered the Consultant's report on criteria development and application in the selection of a basin for piloting the BRIDGE project. After discussion of the report, the TAC selected the Juba-Shabelle basin as the basin for piloting of the BRIDGE Project in the IGAD Region.

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11. Annexes

Annex 1: List of ongoing and future projects

Annex 2: List of stakeholders

Annex 1: List of ongoing and future projects

The preliminary list is presented in the Ms Excel Sheet

Annex 2: List of stakeholders

The preliminary list is presented in the Ms Excel Sheet