



Project Information Document/ Identification/Concept Stage (PID)

Concept Stage | Date Prepared/Updated: 18-Oct-2018 | Report No: PIDC171074



BASIC INFORMATION

A. Basic Project Data

Project ID	Parent Project ID (if any)	Environmental Assessment Category	Project Name
P169078		B - Partial Assessment (B)	Horn of Africa - Groundwater Initiative
Region	Country	Date PID Prepared	Estimated Date of Approval
AFRICA	Africa	18-Oct-2018	
Financing Instrument	Borrower(s)	Implementing Agency	Initiation Note Review Decision
Investment Project Financing	Intergovernmental Authority on Development (IGAD)	Daher Elmi	The review did authorize the preparation to continue

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PROJECT FINANCING DATA (US\$, Millions)

SUMMARY

Total Project Cost	2.00
Total Financing	2.00
Financing Gap	0.00

DETAILS

Non-World Bank Group Financing

Trust Funds	2.00
Cooperation in International Waters in Africa	2.00

B. Introduction and Context

Country Context

The HoA Groundwater Initiative (RGI) targets the Intergovernmental Authority on Development (IGAD) region, covering Djibouti, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda. It is home to a rapidly growing population of over 251 M people. Most of the population is poor and relies on rainfed agriculture and for its livelihood, in a climate characterized by irregular and unpredictable short rainy seasons and recurrent droughts. In this regard, the IGAD region is not homogeneous in terms of hydro-climatology. Rainfall is concentrated in the Ethiopian highlands and along the southwestern border of the region



(southern Sudan, South-Sudan and Uganda), while the climate in the northern, eastern and southeastern parts of the region is characterized by low rainfall and high potential evapotranspiration.

A great part of the region is composed of arid and semi-arid lands (ASALs), in which around 30% of the total population is found. Groundwater is the largest water resource in these areas, if not the only one available, having the greatest potential for providing water security and socio-economic benefits. Adding to this average low water availability, the region has been affected by longer dry periods since the second half of the 20th century until now, suffering several episodes of catastrophic and intense drought, and is now affected by increasing inter-annual variation in the length of the rainy season.

The Great Horn of Africa region (shortened as “HoA”), already characterized by high climate variability, will suffer significant impacts as a result of climate changes[1]. Average temperatures in the region will rise by up to 1.5°C in the next 20 years and up to 4.3°C by the 2080s. Changes in both rainfall and temperature are likely to have significant impacts on the water cycle and the water resources, drought frequency and intensity, erratic floods and untimely precipitation patterns which will affect the ground water recharge and others. Indeed, related to groundwater recharge, the trends point to more intense rains of increasingly shorter duration, which are less efficient for recharge.

In addition to climate change, increasing population density in the region will put additional pressure on the region’s fragile natural resource base, pushing it in some cases beyond its regenerative capacity. Conflicts over land and water are likely to multiply, which may exacerbate insecurity and emigration. The World Bank Regional Initiative in Support of the Horn of Africa (2014) envisioned to conduct a regional groundwater assessment to address food insecurity, energy insecurity and water insecurity, and promote regional integration. Water resources link the IGAD member states both internally and externally with neighboring countries through several transboundary river basins and aquifers (see Figure 2). A number of previous studies have made important progress in the mapping of the region’s water resources and the search for optimal ways to develop and manage them.

[1] “Assessment of Resilience Frameworks in the *HoA*” prepared in 2015 by the Global Water Partnership Eastern Africa and the IPCC Report on “*Climate Change 2014: Impacts, Adaptation and Vulnerability*”.

Sectoral and Institutional Context

Because of its decentralized nature, groundwater can play a unique role in addressing some of the key development challenges in Africa. Groundwater constitutes a natural buffer against the variability of climate and can be an important ingredient for building climate resilience. As a decentralized and often easy accessible water resource, (shallow) groundwater can provide water security in fragile or conflict-ridden regions where centralized water supply services are lacking. Believed to be widely available and comparatively cheap, groundwater can also be a catalyst for economic opportunity. Increased water security could help reduce some of the drivers for immigration as they are linked to lack of economic opportunity and loss of livelihoods due to climate shocks. As such improved groundwater governance and increased water



security also contribute to regional stability. These unique attributes are particularly valuable in the context of African drylands, including the IGAD region. There is potential for agricultural intensification via groundwater irrigation to contribute to upstream and downstream value chain job creation and income improvements.

Groundwater is essential in the Horn of Africa region and its development through boreholes and water harvesting has been instrumental in reducing conflicts for water access and transboundary resource sharing. Important examples are found among the pastoralists and agro-pastoralist cross-border communities. Groundwater is harnessed by the rural and urban population through dug wells, bore holes and springs to meet water needs. In countries like South Sudan or Somalia, entrepreneurs have built berkads, drilled private boreholes and provided services throughout the main cities. However, the drilling is done without proper coordination and community consultation, posing risks of environmental damage to critical pasture areas and over-depletion of fragile aquifers.

Notwithstanding these potential benefits, there are significant risks of over-exploiting this strategic resource. Uncontrolled groundwater development may threaten water security. Although several studies seem to agree that the existing regional groundwater potential is not fully utilized in the IGAD region, questions remain about how to quantify the potential and how to mobilize the groundwater resource in a sustainable way. There are major deficiencies in our knowledge and understanding of groundwater in the Horn of Africa. Moreover, the transboundary nature of a large share of groundwater resources in Africa makes their assessment and management complex. The question arises how much groundwater should be set aside to ensure water security for populations and livestock, especially during periods of reduced surface water availability, and which share of the available groundwater resource can safely be mobilized for economic development without threatening priority uses like water supply for citizens and livestock during periods of lowest availability.

There are many studies on groundwater in the Horn of Africa region. These studies focus on two major aspects, namely the characterization of large deep aquifers and on rural water supply. Most regional assessments do not consider some of the most significant limitations to groundwater development and use: (i) the spatial and temporal variability of the shallow groundwater resource[1], including the quantification of the recharge of the water tables (ii) the technical, economical or hydrogeological limitations to the lift and use of deeper groundwater, (iii) the capacity constraints for managed development of the resource, and (iv) the water quality constraints. In the region, the most readily accessible and affordable groundwater resources are those stored in shallow aquifers.

However shallow groundwater is more prone to pollution, it fluctuates in quality and quantity, vulnerable to climatic variations and, for those reasons is less reliable in drought periods than deep groundwater. Often, data on groundwater availability do not reflect the significant spatial and temporal variability of the renewable groundwater resources. Correlated to the rainfall patterns, groundwater recharge changes a lot depending on the part of the region and intra-annual and inter-annual variability of rainfall is very high. As a result, shallow groundwater availability varies a lot across the region and in time. Water security plans should consider minimum water availability and low-level percentiles, never long-term averages. Another aspect



often highlighted in regional studies is the availability of substantial amounts of deep groundwater storage. Considering the depth of these reserves, the required technology and infrastructures to tap is expensive and the economic cost to lift would not be suitable for economic uses. The capacity, technical and economic constraints in many cases generate a relative scarcity of the resource. Finally, due to high evaporation rates combined with low recharge rates, groundwater in arid and semi-arid regions may have poor water quality characteristics including high salinity, fluoride or arsenic that limit its use.

Besides the need to better quantify and map the usable groundwater resource, it is necessary to improve governance arrangements at all levels, to reduce the risk of pollution and over-abstraction. Governance arrangements need to be put in place/ strengthened at the local level and supported by adequate water resources management (i.e. including planning) at the national and basin level before the resource is over allocated. For the cases of the transboundary aquifers, which are several in the region (see Figure 2), improved cooperation and management mechanisms among countries through regional and basin organizations will be required. In transboundary aquifers it is important to establish the delineation, hydrological similarity, recharge and discharge mechanism and zones, and significant hydraulic connectivity between the various compartments in the different states.

[1] Shallow being defined here as the groundwater reserves up to a maximum depth of about 15 m below surface, that are accessible through traditional wells and structures

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Relationship to CPF

The World Bank has had a long-standing commitment to global priorities and region-wide programs and the 2008 Regional Integration Strategy for Africa provides a coherent and strategically focused framework to guide the Bank Group's assistance in support of regional integration and regional programs in the provision of regional public goods. The strategy acknowledges that regional approaches to the management of shared waters can provide improved water security and more sustainable management of these resources that can be achieved through national action. It further recognizes that effective management is even more urgent given the potentially disruptive impact of climate change on water resources availability and increasing water demand resulting in potential conflicts arising from limited supplies.

The World Bank Country Partnership Strategies and engagement frameworks of Djibouti, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda include a strong focus on water and recognition of the role of water, and particularly of its access, sustainable management and improved governance, in fostering the goals of economic cooperation. Specifically,

- **Djibouti** Country Partnership Strategy (CPS) Program until FY17 included reducing vulnerability in the country as the first pillar, being water mobilization one of the key lending elements of it. As mentioned: *“The CPS program will aim to address the following challenges: [...] The lack of access to basic infrastructure, including water and agro-pastoral resources in rural communities and water in poor urban areas of Djibouti-Ville; and the country’s poor resilience to climate change and natural disasters”* (CPS FY14-17, signed March 13, 2014, Report No. 83874- DJ).



- Water is also one of the main focuses of **Ethiopia's** Country Partnership Framework (CPF) from FY18-22 and it is addressed already in one of the main CPF targets: *"The number of people with access to improved water sources [...] will increase by one fifth"*. In particular, the CPF Focus Area 2- *Building Resilience and Inclusiveness*- includes increased access to safe water as one of the main objectives (CPF FY18-22, signed May 22, 2017, Report No. 115135-ET).
- The **Kenya's** CPS addresses water security as a main topic under its Domain 1: *"Competitiveness and Sustainability -- Growth to Eradicate Poverty"* and improved water sources development is a key outcome of Domain 2: *"Protection and potential"*. Clean water delivery is considered essential for human development in Kenya. Special emphasis is made on improving access to water services in urban areas, as the engines of growth (CPS FY14-18, signed June 2014, Report No. 88940v2).
- For the case of **Somalia**, the Interim Strategy Note (ISN) recognizes that the *"fluid social and economic patterns amid scarce resources lead to frequent local-level conflict over [...] water points"*, so more sources development and better governance is essential, emphasizing the need to focus on the rural areas, since in them the scarcity, fragility and competition problems are worse. Also, the fifth key pillar of the strategy is about *"Increasing the delivery of equitable, affordable, and sustainable services"*, among which is water (Interim Strategy Note FY14-16, signed November 11, 2013, Report No. 75212 – SO).
- In **South Sudan's** ISN water is listed as the forth Funding for Priority Sector, since around half of the population lacks access to water and it is recognized that *"conflicts among pastoralists and farmers over migration routes and access to water and pasture"* are by far the main sources of inter-communal conflicts. Water is also tackled within the second main strategic pillar: *"Increasing access to basic services in health, education, water supply and HIV/AIDS prevention"*, with an emphasis on the marginalized groups (Interim Strategy Note FY13-14, signed January 2013, Report No: 74767-SS).
- The ISN for **Sudan** lists water as a priority, arguing that *"access to safe drinking water remains low, 44 percent in urban areas, 41 percent in rural areas, with many Sudanese relying on rivers, lakes, ponds, and wells due to the absence of piped drinking water"*. *"Increasing access to basic human services"* is a main indicator and a goal in the strategy for the country and, within it, one of the sub- indicators is provision of clean and safe water. Within another goal: *"Promoting rural development and private sector development"*, livestock enhancement and better access to water point for that activity are other relevant sub-indicators (Interim Strategy Note FY14-15, signed August 30, 2013, Report No: 80051-SD).
- **Uganda's** CPF mentions several times that better access to sustainable land, surface water and groundwater management will be essential in the country, and that the approach will be focused on source protection. Indeed, under Strategic Focus Area B: *"Raising Incomes in Rural Areas"*, it is specifically stressed that *"The Bank will also support the development of a resilient landscape program, including integrated water and forest resources management plans for key catchments"* (Country Partnership Framework FY16-21, signed March 2016, Report No 101173-UG).

This project is well aligned with the CPFs and engagement frameworks of the IGAD countries. In line with that, in addition to the RGI the Bank is preparing and implementing many other projects on water resources management, land protection and climate smart agriculture where groundwater protection, development



and management are aspects addressed and that will be complemented by the RGI. Some examples are the P123204, Water Management and Development Project in Uganda, the series of Sustainable Land Management Projects in Ethiopia, the P117635, Kenya Water Security and Climate Resilience Project, the P152024, The Somalia - Water for Agro-pastoral Productivity and Resilience (P167826) under preparation, Rural CDD and Water Mobilization in Djibouti.

Relationship and alignment with other regional projects from the World Bank is guaranteed as well. The project will be closely coordinated with other World Bank funded regional projects on relevant topics or will build from their recent results to the extent possible. These include the Nile Cooperation for Results Project, the Pastoralism & Stability in the Sahel and Horn of Africa Project or the Regional Pastoral Livelihoods Resilience Project. Apart from them, the Regional Groundwater Initiative is developed in line with the strategic context for operational guidance provided in the African Groundwater Strategy Note “Assessment of Groundwater Challenges & Opportunities in Support of Sustainable development in Sub-Saharan Africa”, which has the goal of supporting groundwater development and management of investments in the region.

C. Project Development Objective(s)

Proposed Development Objective(s)

To strengthen the knowledge and analytical foundation for cooperative management and development of international waters in Sub-Saharan Africa to aid sustainable climate resilient growth. This will be done by through the Catalytic subprogram of the Cooperation in International Waters in Africa (CIWA) MDTF. The Catalytic subprogram will generate, share, and manage knowledge that can facilitate cooperative development and management of international waters; explore potential high impact collaborative investment opportunities in defined basins and regions; and create shared understanding of the opportunities, risks, costs, and benefits of cooperative development and management of international waters among stakeholders.

The specific objectives of this sub activity are to undertake a comprehensive assessment of the ground and surface water potential in the IGAD member countries, strengthen the regional ground water information data availability and support IGAD member countries to Strengthen and manage the sustainable development of their groundwater potential.

Task description: This project strengthens the knowledge and analytical foundation for sustainable development of groundwater resources in the greater Horn of Africa region and supports trans boundary cooperation for its management. The project will provide critical knowledge for improving the planning and design of water harvesting and artificial recharge infrastructure that are key to water security in the Horn of Africa and explore opportunities to mobilize deeper groundwater resources for economic development, as a basis for sustainable and climate resilient growth.

The project will (i) increase the knowledge base on regional ground water resources by conducting a regional hydrological assessment of the surface and renewable groundwater potential, considering their spatial and temporal variability, as a basis for investments aiming at building resilience against climate variability (ii) Strengthen the capacities of ground water development and management in IGAD member countries by undertaking a needs assessment for building the capacity of ground water management at the national level (iii) Prepare three feasibility



studies for groundwater development opportunities in the region, including an assessment of available groundwater resources and identification of infrastructure investment needs and (iv) strengthen the capacity of IGAD Water Unit to support regional cooperation on groundwater management and enhance the capacity of IGADs climate center ICPAC in the area of groundwater data management and assessments.

Key Results

A surface and ground water assesment for selected parts of the region.

Comprehensive needs assessment of the capacity to develop and manage groundwater in the region.

Three complete feasibility studies for the development of Ground Water potential areas.

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D. Preliminary Description

Activities/Components

Approach. Ensuring the proper management of the resource and the sustainability of groundwater related uses requires reliable information on the actual availability, variability and quality of it, as well as a proper institutional framework and sufficient capacity to guarantee efficient use, help avoid overexploitation and pollution and manage critical situations.

The results of the assignment “Case Study on Drought Resilience for the Horn of Africa”, funded by the WB Water Partnership Program (WPP) Disaster Risk Management (DRM) Window were used as a guidance for the development of this project’s objective, approach and components. Building from the main findings of the assessment, and in close collaboration with the Intergovernmental Authority on Development (IGAD), the focus and scheduling of the Regional Groundwater Initiative activities have been developed.

The proposed project will complement WB and other donors’ water resources management activities in the region by strengthening knowledge and capacity, with a focus on drought resilience and transboundary cooperation. The CIWA-funded activities will contribute to the sustainability of other investments because they will address fundamental technical issues. For instance, in the region there are many resilience programs making a valuable contribution to overall water security by investing in landscape and watershed protection, building groundwater development structures, recharge devices or water harvesting structures based on a mostly empirical basis, but a quantified basis for the required number, design and volume of these structures is often lacking precisely because of poor knowledge and capacity, as is coordination among programs and systematic evaluation and monitoring. This project will help with tools, studies and trainings on new technologies, focused on the sustainable exploitation of the groundwater resources.

The proposed project will provide support to all the IGAD countries because, to different levels depending on their capacity and awareness, water resources management in Djibouti, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda generally neglects groundwater.



A few key reasons for that were identified in the WPP assignment. First, groundwater remains an invisible and unknown resource very much. It is confirmed that some of the countries, like South Sudan or Somalia, share a weak knowledge of the groundwater resource, while some others have less limitations in that sense, like Uganda or Kenya, but it is recognized as a subject to improve for the entire region. There are several aspects for which applied knowledge is inadequate or not shared and there is still a strong disconnection with water resources management. The Regional Groundwater Initiative should help to guarantee more knowledge creation and dissemination, for it to be applied by governments, NGOs, local users, private sector and organizations working on drought relief. For all the countries, it is constantly mentioned that transboundary aspects and dynamics of groundwater need to be more considered in the ongoing groundwater assessments.

The other challenge for sustainably mobilizing the regional groundwater resources is the inadequate capacity for groundwater development, management and use in the region. In terms of policy and legal frameworks, these should be updated and more work to ensure proper enforcement is required. Consideration should also be given to developing specific national groundwater frameworks. On the other hand, the expertise needed to provide the required guidance to groundwater development and management is much higher than what exists among most of the countries. Therefore, building of the technical and leadership capacity of the staff dealing with groundwater development and management needs to be given more attention in the IGAD region.

The proposed project with an estimated budget of US\$ 2 mill. has been structured around four main components that start addressing the abovementioned gaps. Each component includes a regional dimension, with a set of activities at local, national or transboundary level in the Horn of Africa, and a global dimension aiming at developing guidance for assessing and managing groundwater in dryland regions in Africa and elsewhere. The Project components are :-

Component 1: Expand the knowledge base on regional groundwater resources (US\$ 450,000). This component seeks to continue taking stock of existing information and initiatives to establish a baseline of knowledge on the physical and social aspects of regional groundwater resources in the region, engaging external partners for some of the activities as needed.

The main activity under this component will be the determination of the surface water availability, water variability and natural recharge of shallow groundwater over the region (with an eye on water harvesting, artificial recharge and resource development) and the status and knowledge of deep groundwater exploration, development and management..

Building on the methodology of a pilot study to understand surface water availability, spatial and temporal variability and reliability in the regions of Somaliland and Puntland, volumes of water available for harvesting for 7, 14, and 21 days monthly will be defined at catchment level for the entire region. The input data used for the study will be extracted from a modelling exercise being carried out at the IGAD ICPAC Center in Nairobi, Kenya. This sub component will be complemented by Mapping of potential groundwater recharge



zones in the arid lands of the IGAD region (funded by European Space Agency ESA). ***The deliverable will be a surface and ground water assesment for selected parts of the region.***

The component will also support the finalization of knowledge management gaps in South Sudan and evaluate the situation in the remaining four regions of the southern part of Somalia. This was a remaining activity from the March 2017 to September 2017 WB Water Partnership Program funded assignment on the knowledge base. This competent also includes developing a dedicated Regional Groundwater Center aligned to ICPAC and a Water Information Database for the region.

Component 2: Strengthen capacities in groundwater development and management in IGAD member countries (US\$ 300,000).

This component aims to support regional capacity in groundwater development and management by identifying institutional needs and regional cooperation opportunities. It will identify institutions with responsibility and interests in groundwater management and associated capacity needs and promote capacity building and regional cooperation by facilitating activities, such as pilot programs, study tours and inter-institutional engagement. Some activities under this component will focus specifically on the nexus groundwater & drought resilience and on transboundary cooperation. Some capacity building activities proposed will be more tailored to state-level needs. ***The main deliverable from this activity will be a comprehensive needs assessment of the capacity to develop and manage groundwater in the region.*** The component will also include different sub activities that aim to strengthen capacity of IGAD Water Unit for the overall coordination of the project.

Component 3: Maximize the benefits of groundwater to strengthen resilience to drought and economic development in the region (US\$ 1,100,000) This component focuses on sectoral water needs, vulnerable groups and on assessing economically exploitable groundwater resources (as opposed to theoretically available resources) and started identifying suitable solutions to build resilience to drought using groundwater. The development in future demands from groundwater resources will certainly require a more detailed understanding of the water availability, water quality and the potential pollution threats, since the available knowledge is not enough for the aquifers in use. Some priorities include Mt. Elgon (between Uganda and Kenay), Merti (between Somalia and Kenya), a ground water aquifer between Sudan-South Sudan. All these are shared ground water resources and if developed, they have huge potential in promoting cooperation among the shared water resources. ***A total of three complete feasibility studies that includes the ground water assesment, the infrastructure need to develop, preliminary cost, assesment of the associated Environmental and social safeguards risks and mitigation measures will the main deliverable from this component.***

Component 4: Project management, Monitoring and evaluation (US\$ 150,000: IGAD is the implementing agency for the project and will mobilize its in-house capacity for the work. However as the need arise IGAD will use the service of consultant either firm or individual to fill some of the missing capacity gaps. This component will finance IGAD staff travel related expense to supervise this project, consultant contracts and travels costs, workshop and review meeting costs, report production and dissemination expenses.



Regional and Global dimension: The project will receive USD 2 M of CIWA financing, to mainly cover the local, national, and the regional dimension. However, some of the funding and the time allocation will be devoted to global activities. IGAD will support regional and national activities. Implementation of global activities will involve key partners (tentatively European Space Agency, IGRAC, IDMP and others) to ensure that activities are delivered in synergy with ongoing and existing international cutting-edge work. Moreover, it is important to consider that a Greater Horn of Africa groundwater strategy could lay the foundations for World Bank engagement in developing other regional strategies in Africa. Like the Horn of Africa, other regions in Africa like the Sahel of the SADC region suffer from severe aridity challenges, and groundwater likely has the potential to also support water security and human and economic development in those areas. Hence, further strategies could be developed from the learning's of the Greater Horn of Africa experience. Table 1 below summarizes the potential project's activities at the local/national/regional and global levels.

Table 1: Preliminary Component summary of national, regional and global activities.

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	Local, National, Regional	Global Activities
Components	Potential partners: IGAD	Potential partners: ESA, IGRAC, IDMP
1- Increase the knowledge base on regional groundwater resources	<ul style="list-style-type: none"> • Evaluations of the level of knowledge available locally, nationally and regionally • Assessments of shallow & deep, renewable & non-renewable groundwater resources considering variability, dynamics, cost and quality (in pilot areas and selected aquifers) • Arrangements for data acquisition, compilation in database, management, processing & sharing 	<ul style="list-style-type: none"> • Development and promotion of methodologies for groundwater assessments (water availability, variability, cost, quality)
2- Strengthen capacities in groundwater development and management in IGAD member countries	<ul style="list-style-type: none"> • Detailed diagnosis of the capacity for groundwater development and management • Reinforcement of regional institutions focused on water and groundwater resources • Support to the legal and policy frameworks on groundwater • Facilitation of the transboundary dialogue • Training and capacity building at national level about several relevant gaps identified, 	<ul style="list-style-type: none"> • Development of methodology and questionnaire for capacity for groundwater development and management diagnostics • Preparation of guidelines for the role of specialized



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	from groundwater surveying to hydro diplomacy	centers in groundwater management
<p>3- Maximize the benefits of groundwater to strengthen resilience to drought and economic development in the region</p>	<ul style="list-style-type: none"> • Assessment of the socio-economic barriers to water security for most vulnerable groups/sectors in the IGAD region • Assessment of sectoral and spatial-temporal supply/demand gaps across the region • Development of a communication strategy on groundwater and its role for building resilience to drought 	<ul style="list-style-type: none"> • Development of methodologies for evaluating the cost of access to secure groundwater sources, based on available technology, capacity, energy costs, depth and variability of groundwater • Preparation of a brief knowledge note on practical examples of innovative approaches in the region that have increased water security/ drought resilience and economic benefits for beneficiaries through the use of groundwater. The collection of examples will be complemented with economic analysis, but in any case, low cost options that could be implemented at community level will be staged

Gender inclusion. The project design is gender sensitive and will assess during preparation the implications for women and men of any planned action, including legislation, policies and activities on the ground at all



levels. In the Horn of Africa, access to water has major implications as women are generally in charge of fetching water for all the uses. Often, the needed water comes from groundwater. Therefore, although over extraction negatively impacts the poorest and most vulnerable groups, because they cannot afford to dig deeper, women are especially affected because they need to fetch it from further away. This project will pay particular attention to the gender dimension, particularly through the development of the pilots, which will address any emerging issues. Indeed, gender-sensitive groundwater development and management help secure and protect groundwater access. An approach to groundwater development and management that puts gender at the center stage facilitates the representation and participation of women in aquifer management, so that groundwater priorities of men and women for different activities are both considered in planning.

Specific gender actions. The project design will lay emphasis on the gender dimension through ensuring equality issues are addressed in the suggested activities to the extent possible. Participation of gender sensitive professionals who can recognize gender differentiated needs, priorities, skills and capacities will be essential part of the project preparation and implementation. The project will make gender a core element of all project components- including studies, capacity building activities and pilot activities- not only because women are a vulnerable group that is disproportionately exposed to the impacts of droughts in the IGAD region, but also because they can play a decisive role in building sustainable resource management. On the one hand, gender balance will be promoted during the entire project implementation. In this regard, it will focus on guaranteeing the attendance of similar number of female and male attendees in the training events, meetings in legal and policy framework discussions.

During project preparation and implementation, this project will coordinate closely with other development partners supporting enhancement of knowledge and capacity for groundwater development and management in the Horn of Arica to maximize synergies and avoid duplication. These includes but not limited to the IDDRSI strategy initiative, launched in 2011; A groundwater and climate change study in Africa funded by DFID in 2010 and conducted by the British geological survey; The livelihoods for resilience initiative in the Horn of Africa by ILRI and supported by FAO and CGIAR, The Integrated Drought management Programme in the Horn of Africa (IDMP HoA) carried out by the Global Water Partnership and WMO in 2015; Mapping, assessment and management of transboundary water resources in the IGAD sub-region project; Forecasting Drought in East Africa by European Centre for Medium- Range Weather Forecasts (ECMWF) products in forecasting droughts in East Africa; UNESCO Mapping Programme in the Horn of Africa and others.

Also, the IGAD's Climate Prediction & Applications Centre, ICPAC, is another initiative that is improving the regional capacity for water resources management from the side of the practical tools, and it is gradually performing more and more efforts on groundwater. ICPAC seeks "to become a viable regional center of excellence in climate prediction and applications for climate risk management, environmental management, and sustainable development". It aims to achieve this by providing timely climate early warning information and supporting specific sector applications to enable the region cope with various risks associated with extreme climate variability and change for poverty alleviation, environment management and sustainable development of its member countries. To date, ICPAC has (i) enhanced regional capacity for climate



diagnostic centres, scientists and users, (ii) produced and disseminated timely climate early warning information, (iii) improved seasonal forecasting, (iv) established a continuously updated data bank for development of baseline statistics and hazards maps, and (v) enhanced collaborations with sector specific users (such as water resources, agriculture, etc.) through pilot application projects for development of new application tools. Specific ICPAC projects currently focus on regional capacity building, monitoring and resilience. ICPAC focus areas with greatest relevance to groundwater include: Water resources, Remote sensing, Climate Prediction & Early Warning and Disaster Risk Reduction.

ICPAC draws on international frameworks and principles for application at regional and national levels. Strategic components particularly relevant to groundwater include contingency planning, regional collaboration of preparedness and response, vulnerability analyses, and needs assessment and resource mobilization.

The regional approach is preferred to complement and extend the benefits of individual national interventions, as well as reflecting the important transboundary nature of many aquifers in the Horn of Africa region. All the components will benefit from regional technical assistance and cross learning activities. The regional dimension of the project is critical in the implementation of this project, notably by fostering exchange of experience among institutions built or strengthened in participating countries. It will help the policy dialogue on groundwater governance issues among the IGAD Member States. As mentioned in the components description, actual activities on those aspects will include, among others: data compilation and sharing; preparation of tools and guidelines; provision of training of trainers; facilitation of exchange of experience through study tours and the delivery of cross learning events; designing and carrying out communication and advocacy campaigns.

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SAFEGUARDS

E. Safeguard Policies that Might Apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
Environmental Assessment OP/BP 4.01	X		
Natural Habitats OP/BP 4.04		X	
Forests OP/BP 4.36		X	
Pest Management OP 4.09		X	
Physical Cultural Resources OP/BP 4.11		X	
Indigenous Peoples OP/BP 4.10	X		
Involuntary Resettlement OP/BP 4.12	X		



Safety of Dams OP/BP 4.37		X	
Projects on International Waterways OP/BP 7.50		X	
Projects in Disputed Areas OP/BP 7.60		X	

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