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Evaluation of the GEF's Approach to and Interventions in Water Security

An Evaluation Report by the GEF IEO

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Volume 2: Technical Documents

Evaluation of GEF's Approach and Interventions in Water Security

Volume 2: Technical Documents

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Technical Document 1: Approach Paper

Evaluation of GEF's strategy and portfolio in water security

(Prepared by the Independent Evaluation Office of the GEF)

May 2022

Introduction

Neither human society nor terrestrial ecosystems can survive without freshwater, making it an essential element for life on earth. Freshwater also forms a critical link between the environment and society—many of the most critical ecosystem services are water-based—from filtering some contaminants to providing a steady flow of usable water, human society relies on water processed by natural ecosystems. Equally, ecosystems rely on a supply of freshwater to be maintained, something that humans threaten through contaminating and diverting water for their own uses. As such, freshwater threads its way into many aspects of GEF's work to achieve global environmental benefits—considering freshwater resources are a necessary element to safeguarding the world's environmental resources.

Since freshwater is so critical to both humans and ecosystems, the threats to freshwater resources are of great importance to GEF and the wider international development community. The global water cycle is impacted by many processes—population growth, agriculture, economic development, industrialization, deforestation and climate change (United Nations Environment Programme 2019). As global population has increased, so has society's use of water, reducing the amount available for ecosystems. Urban areas and industrial processes create wastewater, which, if not properly handled, can contaminate water bodies. Land use change such as deforestation can leave areas more prone to water-based natural disasters, namely flood and drought. Many of the most obvious changes felt by climate change are changes to the ways societies and ecosystems interact with water—increased instance of floods and droughts, increased evaporation and other changes in water availability and melting of glaciers (Intergovernmental Panel on Climate Change 2021).

Water security has increasingly been used by the global water community to frame the issues relating to freshwater. United Nations Environment Programme (2013) defines water security as "the capacity of a population to safeguard sustainable access for sustaining livelihoods, human well-being and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability." As such, water security has four main elements: safeguarding water resources for 1) water for drinking, sanitation, hygiene and human well-being, 2) economic activities and development and 3) ecosystems and 4) protecting against water-related hazards and climate change.

Given the importance and cross-cutting nature of water security and the growing recognition of the issue in the GEF strategies and projects, the GEF IEO is undertaking a comprehensive, multi-focal area evaluation of the topic. The evaluation will take a look at the broader "footprint" of the GEF portfolio in terms of water security, in terms of impacts and missed opportunities.

Background

The importance of solving the freshwater issues within the framework of water security is further seen by ubiquity of freshwater in the Sustainable Development Goals (SDGs): principally SDG 6, to "ensure availability and sustainable management of water and sanitation for all" (United Nations 2015). Freshwater is also critical to food security (SDG 2), health and well-being (SDG 3), energy and security (SDG 7), sustainable cities (SDG 11), responsible consumption and production (SDG 12), climate impacts (SDG 13), conservation and sustainable use of the oceans (SDG 14) and terrestrial biodiversity (SDG 15) (United Nations Environment Programme 2019). Water security is also linked to human security—increasing population plus reduced availability of freshwater due to climate change could contribute to social instability and migration (Gleick and Iceland 2018). In areas with high fragility, conflict and

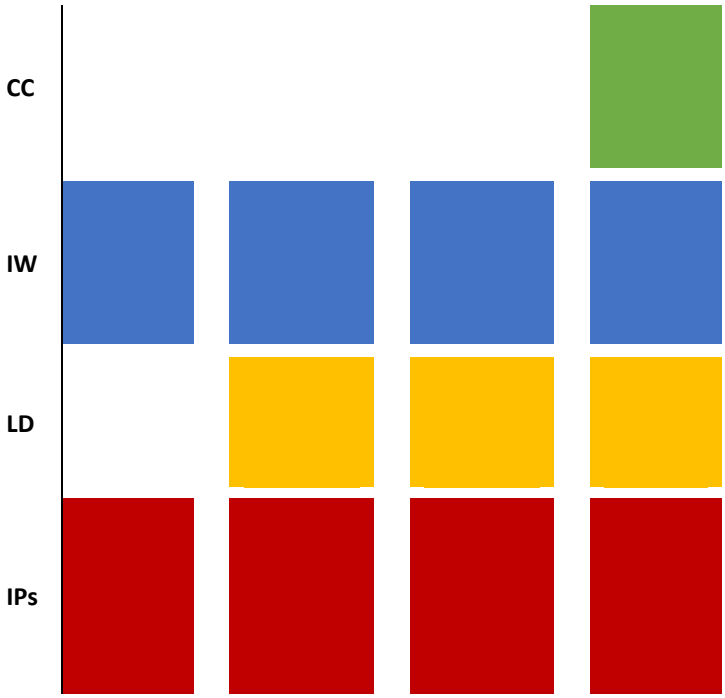
violence (FCV) where GEF works, competition over land and water is a major driver of conflict (GEF IEO 2020). Cultural gender norms also impact water security—women have the responsibility of collecting water for domestic purposes in almost all developing countries, prioritize different water uses than men and often have the least access to it (International Fund for Agricultural Development 2007).

The most obvious and direct way in which GEF addresses water security is through the International Waters (IW) focal area, which aims to safeguard transboundary marine and freshwater resources. The focal area has always had objectives relating to freshwater resources and more recently has framed its freshwater objectives around water security. In GEF-7, the main freshwater IW objective is to "enhance water security in freshwater systems" (GEF 2018a) The most recent proposed programming directions for GEF-8 include the exact same objective (GEF 2021). This work transcends the four elements of water security in transboundary watersheds and aquifers, as IW activities aim to safeguard freshwater resources for a diverse group of users and prevent interstate conflict in their use. According to United Nations Development Programme (2012), 263 watersheds cross political boundaries of two or more countries, and these watersheds make up over half of the earther's land surface and contain 40% of the global population.

This limitation of IW to addressing water security in transboundary watersheds and aquifers doesn't mean that GEF only addresses the topic in international contexts. In fact, all GEF focal areas address elements of water security in one manner or another (Table 1). Protecting against water-related hazards and disasters are a key theme addressed by the two GEF-administered climate change adaptation focused trust funds, the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF). A major goal of the land degradation focal area is to mitigate the effects of drought and a key objective is drought-smart land management in dryland geographies, including the management of water resources for agriculture. Chemicals and Waste projects aim to treat wastewater so harmful pollution doesn't affect water supply. Biodiversity projects preserve freshwater resources for ecosystems and ecosystem services. Several integrated programs address aspects of water security as well.

Table 1. The most prominent ways in which GEF focal areas overlap with the major elements of water security.

		Elements of water security				
		Drinking, sanitation and hygiene	**Economic activity**	**Ecosystems**	**Hazards and climate change**	**Notes**
GEF focal areas	**BD**			■		Biodiversity projects seek to safeguard the flow of water to biodiverse ecosystems and water-based ecosystem services provided to communities.
	CW	■	■	■		Many CW projects deal with treating domestic and industrial wastewater and preventing contaminants from entering drinking water supply and harming ecosystems.



The LDCF and SCCF fund projects to reduce the impact of floods and droughts, including watershed management and early warning systems.

One of IW's main objectives is managing transboundary freshwater resources for all uses, and protecting these watersheds from water-based hazards.

LD directly linked with reducing the impacts of drought and managing the use of water in agriculture, a critical rural livelihood.

Water plays a key role in the food security and cities IPs, with several child projects aiming to protect populations from floods and other disasters and safeguard clean water supplies.

Note: BD = Biodiversity focal area, CW = Chemicals and Waste, CC = Climate Change, IW = International Waters, LD = Land Degradation and IPs = integrated programs or integrated approach pilots.

The 2019 GEF safeguards policy also includes regulations to ensure GEF projects do not worsen water security in their project areas (GEF 2019). Projects must promote efficient use of water and, in cases of high water use, include measures to "avoid or reduce" their water use and the impact on communities, other water users and the environment. Additionally, projects must manage waste and effluents (including water-based pollutants) and screen and plan for natural hazards, including water-based disasters.

Available evaluative evidence

Although the GEF IEO has so far not conducted an evaluation focusing exclusively on water security, several evaluations have looked at themes related to water security and focal areas which feature the topic. The various IW focal area evaluations, for example, have highlighted GEF work in transboundary freshwater resources. Early IW studies noted the good geographical coverage of IW projects, covering "almost every" GEF-eligible large watershed (GEF IEO 2005) and that freshwater basin projects were one of the most commonly addressed IW themes, although investments in groundwater projects were not common (GEF IEO 2002). The most recent IW evaluation pointed to an imbalance between marine and freshwater investment in GEF, especially acute in GEF-5 and GEF-6, in which marine projects, especially dealing with fisheries, received more investment (GEF IEO 2018a). In GEF-5 and 6, GEF invested twice as much in marine as in freshwater projects. The evaluation hypothesized the reasons for this included that transboundary freshwater settings were more complex and lacked the more easily attainable benefits that could be obtained in marine fisheries settings, including the short-term economic, social and biodiversity benefits of ecosystem-based sustainable fishing. The study also noted that freshwater projects had slightly lower satisfactory ratings than marine projects. In OPS-7 however, evidence was found that this imbalance had started to diminish, with increased investment in integrated water resources management in transboundary river and lake basins, which made up 36% of GEF-7 IW funding

(at the point of analysis for OPS-7) up from 24% in GEF-6 (GEF IEO 2021) Additionally, little difference was found in performance between freshwater and marine IW projects.

Other IEO findings highlight the cross-cutting nature of water security themes. GEF IEO (2018a) concluded that IW projects show that solutions to water issues need to come from a variety of sectors that are big water users, such as energy and food production, trade, land use and urban planning—themes that are common in other focal areas. However, at that point, focal area silos, sectoral conventions and difficulties in aligning country and regional priorities for the most part prevented integration. Later studies point to the ability of the integrated programs to overcome this issue and obtain a more holistic approach to water security. GEF IEO (2021) gives the example of the Kenya Water Fund project under the Resilient Food Systems integrated approach pilot (GEF ID 9139), which promoted sustainable land management and water conservation measures while also improving climate change adaptation, increasing supply chain efficiency and land restoration. Another pair of projects in the Hai Basin in China (GEF ID 1323 and 5561) were also highlighted as being able address both water scarcity and water pollution at once, achieving a reduction in overexploitation of groundwater. An evaluation on the Land Degradation focal area found that the focal area had strategically moved towards integrated approaches but that key contextual factors including drought, food insecurity and migration should be given more consideration in project design (GEF IEO 2018b).

There is also limited evidence that certain GEF projects unintentionally decrease water security. GEF IEO (2021) points to the example of a project in Guinea (GEF ID 1877) that relocated farmers to a nearby watershed to perform reforestation efforts around a river source. However, the area which the farmers were moved to had limited groundwater resources, which is not enough for year-round irrigation for the farmers.

IEO studies have also noted the overlap of water insecurity and FCV areas. GEF IEO (2020) found that 29% of IW projects had been done in countries affected by major armed conflict and 70% were in fragile situations. In some cases, the unstable situations decreased the ability of the projects to implement and achieve results. GEF IEO (2018a) found that fostering sufficient cooperation among neighboring countries to even formulate a project document can be a long and sensitive process.. Often the 18-month time limit to design a GEF project is not sufficient. However, the GEF IEO (2020) also found that IW projects have had a co-benefit of fostering more general cooperation between countries that are in disagreement by bringing them together to discuss shared water resources.

GEF Agency evaluation offices have also looked at aspects of water security, including water supply and sanitation and agricultural water use. Multiple studies point to the importance of a cross-sectoral approach to water issues— African Development Bank Independent Development Evaluation (IDEV) (2015) points to the need to integrate water supply and sanitation programming with health education activities and that projects which took into account multiple water users were more sustainable, while World Bank Independent Evaluation Group (WB IEG) (2018) notes that World Bank water supply and sanitation (WSS) projects needed to take into account the cross-sectoral issues relating to WSS, including wastewater, flood management and climate change. WB IEG (2018) pointed to the difficulty and importance of establishing financial sustainability post project, which often meant charging water tariffs, but this was commonly missing from WB projects. IDEV (2015) noted that although private sector providers are a common and useful way of providing financial sustainability, they only work in rural areas if competition is present. Both evaluations noted the importance of measuring quality of service

rather than simply measuring user access. The importance of monitoring quality of service and water quality over just user access is reinforced by research showing that reporting on the number of people that were considered to have achieved access to "safe drinking water" for achievement of the Millennium Development Goals Target 7.c was overestimated because, although they achieved access to improved drinking water sources, many of these sources did not provide water that met World Health Organization water quality guidelines (Bain et al. 2012).

This evaluation will also seek to coordinate and obtain evidence from other ongoing and related evaluations within GEF IEO, such as the ongoing evaluation of GEF interventions in the Mekong river basin, and from GEF Agency evaluation offices, such as the Food and Agriculture Organization of the United Nations (FAO) evaluation of contributions to SDG 6.

Purpose, objectives and audience

The purpose of this evaluation is to assess GEF's strategy and interventions that address water security, a topic of growing international interest, building on previous work. The objective is to provide GEF stakeholders with evaluative evidence of the relevance, coherence, effectiveness, and sustainability of interventions that directly or indirectly impact water security and provide lessons.

The audience of the evaluation includes the major GEF stakeholders, especially the GEF Council, the GEF Secretariat, the GEF Agencies, the Scientific and Technical Advisory Panel (STAP) and the GEF country focal points.

Scope and key evaluation questions

More specifically, the evaluation will provide evidence against the following evaluation questions, which are framed by the criteria of the GEF Evaluation Policy (GEF IEO 2019)[1]:

- Relevance
    - To what extent have GEF interventions with a significant focus on water security responded to beneficiaries' (communities, resource users, governments, river basin organizations, etc.) needs, policies and priorities relating to freshwater?
    - In what ways and using what frameworks and strategies has GEF addressed water security and its four elements (sufficient and clean water for drinking, sanitation, hygiene and well-being; livelihoods; ecosystems and protecting against water-related natural disasters)?
- Coherence
    - How does GEF's approach and activities related to water security interact with similar activities and initiatives at the country level?
    - How does GEF's approach and activities compare to a theory of change for improving water security derived from best practices among peer organizations and the larger international water community of practice?
- Effectiveness
    - To what extent have GEF interventions been effective in improving water security within the GEB framework and as co-benefits while avoiding negative trade-offs?

[1] Although coherence is not one of the criteria in the GEF Evaluation Policy, its main elements are included for the program context, and the criterion appears in the latest version of the OECD DAC evaluation criteria: https://www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.htm

- Have GEF projects focused on water security considered impacts on gender and all stakeholder groups, including the most vulnerable?

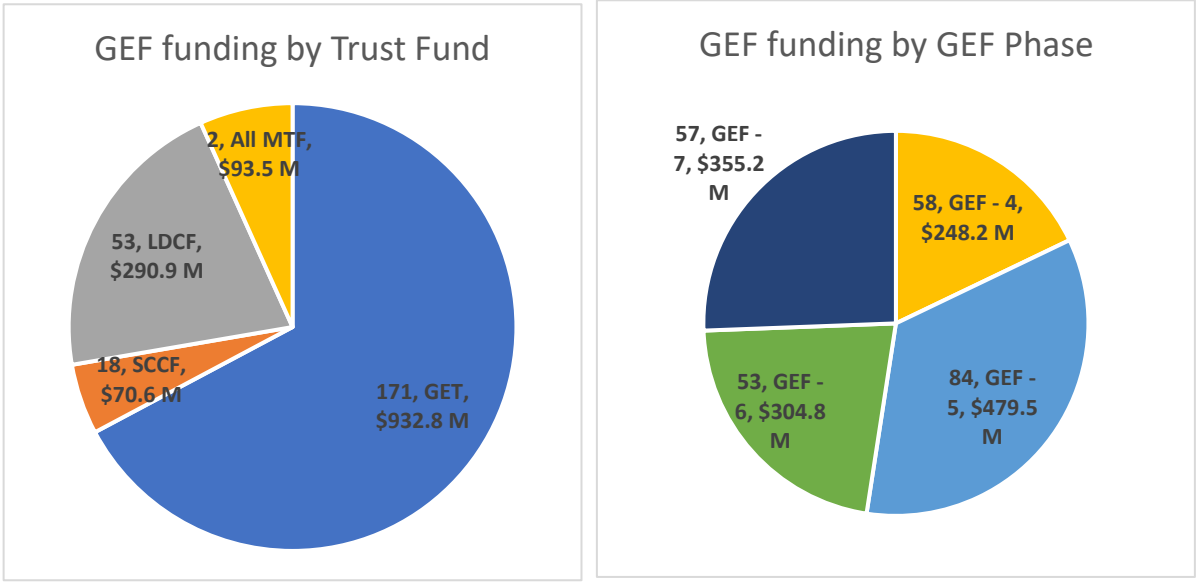
- Sustainability
  - To what extent are GEF outcomes related to water security sustained or continued beyond the end of the implementation period?

The scope of this evaluation includes all GEF projects and programs, starting in GEF-4, whose main objective addresses one or multiple of the four main dimensions of water security[2]. The evaluation team will also look beyond the GEF projects themselves and identify best practices for measuring, mainstreaming and maintaining water security to evaluate GEF's approach against and to recommend for GEF projects in the future.

There are an estimated 252 GEF projects that have a water security focus with $1.39 billion in GEF financing[3] (including LDCF and SCCF) and $12.21 billion in co-financing. This represents about 8% of total GEF financing over that time frame.

The water security focused portfolio is made up of a majority of GEF-funded projects (67%) but also a significant amount of LDCF, SCCF and multi trust fund (MTF) projects (Figure 1). GEF-5 projects make up the largest funding share of the three GEF phases at 35% of the portfolio, while a decrease was seen in GEF-6.

Figure 1. Portfolio of water security focused projects categorized by GEF-managed trust fund and GEF phase.



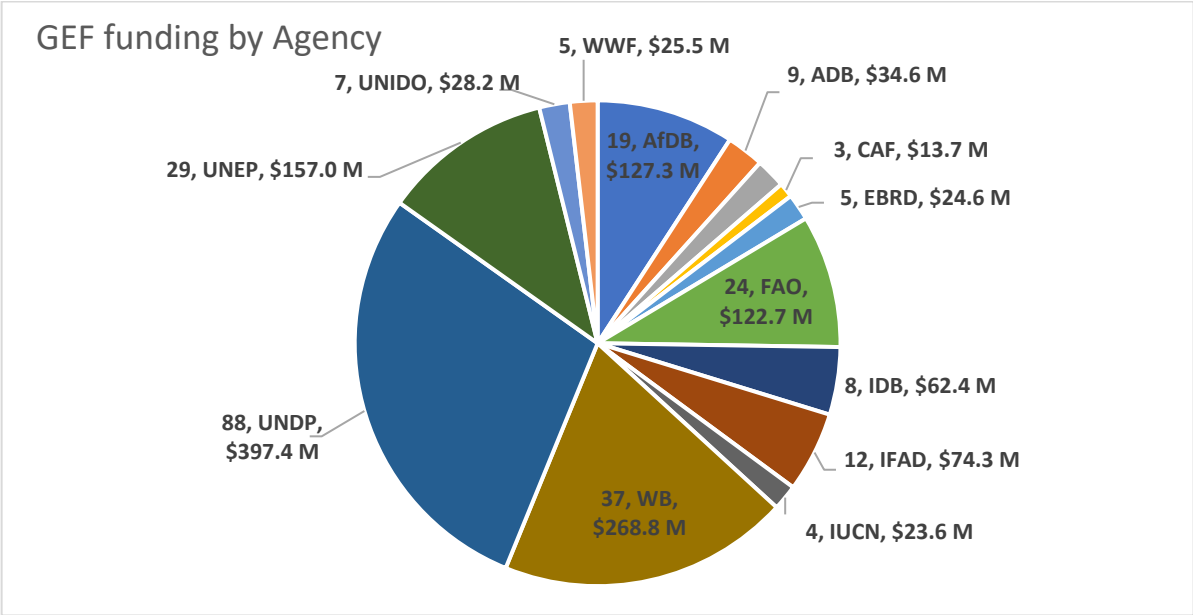
[2] The portfolio was defined by querying GEF project titles and objectives on the GEF Portal. First, the search terms "water", "flood", "drought", "disaster", "watershed", "aquifer" and "basin" were used to identify potential projects to include. Resulting projects were discarded if they were not directly focused water security themes (such as marine topics or projects focused on a basin or watershed without a clear focus on water resources). Additional GEF-7 projects were added that included funding from the water security focused IW focal area objective in GEF-7. Dropped, cancelled and PIR rejected projects were removed.

[3] GEF funding reported here includes GEF financing for implementation, Agency fees and project preparation grants.

Note: For each category, number of projects is shown first, followed by the category name and GEF funding amount.

The United Nations Development Programme is the GEF Agency with the largest share of funding in the portfolio at 29% of the total, while the World Bank (19%), the United Nations Environment Programme (11%), the Food and Agriculture Organization (and the African Development Bank (9% each) also have significant shares (Figure 2).

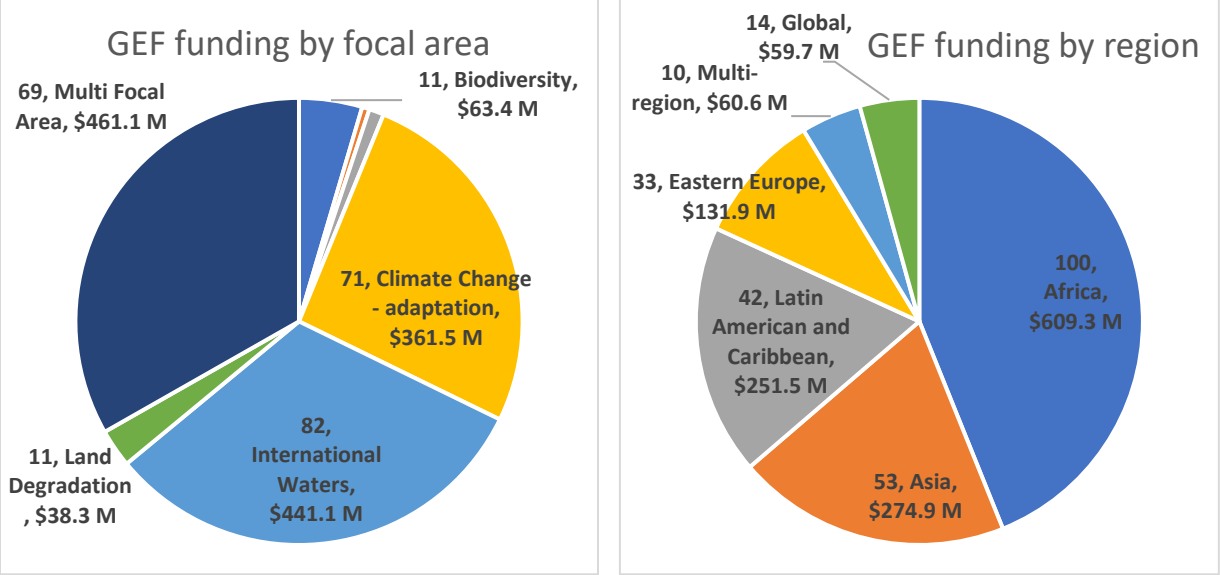
Figure 2. Portfolio of water security focused projects categorized by GEF Agency.



Note: For each category, number of projects is shown first, followed by the category name and GEF funding amount.

Despite the prominence of the IW focal area for addressing water security elements, the largest share of GEF or GEF-managed trust fund funding in the portfolio are in multi-focal area projects (33%), showing the cross-cutting nature of the topic (Figure 3). Climate change adaptation projects funded by LDCF and SCCF funded make up 26% of the portfolio behind IW which makes up 32%. The region with the most amount of water security focused projects is Africa with 44% of trust fund funding, followed by Asia at 20% and Latin America and the Caribbean with 18%. $196 million or 14% of funding for water security focused projects was in SIDS countries and $357 million or 26% was in countries categorized as having fragile or conflict situations according to the World Bank.

Figure 3. Portfolio of water security focused projects categorized by focal area and region.



Note: For each category, number of projects is shown first, followed by the category name and GEF funding amount.

Evaluation design

A variety of methods will be used to address the evaluation questions raised earlier:

- **Examination of GEF's water security strategy**. Water security has been the overarching framework for the IW transboundary freshwater strategy since GEF-7 and all of the elements of water security were featured in IW strategies for previous GEF phases. However, the GEF does not have a comprehensive, cross-focal area water security strategy, so this task will involve reviewing multiple documents including programming directions, focal area strategies, policies, technical notes including those published by STAP and GEF Agency strategy documents related to elements of water security to piece together strategies for addressing different aspects of water security from various sources The GEF's and GEF Agency safeguards policies will also be reviewed to see GEF's strategy for ensuring its interventions do not unintentionally decrease water security in project areas.
- **Study of good practices in water security**. This study involves a literature review of results, lessons learned and best or innovative practices gleaned from other actors in international development who have long histories and expertise in water security or its main elements. The literature includes both published peer-review articles evaluating certain methods or activities that aim to improve and avoid a decrease in water security and technical reports highlighting lessons or innovative techniques. The study will also include interviews with sector experts. Based on this review, a theory of change (TOC) will be constructed to show how, using good practices, water security can be improved through development projects. The TOC will take into account the differing contexts that GEF works in that may require variations in approaches to solve diverse water security issues. This TOC will then serve as a comparator for evaluating GEF's work in water security, taking into account the four elements of water security and key cross-cutting elements including stakeholder inclusion and gender. This study will also inform the indicators by which project effectiveness at increasing water security will be assessed through the portfolio review and the case studies.

- **GEF project portfolio review**. The portfolio review will obtain and examine targeted information about a large number of water security focused projects, including all GEF-4 and 5 projects with completed terminal evaluations and all ongoing GEF-6 and 7 projects. This data gathered will include information on indicators used to measure elements of water security, level of consideration of cross-cutting themes like stakeholder engagement and gender[4], water security related safeguards and results.
- **Regional and country case studies**. Case studies will be used to look into more detail at how water security is addressed at the project level. Six case studies will be completed. In each case study country, multiple projects completed at least three years ago (using the IEO post-completion evaluation tool) and one ongoing project (using the IEO formative evaluation tool) will be included. Countries and transnational basins with the highest number of completed water security focused projects from GEF-4 or later will be prioritized, and the countries will be chosen during the evaluation start-up based on an examination of the details of available projects and stakeholder input. Several case studies will be multi-country involving countries that share a transboundary watershed. Selection of case studies will also take into account achieving geographical, focal area and Agency diversity. A list of potential countries that have both two completed and one ongoing water security focused projects are shown in Table 2 which will help inform case study selection (however, actual case study selection will take into account transboundary watershed and aquifer locations as well). Within each case study country, GEF project documents, other documents, reports, studies and websites created by the projects and outside literature pertaining to the projects will be reviewed in detail. Other assessments of water security issues in case study countries, such as the World Bank's water security diagnostic studies[5], will also be consulted. To the extent possible, interviews will be performed with project staff, key partners, beneficiaries, staff of other similar development projects and other key water users in the project areas. If feasible given travel restrictions, a member of the evaluation team will visit project sites and do interviews in person. Depending on the outcomes of individual projects and feasibility, additional post-completion analysis will be performed using geospatial analysis, community water quality testing, flow or water level monitoring and/or water user surveys.
- **Geospatial relevance analysis**. Geospatial and tabular datasets that contain indicators showing areas of high and low water security will be collected and compared against areas with the most water security focused GEF, LDCF and SCCF project presence. This analysis will show if GEF is concentrating water security efforts in the areas that are most in need of assistance.
- **Examination of complaints about GEF projects**. The GEF Secretariat maintains a database of complaints made against GEF projects by stakeholders[6]. These complaints will be reviewed to see if any are related to GEF projects decreasing water security or failing to consider water security in project design or implementation. If such cases are found, the project and complaint

[4] For more recent projects, the portfolio review will examine how many projects are targeting the three gender main results areas used by GEF, using a water security context: i) closing gender gaps in access to and control over resources, ii) improving women's participation and decision making and iii) contributing to social and economic benefits or services for women (GEF 2018b).

[5] The World Bank has realized several country or regional water security diagnostics through its Water Security Diagnostic Initiative. For more information see: https://www.worldbank.org/en/topic/water/publication/water-security-diagnostic-initiative#3

[6] For more information, see: https://www.thegef.org/projects-operations/conflict-resolution-commissioner

documentation will be reviewed in detail to determine the nature of the failure, the lessons learned and if safeguards policies properly reflect these lessons.

Table 2. Potential case study countries that contain water security projects suitable for both post-completion and formative evaluation.

Country	Projects with reviewed terminal evaluations	Ongoing projects (GEF-6 and 7)
Africa		
Algeria	2	3
Burundi	2	4
Cabo Verde	2	1
Comoros	2	1
Egypt	4	5
Ethiopia	2	1
Libya	2	5
Morocco	4	4
Rwanda	2	2
South Africa	2	2
Sudan	3	4
Tunisia	4	5
Asia		
Azerbaijan	2	1
China	5	2
Indonesia	2	3
Kiribati	2	1
Lebanon	2	4
Latin America		
Argentina	3	3
Bolivia	2	4
Ecuador	3	4
Eastern Europe		
Albania	2	5
Bosnia-Herzegovina	3	7
Montenegro	2	7

Limitations

Water security is an over/arching topic that includes elements spanning several GEF focal areas and GEF-administered trust funds. As such, the portfolio of projects that includes water security elements is not easily defined beyond the specific IW objective targeting the topic specifically. Furthermore, there is no searchable database of all GEF project objectives to help define the portfolio, nor can projects that impact water security but don't focus on water security be easily identified. This challenge will be overcome by using project titles and components to define the water security focused portfolio, along with using the case studies to identify a limited number of non-water security focused projects to look at more in detail.

Additionally, as this evaluation will take place during the COVID-19 pandemic, travel restrictions are likely to be in place during its implementation, limiting field work. As such, international travel will be avoided unless travel restrictions are lifted early in 2022 and the evaluation team will hire team members placed in case study countries who, if local conditions allow, could perform field visits. This situation is changing quickly so case study plans will remain flexible.

Stakeholder engagement and quality assurance processes

This evaluation will engage with stakeholders in several ways. A reference group will be formed during the approach paper phase that consists of GEF Secretariat, STAP, GEF Agency and potentially the Indigenous Peoples Advisory Group and the Civil Society Organization Network representatives to help guide and inform the evaluation's main focuses. Additionally, the case studies will seek to engage stakeholders at the project level through interviews, surveys and focal group discussions. Despite travel restrictions, efforts will be made to reach community members involved in GEF projects and ensure a diverse mix of voices (including women, youth and vulnerable groups) are heard.

The evaluation will engage an external reviewer to review major deliverables of the evaluation. The evaluation will also receive quality assurance from a senior evaluation officer, the chief evaluation officer and the IEO director.

Knowledge management and dissemination plan

The results of this evaluation will be shared with all stakeholders involved in the evaluation process and presented at the June 2023 GEF Council meeting. The final evaluation report will be publicly available on the GEF IEO website and an IEO Learnings Brief (a four-page summary of key findings) will be shared publicly as well. The IEO will look for opportunities to present the findings in relevant meetings, especially at international conventions such as the UN Convention to Combat Desertification and the UN Framework Convention on Climate Change.

Resources

The evaluation team will be led by Task Team Leader Gabriel Sidman, Evaluation Officer with technical oversight by Carlo Carugi, Senior Evaluation Officer. Portfolio, literature review and research support will be provided by Malac Kabir, Research Assistant and one junior consultant. One senior consultant will be hired to provide sectoral expertise in water security and stakeholder engagement and lead the benchmarking study. Additional case study consultants will be hired located in each of the case studies to lead stakeholder consultation in their respective countries.

The evaluation will take place between January 2022 and June 2023 (Table 3). Evaluation design began in December 2021 and will finish in April 2022, data gathering and analysis will occur between March 2022-January 2023 and review and finalization processes will occur between February-May 2023 with presentation to the GEF Council in June 2023.

Table 3. Gantt chart showing evaluation timeline.

	2021	2022											2023						
Task	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**
Evaluation start-up																			

	2021	2022												2023						
Task	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**
GEF project portfolio review																			
Benchmarking study																			
Case studies																			
Draft evaluation report and internal review																			
GEF SEC and reference group review																			
Evaluation report revision, editing and finalization																			
Council review and GEF SEC management response																			
Presentation to GEF Council																			

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Annexes

Annex I: Evaluation Matrix

Key questions	Indicators/basic data/what to look for	Sources of information	Methodology	Responsibility
Relevance				
To what extent have GEF interventions with a significant focus on water security responded to beneficiaries' (communities, resource users, governments, river basin organizations, *etc.) needs, policies and priorities relating to freshwater?*	• Comparisons of GEF strategy/project priorities and activities with stakeholder stated priorities • Comparisons of GEF strategy/project priorities and activities with priorities in stakeholder strategy documents or policies	• Community members and community organizations • Private sector companies (that are large water users) • Other water user organizations or stakeholder groups • Local and national government • Government or water user group strategy and prioritization documents • Other water security literature (World Bank diagnostics) • Government policies on freshwater use	• Key and diverse stakeholder interviews in case study countries • Literature review – case study countries • Water user surveys – case study countries (if feasible)	• Task team leader (interviews and literature review) • Local consultants (interviews and local document research) • Consulting firm (water use surveys)
	• Comparison of water security threats/vulnerability from independent indices with locations of GEF projects in water security	• Independent indices and data on water security	• Geospatial/statistical analysis	• Task team leader
In what ways and using what frameworks and strategies has GEF addressed water	• Key water security priorities from GEF strategy documents, GEF SEC and other corporate stakeholders	• GEF Secretariat • GEF Agencies • STAP • GEF and Agency strategy documents • GEF project documents	• Literature review – corporate level • Interviews at corporate level	• Task team leader (interviews and literature review) • Senior consultant (interviews)

Key questions	Indicators/basic data/what to look for	Sources of information	Methodology	Responsibility
security and its four dimensions (sufficient and clean water for drinking, sanitation, hygiene*; livelihoods; ecosystems and protecting against water-related natural disasters)?*	• Key components of GEF freshwater strategy documents			• Junior consultant (portfolio review)
	• Changes in GEF freshwater priorities over time	• GEF and Agency strategy documents • GEF SEC • STAP • GEF project documents	• Literature review – corporate level • Interviews at corporate level • Portfolio review of GEF projects	
Coherence				
How does GEF's approach and activities related to water security interact with similar activities and initiatives at the country level?	• Amount of consideration and complementarity in GEF project documents of other water security related initiatives	• GEF project documents	• GEF portfolio and project document review • Literature review (non-GEF documents)	• Junior consultant
	• Level of knowledge by GEF project teams of other nearby water related initiatives	• GEF project execution staff	• Interviews – case study project staff	• Task team leader and local consultants
	• Level of collaboration of GEF projects described by other nearby water security project teams	• Government staff involved in water security • Other donors investing in water security	• Interviews – case study country non-GEF project staff and government staff	• Task team leader and local consultants

Key questions	Indicators/basic data/what to look for	Sources of information	Methodology	Responsibility
How does GEF's approach and activities compare to a theory of change for improving water security derived from *good practices among peer organizations and the larger international water community of practice?*	• Level of agreement between GEF water security strategy and safeguards and best practices found in literature/stated by experts	• GEF strategy documents • Experts/academics/organizations in water security in international development • Prominent and highly-cited water security literature	• Literature review • Benchmarking exercise • Interviews of water security experts, including GEF Agencies	• Senior consultant
	• Level of agreement between water security activities and local/regional best practices found in literature/stated by experts	• GEF project documents • Experts/academics/organizations in water security in international development • Prominent and highly-cited water security literature		
Effectiveness				
To what extent have GEF interventions been effective in improving water security within the GEB framework and as co-benefits (or inadvertently decreased water security)?	• Success of GEF project outcomes related to water security's four main dimensions (including terminal evaluation outcome and performance ratings)	• Terminal evaluations • Closed project staff • Closed project beneficiaries • Government or other water user data • Satellite images	• Review of terminal evaluations • Stakeholder interviews – case study post-completion (beneficiaries, GEF executing project staff, water users) • Geospatial analysis	• Task team leader (interviews, geospatial analysis) • Local consultants (case study interviews) • Junior consultant/research assistant (terminal evaluation reviews)
	• Evidence of co-benefits achieved in GEF projects related to water			

Key questions	Indicators/basic data/what to look for	Sources of information	Methodology	Responsibility
	security's four dimensions			
	• Evidence of decreasing water security in GEF projects project areas or failure to consider in design	• Documented safeguard related complaints linked to water security • Terminal evaluations • Satellite images • Water user stakeholders (case study projects)	• Review of safeguard related complaints • Water user interviews in case study areas • Water user survey (if feasible)	• Junior consultant/research assistant (review of safeguards complaints) • Local consultants (case study interviews)
	• Degree and quality of application of GEF/Agency safeguards on water security in GEF project documents	• GEF and Agency safeguards policies • GEF project execution staff • Community members and organizations	• Literature and key document review • Interviews – case study countries	• Task team leader (interviews, geospatial analysis) • Local consultants (case study interviews)
	• Level of sensitization to water security challenges and opportunities among key stakeholders (government, key water user groups)	• Local and national government stakeholders • GEF project execution staff – current and former • GEF project terminal evaluations	• Key and diverse project stakeholder interviews – formative and post-completion • GEF project document and terminal evaluation review • Water user survey in case study project areas (?)	• Task team leader (interviews, geospatial analysis) • Local consultants (case study interviews) • Junior consultant/research assistant (terminal evaluation review)
Have GEF projects focused on water	• Level of discussion and sensitivity of cross-cutting	• GEF project documents	• GEF project document review – case study projects	• Senior consultant • Research assistant

Key questions	Indicators/basic data/what to look for	Sources of information	Methodology	Responsibility
security considered impacts on gender and all stakeholder groups, including the most vulnerable?	themes in GEF project documents		• Portfolio review	
	• Level of knowledge and consideration of cross-cutting themes by GEF project teams	• GEF project execution team • Key water user groups in GEF project areas	• Key and diverse stakeholder interviews – community members and groups, GEF project staff	• Senior consultant • Local consultants, task team leader, research assistant
	• Terminal evaluation outcome and performance ratings	• Terminal evaluations	• Terminal evaluation review	• Junior consultant/research assistant
Sustainability				
To what extent are GEF outcomes related to water security sustained or continued beyond the end of the implementation period?	• Evidence of financial sustainability of project activities	• Closed project terminal evaluations • Closed project beneficiaries and community groups • Closed project staff • Local news articles about project sites • Technical reports from other projects in project sites	• Site visits/stakeholder interviews • Project document review	• Local consultants • Junior consultant/research assistant
	• Evidence of community knowledge and ownership of project activities			
	• Evidence of government or multinational institution knowledge and ownership of project activities			
	• Evidence of improving water security related environmental indicators	• Satellite images, water quality/quantity data and other environmental or socio-economic indicator data	• Geospatial or statistical analysis • Water quality sampling	• Task team leader

Key questions	Indicators/basic data/what to look for	Sources of information	Methodology	Responsibility
	• Terminal evaluation outcome, performance and sustainability ratings	• Terminal evaluations	• Terminal evaluation review	• Junior consultant/research assistant

Annex II: Portfolio of water security focused projects

GEF Project ID	GEF Phase	Project Title	Lead Agency Name	Country Name	Focal Area Name	Fund Source Name	GEF Financing at latest stage ($US millions)	Cofinancing at latest stage ($US millions)
1375	GEF - 4	Reducing Transboundary Degradation in the Kura-Aras Basin	UNDP	Armenia,Azerbaijan,Georgia,Regional	IW	GET	2.90	11.72
2095	GEF - 4	Sustainable Management of the Water Resources of the la Plata Basin with Respect to the Effects of Climate Variability and Change	UNEP	Argentina,Bolivia,Brazil,Paraguay,Uruguay,Regional	MFA	GET	10.73	51.03
2364	GEF - 4	Integrated and Sustainable Management of Transboundary Water Resources in the Amazon River Basin Considering Climate Variability and Climate Change	UNEP	Bolivia,Brazil,Colombia,Ecuador,Guyana,Peru,Suriname,Venezuela,Regional	MFA	GET	7.00	44.84
2422	GEF - 4	Integration of Ecosystem Management Principles and Practices into Land and Water Management of Slovakia's Eastern Lowlands	UNDP	Slovak Republic	MFA	GET	0.97	3.35
2544	GEF - 4	Implementation of The Dnipro Basin Strategic Action Program for the reduction of persistent toxics pollution	UNDP	Belarus,Ukraine,Regional	IW	GET	2.04	7.81
2586	GEF - 4	PAS: Implementing Sustainable Integrated Water Resource and Wastewater Management in the Pacific Island Countries - under the GEF Pacific Alliance for Sustainability	UNDP	Cook Islands,Fiji,Kiribati,Marshall Islands,Micronesia,Nauru,Niue,Palau,Papua New Guinea,Samoa,Solomon Islands,Tonga,Tuvalu,Vanuatu,Regional	IW	GET	9.03	90.58
2631	GEF - 4	MENARID: Mainstreaming Sustainable Land and Water Management Practices	IFAD	Jordan	MFA	GET	6.45	22.80
2701	GEF - 4	Development and Adoption of a Strategic Action Program for Balancing Water Uses and Sustainable Natural Resource Management in the Orange-Senqu River Transboundary Basin	UNDP	Botswana,Lesotho,Namibia,South Africa,Regional	IW	GET	6.30	32.07
2706	GEF - 4	Implementing Integrated Water Resource and Wastewater Management in Atlantic and Indian Ocean SIDS	UNEP	Cabo Verde,Comoros,Maldives,Mauritius,Sao Tome and Principe,Seychelles,Regional	IW	GET	9.70	39.42
2732	GEF - 4	MENARID: Institutional Strengthening and Coherence for Integrated Natural Resources Management	UNDP	Iran	MFA	GET	4.32	15.74
2766	GEF - 4	CBPF: Integrated Ecosystem and Water Resources Management in the Baiyangdian Basin	ADB	China	BD	GET	2.98	246.93

2860	GEF - 4	Regional Framework for Sustainable Use of the Rio Bravo	UNEP	Mexico	IW	GET	4.00	10.31
2864	GEF - 4	Accruing Multiple Global Benefits through Integrated Water Resources Management/ Water Use Efficiency Planning: A Demonstration Project for Sub-Saharan Africa	UNDP	Botswana	IW	GET	0.98	11.82
2924	GEF - 4	Development, Empowerment and Conservation in the Greater St Lucia Wetland Park and Surrounding Region	WB	South Africa	BD	GET	9.00	12.70
2929	GEF - 4	Reducing Conflicting Water Uses in the Artibonite River Basin through Development and Adoption of a Multi-focal Area Strategic Action Programme	UNDP	Dominican Republic,Haiti,Regional	MFA	GET	3.08	7.18
2931	GEF - 4	Adaptation to Climate Change through Effective Water Governance	UNDP	Ecuador	CC	SCCF	3.00	16.19
3128	GEF - 4	Integrated Water Resources Management of the Sao Francisco River Basin and Its Coastal Zone	UNEP	Brazil	IW	GET	1.00	4.79
3223	GEF - 4	WB/GEF POL: Shanghai Agricultural and Non-Point Pollution Reduction project (SANPR) - under WB/GEF Strategic Partnership Investment Fund for Pollution Reduction in the LME of East Asia	WB	China	IW	GET	4.79	29.89
3265	GEF - 4	Mainstreaming Adaptation to Climate Change Into Water Resources Management and Rural Development	WB	China	CC	SCCF	5.00	50.50
3279	GEF - 4	Citarum Watershed Management and Biodiversity Conservation Project	ADB	Indonesia	BD	GET	3.75	26.23
3321	GEF - 4	Mainstreaming Groundwater Considerations into the Integrated Management of the Nile River Basin	UNDP	Burundi,Congo,Egypt,Ethiopia,Kenya,Rwanda,Sudan,Tanzania,Uganda,Regional	IW	GET	1.00	2.89
3340	GEF - 4	Good Practices and Portfolio Learning in Transboundary Freshwater and Marine Legal and Institutional Frameworks	UNDP	Global	IW	GET	0.95	1.21
3341	GEF - 4	Regional Dialogue and Twinning to Improve Transboundary Water Resources Governance in Africa	UNDP	Africa,Regional	IW	GET	1.00	1.92
3342	GEF - 4	Development of Methodologies for GEF Transboundary Waters Assessment	UNEP	Global	IW	GET	0.95	1.31
3369	GEF - 4	SIP: Sustainable Land Management in Ghana	WB	Ghana	LD	GET	7.15	129.20
3377	GEF - 4	SIP: Fostering Agricultural Productivity in Mali	WB	Mali	LD	GET	8.10	145.20
3398	GEF - 4	SIP: Eastern Nile Transboundary Watershed Management in Support of ENSAP Implementation	WB	Egypt,Ethiopia,Sudan,Regional	MFA	GET	8.70	26.70
3404	GEF - 4	Promoting Climate-Resilient Water Management and Agricultural Practices	UNDP	Cambodia	CC	LDCF	1.85	2.24
3430	GEF - 4	Implementing NAPA Priority Interventions to Build Resilience in the Agriculture and Water Sectors to the Adverse Impacts of Climate Change	UNDP	Sudan	CC	LDCF	3.30	3.50
3471	GEF - 4	SLEM/CPP: Sustainable Land Water and Biodiversity Conservation and Management for Improved Livelihoods in Uttarakhand Watershed Sector	WB	Global,India	MFA	GET	7.49	90.00
3529	GEF - 4	SIP: Harmonizing support: a national program integrating water harvesting schemes and sustainable land management	UNDP	Djibouti	LD	GET	0.96	12.74
3581	GEF - 4	Building Adaptive Capacity and Resilience to Climate Change in the Water Sector in Cape Verde	UNDP	Cabo Verde	CC	LDCF	3.00	63.70

3645	GEF - 4	MENARID: Reducing Risks to the Sustainable Management of the North West Sahara Aquifer System (NWSAS)	UNEP	Algeria,Libya,Tunisia,Regional	IW	GET	0.96	2.27
3689	GEF - 4	Adaptation to the effects of drought and climate change in Agro-ecological Zone 1 and 2 in Zambia	UNDP	Zambia	CC	LDCF	3.80	9.80
3690	GEF - 4	Protection and Sustainable Use of the Dinaric Karst Aquifer System	UNDP	Albania,Bosnia-Herzegovina,Croatia,Montenegro,Regional	IW	GET	2.16	3.40
3717	GEF - 4	SFM Sustainable Management of Biodiversity and Water Resources in the Ibarra-San Lorenzo Corridor	IFAD	Ecuador	MFA	GET	2.70	16.05
3726	GEF - 4	Groundwater Governance: A Global Framework for Country Action	FAO	Global	IW	GET	1.75	2.70
3766	GEF - 4	Testing a Prototype Caribbean Regional Fund for Wastewater Management (CReW)	IADB	Antigua and Barbuda,Barbados,Costa Rica,Guatemala,Guyana,Honduras,Panama,St. Lucia,Suriname,Regional	IW	GET	20.00	251.70
3831	GEF - 4	Conservation and Sustainable use of Biodiversity and Land in Andean Vertical Ecosystems	IADB	Bolivia	MFA	GET	6.00	8.05
3836	GEF - 4	SPWA-BD: Management of Riparian Biological Corridors	WB	Ghana	BD	GET	1.00	6.10
3838	GEF - 4	Reducing Vulnerability to Climate Change by Establishing Early Warning and Disaster Preparedness Systems and Support for Integrated Watershed Management in Flood Prone Areas	UNEP	Rwanda	CC	LDCF	3.49	12.43
3857	GEF - 4	Adapting Water Resource Management in Comoros to Increase Capacity to Cope with Climate Change	UNDP	Comoros	CC	LDCF	3.74	9.32
3862	GEF - 4	Strengthening Fisheries Governance to Protect Freshwater and Wetland Biodiversity	UNDP	Argentina	BD	GET	2.36	5.26
3882	GEF - 4	SLEM/CPP: Reversing Environmental Degradation and Rural Poverty through Adaptation to Climate Change in Drought Stricken Areas in Southern India: A Hydrological Unit Pilot Project Approach (under India: SLEM)	FAO	India,Global	CC	GET	0.91	2.88
3893	GEF - 4	Support to the Adaptation of Vulnerable Agricultural Production Systems	IFAD	Mauritania	CC	LDCF	3.50	10.47
3967	GEF - 4	Integrating Climate Change in Development Planning and Disaster Prevention to Increase Resilience of Agricultural and Water Sectors	WB	Morocco	CC	SCCF	4.35	26.95
3974	GEF - 4	MED: Tunisia Northern Tunis Wastewater Project	WB	Tunisia	IW	GET	8.03	60.60
3978	GEF - 4	MED: Regional Coordination on Improved Water Resources Management and Capacity Building Horizontal Adaptable Programmatic Programme (H-APL)(TA)	WB	Jordan,Lebanon,Morocco,Tunisia,Regional	IW	GET	5.64	13.87
3991	GEF - 4	MED: Enhanced Water Resources Management	WB	Egypt	IW	GET	6.68	28.12
4001	GEF - 4	MED: Sustainable Governance and Knowledge Generation	WB	Albania,Algeria,Bosnia-Herzegovina,Egypt,Lebanon,Libya,Montenegro,Morocco,North Macedonia,Serbia,Syria,Tunisia,Turkey,Global	IW	GET	3.00	4.40
4019	GEF - 4	Strengthening Resilience and Adaptive Capacity to Climate Change in Guinea-Bissau's Agrarian and Water Sectors	UNDP	Guinea-Bissau	CC	LDCF	4.00	19.95
4029	GEF - 4	Integrated Natural Resource Management in the Baikal Basin Transboundary Ecosystem	IFAD	Mongolia,Russian Federation,Regional	CC	GET	3.90	49.29

4034	GEF - 4	Improving the Resilience of the Agriculture Sector in Lao PDR to Climate Change Impacts	EBRD	Lao PDR	CC	LDCF	4.45	7.72
4036	GEF - 4	TT-Pilot (GEF-4) DHRS: Irrigation Technology Pilot Project to face Climate Change Impact	FAO	Jordan	CC	SCCF	2.00	5.52
4068	GEF - 4	Increasing Resilience to Climate Variability and Hazards	FAO	Kiribati	CC	LDCF	3.00	7.80
4092	GEF - 4	WB/GEF POL: Huai River Basin Marine Pollution Reduction	IADB	China	MFA	GET	5.00	32.83
4234	GEF - 5	Climate Change adaptation project in the areas of watershed management and water retention	UNDP	Senegal	IW	LDCF	5.00	10.18
4255	GEF - 4	To Promote the Implementation of National and Transboundary Integrated Water Resource Management that is Sustainable and Equitable Given Expected Climate Change.	UNEP	Eswatini	IW	SCCF	1.67	5.82
4261	GEF - 4	Integrating climate change risks into water and flood management by vulnerable mountainous communities in the Greater Caucasus region of Azerbaijan	WB	Azerbaijan	CC	SCCF	2.70	7.26
4340	GEF - 5	Strategic Planning and Action to Strengthen Climate Resilience of Rural Communities in Nusa Tenggara Timor Province (SPARC)	UNEP	Indonesia	IW	SCCF	5.00	74.31
4422	GEF - 5	Increasing Climate Resilience through Drinking Water Rehabilitation in North Tajikistan	UNDP	Tajikistan	CC	SCCF	2.93	23.90
4483	GEF - 5	Enabling Trans-boundary Cooperation and Integrated Water Resources Management in the Extended Drin River Basin	UNDP	Albania,Montenegro,North Macedonia,Regional	CC	GET	4.50	221.83
4489	GEF - 5	A Transboundary Waters Assessment Programme: Aquifers, Lake/Reservoir Basins, River Basins, Large Marine Ecosystems, and Open Ocean to Catalyze Sound Environmental Management	UNDP	Global	CC	GET	5.00	31.86
4492	GEF - 5	Adaptation of Nicaragua's Water Supplies to Climate Change	IADB	Nicaragua	CC	SCCF	6.00	31.25
4533	GEF - 5	Development of Tools to Incorporate Impacts of Climatic Variability and Change in Particular Floods and Droughts into Basin Planning Processes	FAO	Global	MFA	GET	4.09	22.46
4551	GEF - 5	Community Based Flood and Glacial Lake Outburst Risk Reduction	WB	Nepal	MFA	LDCF	6.30	20.35
4599	GEF - 5	Building Adaptive Capacity to Catalyze Active Public and Private Sector Participation to Manage the Exposure and Sensitivity of Water Supply Services to Climate Change in Sierra Leone	WB	Sierra Leone	MFA	LDCF	2.94	10.15
4610	GEF - 5	Adaptation to Climate Impacts in Water Regulation and Supply for the Area of Chingaza - Sumapaz - Guerrero	UNDP	Colombia	CC	SCCF	4.22	23.71
4616	GEF - 5	Climate Change Adaptation to Reduce Land Degradation in Fragile Micro-Watersheds Located in the Municipalities of Texistepeque and Candelaria de la Frontera	FAO	El Salvador	CW	GET, MTF ,SCCF	1.52	6.44
4625	GEF - 5	Shire Natural Ecosystems Management Project	FAO	Malawi	MFA	GET, LDCF,MTF	6.58	72.77
4631	GEF - 5	Watershed Approach to Sustainable Coffee Production in Burundi	WB	Burundi	MFA	GET	4.20	20.80
4632	GEF - 5	Biodiversity Conservation and Sustainable Land Management in the Soda Saline-alkaline Wetlands Agro Pastoral Landscapes in the Western Area of the Jilin Province	WB	China	MFA	GET	2.63	16.80
4642	GEF - 5	Sustainable Agriculture and Climate Change Mitigation Project	WB	Uzbekistan	MFA	GET	12.70	107.96

4692	GEF - 5	Strengthening Resilience of Farming Communities' Livelihoods against Climate Changes in the Guinean Prefectures of Gaoual, Koundara and Mali	UNEP	Guinea	MFA	LDCF	3.72	29.34
4709	GEF - 5	GGW: Integrated Disaster and Land Management (IDLM) Project	UNDP	Togo	LD	GET, LDCF,MTF	9.16	55.29
4725	GEF - 5	Solomon Islands Water Sector Adaptation Project (SIWSAP)	IUCN	Solomon Islands	MFA	LDCF	6.85	43.62
4740	GEF - 5	Disposal of Obsolete Pesticides including POPs and Strengthening Pesticide Management in the Permanent Interstate Committee for Drought Control in the Sahel (CILSS) Member States	WB	Burkina Faso,Cabo Verde,Chad,Gambia,Guinea-Bissau,Mali,Mauritania,Niger,Senegal,Regional	IW	GET	7.45	25.34
4748	GEF - 5	Improving Lake Chad Management through Building Climate Change Resilience and Reducing Ecosystem Stress through Implementation of the SAP	UNDP	Cameroon,Central African Republic,Chad,Niger,Nigeria,Regional	CC	GET	5.83	236.28
4766	GEF - 5	Implementation of Eco-industrial Park Initiative for Sustainable Industrial Zones in Vietnam	UNDP	Viet Nam	CC	GET	3.52	49.60
4773	GEF - 5	Conservation and Sustainable Use of High-Andean Ecosystems through Compensation of Environmental Services for Rural Poverty Alleviation and Social Inclusion	UNDP	Peru	CC	GET	5.35	37.02
4774	GEF - 5	Conservation and Sustainable Use of Biodiversity, Forests, Soil and Water to Achieve the Good Living (Buen Vivir / Sumac Kasay) in the Napo Province	UNDP	Ecuador	BD	GET	2.63	12.32
4795	GEF - 5	ARCTIC: Integrated River Basin Management (IRBM) for Major Arctic Rivers to Achieve Multiple Global Environmental Benefits	EBRD	Russian Federation	CC	GET	1.74	15.68
4797	GEF - 5	Climate Proofing Local Development Gains in Rural and Urban Areas of Machinga and Mangochi Districts	FAO	Malawi	CC	LDCF	5.32	36.00
4849	GEF - 5	Sustainable Management and Conservation of Biodiversity in the Magdalena River Basin	UNDP	Colombia	CC	GET	6.36	25.00
4908	GEF - 5	GGW: Agriculture Production Support Project (with Sustainable Land and Water Management)	AfDB	Chad	CC	GET, LDCF,MTF	9.26	102.25
4922	GEF - 5	Decision Support for Mainstreaming and Scaling up of Sustainable Land Management	UNDP	Argentina,Bangladesh,Bosnia-Herzegovina,China,Colombia,Ecuador,Lesotho,Morocco,Nigeria,Panama,Philippines,Thailand,Tunisia,Turkey,Uzbekistan,Global	CC	GET	6.12	38.10
4932	GEF - 5	Integrating Water, Land and Ecosystems Management in Caribbean Small Island Developing States (IWEco)	AfDB	Antigua and Barbuda,Barbados,Cuba,Dominican Republic,Grenada,Jamaica,St. Kitts and Nevis,St. Lucia,St. Vincent and Grenadines,Trinidad and Tobago,Regional	CC	GET	20.72	68.02
4953	GEF - 5	Mano River Union Ecosystem Conservation and International Water Resources Management (IWRM) Project	AfDB	Cote d'Ivoire,Guinea,Liberia,Sierra Leone,Regional	CC	GET	6.34	56.39
4966	GEF - 5	Sustainable Groundwater Management in SADC Member States	UNDP	Angola,Botswana,Congo DR,Eswatini,Lesotho,Malawi,Namibia,Seychelles,South	CC	GET	8.20	42.61

				Africa,Tanzania,Zambia,Zimbabwe,Regional				
5029	GEF - 5	Rural Electrification with Renewable Energy in Isolated Areas of Ecuador	WB	Ecuador	MFA	GET	0.91	3.79
5056	GEF - 5	Strengthening Community Resilience to Climate-induced Disasters in the Dili to Ainaro Road Development Corridor, Timor Leste	AfDB	Timor Leste	CC	LDCF	5.25	37.37
5115	GEF - 5	Promoting Climate Resiliency of Water Supplies in Kyrgyzstan	AfDB	Kyrgyz Republic	CC	SCCF	5.00	35.22
5124	GEF - 5	Strengthening Capacity for Climate Change Adaptation through Support to Integrated Watershed Management Programme in Lesotho	UNDP	Lesotho	IW	LDCF	3.59	8.44
5133	GEF - 5	Senegal River Basin Climate Change Resilience Development Project	UNDP	Guinea,Mali,Mauritania,Senegal,Regional	IW	GET, LDCF,MTF	16.00	68.60
5147	GEF - 5	Enhancing Resilience of Agricultural Sector in Georgia (ERASIG)	UNDP	Georgia	IW	SCCF	5.30	27.50
5174	GEF - 5	Rural Adaptation in Yemen	UNDP	Yemen	MFA	LDCF	10.00	11.42
5190	GEF - 5	Improving Climate Resilience of Water Sector Investments with Appropriate Climate Adaptive Activities for Pastoral and Forestry Resources in Southern Mauritania	IADB	Mauritania	MFA	LDCF	6.35	14.58
5204	GEF - 5	Building Resilience to Climate Change in the Water and Sanitation Sector	UNDP	Uganda	IW	LDCF	8.37	38.00
5209	GEF - 5	Building Resilience to Climate Change in the Water and Sanitation Sector	UNEP	Sierra Leone	CC	LDCF	4.00	28.74
5211	GEF - 5	Integrated Water Harvesting Technologies to Adapt to Climate Change Induced Water Shortage	UNDP	Yemen	LD	LDCF	4.92	28.80
5221	GEF - 5	PSG-Additional financing - Sustainable Land and Water Management Project	AfDB	Ghana	CC	GET	8.75	59.50
5232	GEF - 5	Flood Control and Climate Resilience of Agriculture Infrastructures in Oueme Valley	UNDP	Benin	MFA	LDCF	7.20	67.64
5233	GEF - 5	Enabling Climate Resilience in the Agriculture Sector in the Southwest Region of Madagascar	WB	Madagascar	CC	LDCF	6.27	37.20
5263	GEF - 5	Enhancing the Resilience of Poor Communities to Urban Flooding in Yaounde	WB	Cameroon	IW	SCCF	4.03	156.28
5270	GEF - 5	GGW Natural Resources Management in a Changing Climate in Mali	WB	Mali	CC	GET, LDCF,MTF	8.43	13.00
5284	GEF - 5	Integrated Water Resources Management in the Puyango-Tumbes, Catamayo-Chira and Zarumilla Transboundary Aquifers and River Basins	UNDP	Ecuador,Peru,Regional	CC	GET	3.96	20.48
5301	GEF - 5	Enabling Country of the Transboundary Syr Darya Basin to Make Sustainable Use of their Ground Water Potential and Subsurface Space with Consideration to Climate Variability and Change	FAO	Kazakhstan,Kyrgyz Republic,Tajikistan,Regional	BD	GET	3.50	17.50
5310	GEF - 5	Enabling Transboundary Cooperation and Integrated Water Resources Management in the Chu and Talas River Basins	UNIDO	Kazakhstan,Kyrgyz Republic,Regional	CC	GET	1.00	6.17
5316	GEF - 5	Promotion and Up-scaling of Climate-resilient, Resource Efficient Technologies in a Tropical Island Context	UNDP	Seychelles	CC	GET	1.77	10.26
5332	GEF - 5	Supporting Rural Community Adaptation to Climate Change in Mountain Regions of Djibouti	AfDB	Djibouti	IW	LDCF	5.38	28.63
5343	GEF - 5	Scaling Up Community Resilience to Climate Variability and Climate Change in Northern	UNEP	Namibia	CC	SCCF	3.05	20.02

		Namibia, with a Special Focus on Women and Children						
5384	GEF - 5	Andes Adaptation to the Impact of Climate Change on Water Resources Project (AICCA)	UNDP	Bolivia,Colombia,Ecuador, Peru,Regional	IW	GET, MTF ,SCC F	9.70	58.18
5403	GEF - 5	Conservation and Sustainable Use of Agricultural Biodiversity to Improve Regulating and Supporting Ecosystem Services in Agriculture Production	UNEP	Uzbekistan	MF A	GET	1.24	4.15
5404	GEF - 5	R2R: Testing the Integration of Water, Land, Forest & Coastal Management to Preserve Ecosystem Services, Store Carbon, Improve Climate Resilience and Sustain Livelihoods in Pacific Island Countries	FAO	Cook Islands,Fiji,Kiribati,Marshall Islands,Micronesia,Nauru, Niue,Palau,Papua New Guinea,Samoa,Solomon Islands,Tonga,Tuvalu,Vanuatu,Regional	BD	GET	10.32	87.71
5452	GEF - 5	Guangdong Agricultural Pollution Control	UNDP	China	LD	GET	5.10	208.20
5456	GEF - 5	Ecosystem-based Approaches to Adaptation (EbA) in the Drought-prone Barind Tract and Haor "Wetland" Area	UNDP	Bangladesh	IW	LDC F	5.20	55.03
5487	GEF - 5	Integrated Development for Increased Rural Climate Resilience in the Niger Basin	UNDP	Benin,Burkina Faso,Cameroon,Chad,Cote d'Ivoire,Guinea,Mali,Niger ,Nigeria,Regional	MF A	GET	12.01	61.00
5504	GEF - 5	Reducing Rural and Urban Vulnerability to Climate Change by the Provision of Water Supply	UNDP	Central African Republic	CC	LDC F	7.14	21.47
5535	GEF - 5	Improving IWRM, Knowledge-based Management and Governance of the Niger Basin and the Iullemeden-Taoudeni/Tanezrouft Aquifer System (NB-ITTAS)	UNDP	Algeria,Benin,Burkina Faso,Cameroon,Chad,Cote d'Ivoire,Guinea,Mali,Mauritania,Niger,Nigeria,Regional	CC	GET	13.43	1071.45
5536	GEF - 5	Energy Efficiency and Renewable Energy for Sustainable Water Management in Turkmenistan	UNDP	Turkmenistan	CC	GET	6.19	72.10
5552	GEF - 5	Application of Ridge to Reef Concept for Biodiversity Conservation, and for the Enhancement of Ecosystem Service and Cultural Heritage in Niue	UNDP	Niue	CC	GET	4.19	11.07
5557	GEF - 5	Developing Core Capacity for MEA Implementation in Haiti	UNDP	Haiti	CC	GET	1.30	2.75
5561	GEF - 5	GEF Mainstreaming Integrated Water and Environment Management	UNIDO	China	MF A	GET	9.50	95.00
5604	GEF - 5	Technology Transfer for Climate Resilient Flood Management in Vrbas River Basin	AfDB	Bosnia-Herzegovina	CC	SCC F	5.00	77.26
5619	GEF - 5	GGW Sudan Sustainable Natural Resources Management Project SSNRMP	AfDB	Sudan	CC	GET	7.73	25.68
5663	GEF - 5	R2R Integrated Environmental Management of the Fanga'uta Lagoon Catchment	UNDP	Regional,Tonga	CC	GET	1.76	6.65
5665	GEF - 5	A New Green Line: Mainstreaming Biodiversity Conservation Objectives and Practices into China's Water Resources Management Policy and Planning Practice	UNDP	China	CC	GET	2.64	25.98
5666	GEF - 5	Mainstreaming Climate Change Adaptation through Water Resource Management in Leather Industrial Zone Development	FAO	Pakistan	MF A	SCC F	3.31	14.70
5673	GEF - 5	Promoting the Use of Electric Water Pumps for Irrigation	UNDP	Sudan	IW	GET	4.37	20.15
5674	GEF - 5	Lakes Edward and Albert Integrated Fisheries and Water Resources Management Project	IFAD	Congo DR,Uganda,Regional	MF A	GET	8.10	23.43

5748	GEF - 5	Integrated Water Resources Management in the Titicaca-Desaguadero-Poopo-Salar de Coipasa (TDPS) System	UNDP	Bolivia,Peru,Regional	MFA	GET	6.56	40.73
5757	GEF - 5	Implementing Land, Water and Ecosystem Management	WB	Bahamas	MFA	GET	0.86	0.87
5759	GEF - 5	Mainstreaming Biodiversity Conservation and Sustainable Use into Inland Fisheries Practices in Freshwater Ecosystems of High Conservation Value (IFish)	UNDP	Indonesia	IW	GET	6.19	34.16
5765	GEF - 5	Integrated Transboundary Ridges-to-Reef Management of the Mesoamerican Reef	AfDB	Belize,Guatemala,Honduras,Mexico,Regional	IW	GET	9.02	51.28
5767	GEF - 5	Implementation of SLM Practices to Address Land Degradation and Mitigate Effects of Drought	WB	Philippines	IW	GET	0.87	5.80
5772	GEF - 5	Strengthening the Institutional Capacity of African Network of Basin Organization (ANBO), Contributing to the Improved Transboundary Water Governance in Africa	UNDP	Regional	IW	GET	2.00	8.43
5787	GEF - 5	Bizerte Lake Environmental Project Lagoon and Marine de Pollution	EBRD	Tunisia	MFA	GET	2.00	110.72
5855	GEF - 5	Flood Hazard and Climate Risk Management to Secure Lives and Assets in Mali	IUCN	Mali	IW	LDCF	8.93	51.75
6923	GEF - 6	Mainstreaming Climate Risk Considerations in Food Security and IWRM in Tsilima Plains and Upper Catchment Area	UNDP	Eritrea	LD	LDCF	9.05	27.50
6945	GEF - 6	Strengthening Capacities of Rural Aqueduct Associations' (ASADAS) to Address Climate Change Risks in Water Stressed Communities of Northern Costa Rica	IADB	Costa Rica	MFA	SCCF	5.00	26.66
6960	GEF - 6	Supporting Climate Resilient Livelihoods in Agricultural Communities in Drought-prone Areas	UNEP	Turkmenistan	IW	SCCF	3.05	20.83
6962	GEF - 6	Advancing IWRM Across the Kura River Basin through Implementation of the Transboundary Agreed Actions and National Plans	UNEP	Azerbaijan,Georgia,Regional	IW	GET	5.33	194.88
6964	GEF - 6	Volta River Basin Strategic Action Programme Implementation Project	EBRD	Benin,Burkina Faso,Cote d'Ivoire,Ghana,Mali,Togo, Regional	MFA	GET	7.20	36.14
6968	GEF - 6	Chad National Adaptation Plan	UNDP	Chad	IW	LDCF	5.78	27.91
6993	GEF - 6	Integrated Solutions for Energy, Water, Energy and Land	UNEP	Global	MFA	GET	1.90	1.90
8009	GEF - 6	Ecosystem-Based Adaptation for Climate-resilient Development in the Kathmandu Valley, Nepal	UNIDO	Nepal	CC	LDCF	6.24	32.46
8013	GEF - 6	Climate Adaptation for Sustainable Water Supply	UNEP	Malawi	IW	LDCF	2.64	39.50
8014	GEF - 6	Climate Change Adaptation for Sustainable Rural Water Supply in Lowlands Lesotho	UNDP	Lesotho	IW	LDCF	4.42	16.04
8020	GEF - 6	Planning and Financing Adaptation in Niger	UNDP	Niger	IW	LDCF	8.93	31.87
8021	GEF - 6	Zambia Lake Tanganyika Basin Sustainable Development Project	UNDP	Zambia	LD	GET	7.33	22.49
8028	GEF - 6	Support for Integrated Water Resources Management to Ensure Water Access and Disaster Reduction for Somalia's Pastoralists	IADB	Somalia	MFA	LDCF	8.83	69.74
9052	GEF - 5	CPDP: Enhancing Climate Resilience of the Urban Services Sector in Timor Leste	ADB	Timor Leste	IW	LDCF	3.00	55.00
9054	GEF - 6	Support to the Orange-Senqu River Strategic Action Programme Implementation	FAO	Botswana,Lesotho,Namibia,South Africa,Regional	MFA	GET	10.82	364.47
9092	GEF - 6	Sustainable Management of Agro-Biodiversity and Vulnerable Ecosystems Recuperation in Peruvian Andean Regions Through Globally	UNDP	Peru	IW	GET	9.37	79.43

		Important Agricultural Heritage Systems (GIAHS) Approach						
9094	GEF - 6	Integrated Natural Resources Management in Drought-prone and Salt-affected Agricultural Production Landscapes in Central Asia and Turkey (CACILM2)	AfDB	Kazakhstan,Kyrgyz Republic,Tajikistan,Turkey ,Turkmenistan,Uzbekistan ,Regional	CC	GET	10.87	64.89
9121	GEF - 6	Enabling Transboundary Cooperation and Integrated Water Resources Management in the White Drin and the Extended Drin Basin	UNEP	Kosovo	IW	GET	1.00	7.85
9132	GEF - 6	Food-IAP: Reversing Land Degradation Trends and Increasing Food Security in Degraded Ecosystems of Semi-arid Areas of Central Tanzania	IADB	Tanzania	IW	GET	7.16	52.96
9139	GEF - 6	Food-IAP: Establishment of the Upper Tana Nairobi Water Fund (UTNWF)	UNDP	Kenya	IW	GET	7.20	61.05
9165	GEF - 6	Enabling Implementation of the Regional SAP for the Rational and Equitable Management of the Nubian Sandstone Aquifer System (NSAS)	UNEP	Chad,Egypt,Libya,Sudan,R egional	CC	GET	3.99	17.73
9166	GEF - 6	Strengthening Agro-ecosystems' Adaptive Capacity to Climate Change in the Lake Chad Basin (Lac, Kanem, Bahr El Ghazal, and Part of the Hadjer-Lamis Region)	FAO	Chad	CC	LDC F	4.05	18.59
9210	GEF - 6	NAMA on Integrated Waste Management and Biogas in Uganda	UNDP	Uganda	MF A	GET	2.17	15.14
9265	GEF - 6	GEF-AF-Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project	UNDP	Viet Nam	IW	GET	6.09	386.7 0
9288	GEF - 6	Improving Environmental Management in the Mining Sector of Suriname, with Emphasis on Gold Mining	FAO	Suriname	IW	GET	7.59	22.13
9315	GEF - 5	Enhancing Climate Resilience of the Urban Services Sector in Timor Leste	AfDB	Timor Leste	CC	GET	3.00	55.00
9318	GEF - 6	Climate Resilience in the Nakambe Basin	AfDB	Burkina Faso	CC	LDC F	4.42	20.15
9340	GEF - 6	Food-IAP: Sustainable Land and Water Management Project, Second Additional Financing	IFAD	Ghana	MF A	GET	12.77	22.00
9359	GEF - 6	Enabling Transboundary Cooperation and Integrated Water Resources Management in the Dniester River Basin	WB	Moldova,Ukraine,Regiona l	MF A	GET	1.95	19.47
9420	GEF - 6	Strengthening Trans-boundary Cooperation and Integrated Natural Resources Management in the Songwe River Basin	UNDP	Malawi,Tanzania,Regional	MF A	GET	6.39	11.04
9446	GEF - 5	Regional Project for the Conservation and Sustainable Development of Lake Chad: Enhancing Transboundary Cooperation and Integrated Water Resources Management in the Lake Chad Basin	UNDP	Cameroon,Central African Republic,Chad,Niger,Niger ia,Regional	CC	GET	6.29	30.15
9540	GEF - 5	GEF Metro Manila Flood Management Project Phase 1	FAO	Philippines	MF A	GET	7.40	9.88
9566	GEF - 6	Integrated Management of Water Resources of the Mira-Mataje and Carchi-Guaitara, Colombia–Ecuador Binational Basins	UNDP	Colombia,Ecuador,Region al	IW	GET	3.85	45.73
9571	GEF - 6	Promoting Accelerated Uptake of Environmental Technologies and Promotion of Best Practices for Improved Water, Chemicals, and Waste Management in the Black Sea Basin	UNEP	Belarus,Georgia,Ukraine,R egional	MF A	GET	5.93	27.00
9575	GEF - 6	Sudan Sustainable Natural Resources Management Project- Additional Financing	AfDB	Sudan	CC	GET	5.50	27.50
9593	GEF - 6	Management of Competing Water Uses and Associated Ecosystems in Pungwe, Busi and Save Basins	WWF	Mozambique,Zimbabwe,R egional	MF A	GET	6.00	42.31
9599	GEF - 6	Sustainable Management of Water Resources, Rangelands and Agro-pastoral Perimeters in the Cheikhetti Wadi watershed of Djibouti	UNDP	Djibouti	CC	GET	3.22	12.54

9601	GEF - 6	CReW+: An Integrated Approach to Water and Wastewater Management Using Innovative Solutions and Promoting Financing Mechanisms in the Wider Caribbean Region	UNDP	Barbados,Belize,Colombia,Costa Rica,Cuba,Dominican Republic,Grenada,Guatemala,Guyana,Honduras,Jamaica,Mexico,Panama,St. Kitts and Nevis,St. Lucia,St. Vincent and Grenadines,Suriname,Trinidad and Tobago,Regional	MFA	GET	14.94	150.03
9654	GEF - 6	Reducing Pollution and Preserving Environmental Flows in the East Asian Seas through the Implementation of Integrated River Basin Management in ASEAN Countries	IUCN	Cambodia,Indonesia,Lao PDR,Malaysia,Myanmar,Philippines,Viet Nam,Regional	LD	GET	8.48	121.79
9685	GEF - 6	Mediterranean Coastal Zones: Managing the Water-Food-Energy and Ecosystems NEXUS	IUCN	Albania,Bosnia-Herzegovina,Egypt,Lebanon,Libya,Montenegro,Morocco,Tunisia,Regional	IW	GET	3.50	11.31
9687	GEF - 6	Mediterranean Coastal Zones Climate Resilience Water Security and Habitat Protection	UNDP	Albania,Algeria,Bosnia-Herzegovina,Egypt,Lebanon,Libya,Montenegro,Morocco,Tunisia,Regional	CC	GET	7.00	143.27
9691	GEF - 6	Financing Advanced Environmental Technologies in the Mediterranean Sea Region for Water Systems and Clean Coasts (EnviTeCC)	FAO	Albania,Bosnia-Herzegovina,Egypt,Lebanon,Montenegro,Morocco,Tunisia,Turkey,Regional	IW	GET	8.75	90.00
9717	GEF - 6	Mediterranean Pollution Hot Spots Investment Project	WB	Albania,Algeria,Bosnia-Herzegovina,Egypt,Lebanon,Libya,Montenegro,Morocco,Tunisia,Regional	MFA	GET	5.00	546.45
9745	GEF - 6	Sustainable Land Management for Improved Livelihoods in Degraded Areas of Iraq	UNDP	Iraq	LD	GET	3.55	21.20
9767	GEF - 6	Fostering Multi-country Cooperation over Conjunctive Surface and Groundwater Management in the Bug and Neman Transboundary River Basins and the Underlying Aquifer Systems	FAO	Belarus,Ukraine,Regional	IW	GET	2.73	9.45
9770	GEF - 6	Implementation of the Strategic Action Programme to Ensure Integrated and Sustainable Management of the Transboundary Water Resources of the Amazon River Basin Considering Climate Variability and Change	WB	Bolivia,Brazil,Colombia,Ecuador,Guyana,Peru,Suriname,Venezuela,Regional	IW	GET	11.74	144.36
9796	GEF - 6	Integrated Management of Production Landscapes to Deliver Multiple Global Environmental Benefits	IADB	Belize	IW	GET	5.11	19.72
9801	GEF - 6	Danube River Basin Hydromorphology and River Restoration (DYNA)	UNDP	Bosnia-Herzegovina,Moldova,Montenegro,Serbia,Ukraine,Regional	IW	GET	4.42	92.71
9812	GEF - 6	Sustainable Energy Access to Manage Water Resources: Addressing the Energy-water Nexus	AfDB	Cabo Verde	IW	GET	1.78	14.95
9910	GEF - 6	Reversing Ecosystem and Water Degradation in the Volta River Basin (REWarD-Volta River Basin)	ADB	Regional	CC	GET	7.12	75.11
9912	GEF - 6	Enhancing Conjunctive Management of Surface and Groundwater Resources in Selected Transboundary Aquifers: Case Study for Selected Shared Groundwater Bodies in the Nile Basin	FAO	Burundi,Ethiopia,Kenya,Rwanda,Sudan,Tanzania,Uganda,Regional	LD	GET	5.33	25.85
9919	GEF - 6	Implementation of the SAP of the Dinaric Karst Aquifer System: Improving Groundwater Governance and Sustainability of Related Ecosystems	UNDP	Albania,Bosnia-Herzegovina,Croatia,Montenegro,Regional	IW	GET	5.15	15.05

9927	GEF - 6	Building Resilience of Cambodian Communities Using Natural Infrastructure and Promoting Diversified Livelihood	UNDP	Cambodia	BD	GET	0.52	2.06
10035	GEF - 6	Preparing the Ground for the Implementation of the La Plata Basin Strategic Action Program	UNDP	Argentina,Bolivia,Brazil,Paraguay,Uruguay,Regional	IW	GET	2.00	2.95
10041	GEF - 6	Managing Coastal Aquifers in Selected Pacific SIDS	FAO	Marshall Islands,Palau,Tuvalu,Regional	IW	GET	5.26	19.60
10048	GEF - 6	Water Funds A Conservation Climate Resilient Model for Stressed Watersheds in Latin America and the Caribbean	FAO	Argentina,Brazil,Chile,Colombia,Guatemala,Regional	MFA	GET	1.83	8.11
10064	GEF - 6	Demonstration Investments in Eco-Waste Infrastructure Solutions: Thanlyin and Ayeyarwady Watersheds (which cover Mandalay, Hpa-An and Mawlaymine)	WWF	Myanmar	CC	GET	4.59	80.00
10083	GEF - 7	Sustainable Natural Resources Management Project -AF	FAO	Sudan	MFA	GET, LDCF,MTF	5.94	17.60
10089	GEF - 7	Strengthening rural and urban resilience to climate change and variability by the provision of water supply and sanitation in Chad	WB	Chad	MFA	LDCF	8.70	16.58
10099	GEF - 7	Landscape restoration for increase resilience in urban and peri-urban areas of Bujumbura	ADB	Burundi	CC	LDCF	8.93	16.02
10108	GEF - 7	Fostering Water Security in the Trifinio Region: Promoting the formulation of a TDA/SAP for its transboundary Lempa River Basin.	ADB	El Salvador,Guatemala,Honduras,Regional	CC	GET	4.80	58.03
10139	GEF - 7	Implementation of the Guarani Aquifer Strategic Action Program: Enabling Regional Actions	UNIDO	Argentina, Uruguay, Brazil	LD	GET	2.00	4.80
10172	GEF - 7	Towards the Transboundary Integrated Water Resource Management (IWRM) of the Sixaola River Basin shared by Costa Rica and Panama	UNDP	Costa Rica,Panama,Regional	CC	GET	4.39	13.85
10193	GEF - 7	Fostering Water and Environmental Security in the Ma and Neun/Ca Transboundary River Basins and Related Coastal Areas	UNEP	Asia/Pacific,Lao PDR,Viet Nam,Regional	IW	GET	8.00	39.14
10199	GEF - 7	Improving Water Availability in The Gambia's Rural and Peri-Urban Communities for Domestic and Agricultural Use	FAO	Gambia	IW	LDCF	8.95	10.37
10209	GEF - 7	Eldoret-Iten Water Fund for Tropical Water Tower Conservation	WB	Kenya	IW	GET	2.63	24.77
10262	GEF - 7	Food Systems, Land Use and Restoration in Tanzania's Forest Landscapes	IUCN	Tanzania	IW	GET	7.37	72.69
10320	GEF - 7	Strengthening the climatic resilience of the drinking water sector in the South of Haiti	UNDP	Haiti	IW	LDCF	4.50	31.60
10352	GEF - 7	Conservation and Sustainable Management of Land Resources and High Nature Value Ecosystems in the Aral Sea Basin for Multiple Benefits	IADB	Turkmenistan	LD	GET	4.58	57.53
10388	GEF - 7	Biodiversity conservation, sustainable land management and enhanced water security in Lake Tanganyika basin	UNEP	Africa,Burundi,Congo DR,Tanzania,Zambia,Regional	IW	GET	14.60	60.77
10401	GEF - 7	Establishing a circular economy framework for the plastics sector in Ghana	UNDP	Ghana	IW	GET	7.00	81.92
10404	GEF - 7	Inclusive Conservation Initiative	UNEP	Global	IW	GET	22.54	90.38
10407	GEF - 7	Innovative approach to restore degraded ecosystems through accelerated access to clean energy services and the development of agribusiness value chains in Chad	UNEP	Chad	IW	GET	2.95	15.00
10411	GEF - 7	Malawi-climate resilient and sustainable capture fisheries, aquaculture development and watershed management project	UNEP	Malawi	IW	LDCF	4.42	14.57

10412	GEF - 7	Sustainable Luangwa: Securing Luangwa's water resources for shared socioeconomic and environmental benefits through integrated catchment management	UNEP	Zambia	IW	GET	2.89	21.85
10430	GEF - 7	Resilience for Peace & Stability, Food and Water Security Innovation Grant Program	UNEP	Global	IW	LDCF	1.00	1.02
10462	GEF - 7	Conservation of Wetland Biodiversity and Sustainable Management of Freshwater Ecosystems in the Western Dvina/Daugava Transboundary River Basin	UNEP	Belarus	IW	GET	3.83	26.95
10508	GEF - 7	Integrated trasnboundary water resources management in the Corubal basin between Guinée and Guinée-Bissau	UNEP	Guinea,Guinea-Bissau,Regional	IW	GET	6.30	26.15
10514	GEF - 7	Integrated Water Resource Management and Ecosystem-based Adaptation (EbA) in the Xe Bang Hieng River Basin and Luang Prabang City	UNEP	Lao PDR	IW	LDCF	5.33	20.00
10520	GEF - 7	Enhancing sustainability of the Transboundary Cambodia - Mekong River Delta Aquifer	UNEP	Cambodia,Viet Nam,Regional	IW	GET	15.00	66.00
10531	GEF - 7	Integrated watershed management of the Putumayo-Içá river basin	UNEP	Brazil,Colombia,Ecuador,Peru,Regional	IW	GET	12.84	88.95
10533	GEF - 7	Degraded Natural Forest Use Land Restoration and Management in Typical Water and Solid Erosion of China	UNEP	China	IW	GET	2.99	27.53
10550	GEF - 7	Binational and integrated water resources management in the Merín Lagoon Basin and Coastal Lagoons	UNEP	Brazil,Uruguay,Regional	IW	GET	4.85	77.11
10553	GEF - 7	Sava and Drina Rivers Corridors Integrated Development Program	UNEP	Bosnia-Herzegovina,Montenegro, Serbia,Regional	IW	GET	8.00	143.50
10554	GEF - 7	Transboundary cooperation for the conservation, sustainable development and integrated management of the Pantanal - Upper Paraguay River Basin	UNEP	Bolivia,Brazil,Paraguay,Regional	IW	GET	8.19	128.57
10565	GEF - 7	Enhanced Water Security and Community Resilience in the Adjacent Cuvelai and Kunene Transboundary River Basins	UNEP	Angola,Namibia,Regional	IW	GET	11.17	70.74
10566	GEF - 7	Lake Kivu and Rusizi River Basin Water Quality Management Project	UNEP	Burundi,Congo DR,Rwanda,Regional	IW	GET	5.74	26.15
10589	GEF - 7	Lake Naivasha Basin Ecosystem Based Management	UNEP	Kenya	IW	GET	1.79	10.02
10593	GEF - 7	South Tarawa Water Supply Project	UNEP	Kiribati	IW	LDCF	4.59	61.83
10627	GEF - 7	Programme to sustainably manage and restore land and biodiversity in the Guadalquivir Basin	UNEP	Bolivia	IW	GET	1.56	21.55
10650	GEF - 7	Conservation and sustainable management of wetlands with focus on high-nature value areas in the Prut River basin	UNEP	Moldova	IW	GET	0.86	20.77
10671	GEF - 7	Enabling Activities for Implementing UNCCD COP Drought Decisions	UNEP	Global	IW	GET	2.00	12.14
10679	GEF - 7	Management of Indonesian and Timor-Leste Transboundary Watersheds (MITLTW)	UNEP	Indonesia,Timor Leste,Regional	IW	GET	5.00	12.32
10680	GEF - 7	Promotion of climate adaptation technology and business model innovations and entrepreneurship in Sierra Leone	UNEP	Sierra Leone	IW	LDCF	8.93	21.88
10700	GEF - 7	Implementation of the Strategic Action Programmes and the National Strategic Action Plans for the Integrated Water Resources Management in the Puyango-Tumbes, Catamayo-Chira and Zarumilla Transboundary Aquifers and River Basins	UNEP	Ecuador,Peru,Regional	IW	GET	8.00	40.00
10711	GEF - 7	Innovating Eco-Compensation Mechanisms in Yangtze River Basin (YRB)	UNEP	China	IW	GET	8.07	111.00

10712	GEF - 7	Enhancing water-food security and climate resilience in volcanic island countries of the Pacific	UNEP	Fiji,Solomon Islands,Vanuatu,Regional	IW	GET	6.00	23.40
10713	GEF - 7	Adapting to climate change and enabling sustainable land management through productive rural communities in Timor-Leste	UNEP	Timor Leste	IW	GET, LDCF,MTF	9.85	25.30
10714	GEF - 7	Institutionalising transboundary water management between Tajikistan and Afghanistan for the Panj River Sub Basin	UNEP	Afghanistan,Tajikistan,Regional	IW	GET	7.99	54.30
10732	GEF - 7	Sustainable and Integrated Water Resource Management in Gediz River Basin in Turkey	UNEP	Turkey	IW	GET	1.14	6.87
10742	GEF - 7	Funafuti Water and Sanitation Project	UNEP	Tuvalu	IW	LDCF	0.00	0.00
10746	GEF - 7	Strengthening Resilience of Water Supply in Honiara	UNEP	Solomon Islands	IW	LDCF	4.59	92.82
10757	GEF - 7	Maintaining and Enhancing Water Yield through Land and Forest Rehabilitation (MEWLAFOR)	UNEP	Indonesia	IW	GET	1.78	23.12
10779	GEF - 7	Advancing Climate Resilience of Water Sector in Bhutan (ACREWAS)	UNEP	Bhutan	IW	LDCF	8.93	25.19
10784	GEF - 7	Enhancing the sustainable management of Senegalo-Mauritanian Aquifer System to ensure access to water for populations facing climate change (SMAS)	UNEP	Gambia,Guinea-Bissau,Mauritania,Senegal,Regional	IW	GET	3.15	54.60
10792	GEF - 7	Adaptive Agriculture and Rangeland Rehabilitation Project (A2R2) - Somalia	UNEP	Somalia	IW	GET, LDCF,MTF	17.04	21.00
10793	GEF - 7	Building climate-resilient livelihoods and food systems	UNEP	Lesotho	IW	LDCF	8.93	40.00
10794	GEF - 7	Enhancing Environmental Security and Transboundary Cooperation in the Golok/Kolok River Basin	UNEP	Malaysia,Thailand,Regional	IW	GET	4.00	28.04
10797	GEF - 7	GEF Sustainable Groundwater Management In SADC Member States Project Phase 2	UNEP	Angola,Botswana,Comoros,Congo DR,Eswatini,Lesotho,Madagascar,Malawi,Mauritius,Mozambique,Namibia,Seychelles,South Africa,Tanzania,Zambia,Zimbabwe,Regional	IW	GET	4.57	35.00
10799	GEF - 7	Regional Initiative for Water and Environment in the transboundary basin of the Mono River (RIWE-Mono)	UNEP	Benin,Togo,Regional	IW	GET	5.00	39.35
10805	GEF - 7	Advancing transboundary co-operation and Integrated Water Resources Management in the Dniester River Basin through implementation of the Strategic Action Programme (SAP)	UNEP	Moldova,Ukraine,Regional	IW	GET	6.00	30.10
10854	GEF - 7	Conservation and Sustainable Management of Land Resources and High Value Ecosystems in Lake Sevan Basin for Multiple Benefits	UNEP	Armenia	IW	GET	3.60	26.48
10877	GEF - 7	Enhancing water security and resilience to climate change in the North-Western Sahara Aquifer's basin	UNEP	Algeria,Libya,Tunisia,Regional	IW	GET	3.48	20.00
10883	GEF - 7	Co-management of climate extremes for agriculture resilience via innovative technologies for irrigation in São Tomé and Príncipe	UNEP	Sao Tome and Principe	IW	LDCF	8.93	8.52
10892	GEF - 7	Towards Sustainable Phosphorus Cycles in Lake Catchments (uP-Cycle)	UNEP	Global	IW	GET	2.00	15.41

Technical Document 2: Case Study Selection Process

1. Introduction

Case studies are a key methodological tool for the water security evaluation, as they will provide a "deep-dive" approach, allowing detailed assessments of how specific GEF projects address water security in specific geographies. Case studies will involve both post-completion and formative evaluation, looking at the sustainability of projects that were completed several years ago and the design of ongoing projects. They will involve a variety of qualitative evaluative methods, including interviews of key project stakeholders (including project execution staff, government and intergovernmental organization representatives, civil society partners and stakeholders and community members), focus group discussions, water user surveys and site visits as well potential quantitative methods (geospatial analysis, water quality testing or data analysis, etc.).

The considerable advantage of the case study in that it can provide in-depth assessment also means that case studies are resource-intensive and time-consuming, so only a limited number can be performed. Therefore, it is necessary to prioritize certain geographies for case studies. This report outlines the methodology used for selecting the case studies for the water security evaluation.

2. Criteria for selection

The criteria for selection of case study locations are listed below in order of priority:

1. **Number of completed and ongoing GEF projects**. The evaluation will prioritize completed projects with terminal evaluations (TEs) that have been reviewed by the GEF IEO and ongoing projects from the two most recent GEF phases (GEF-6 and 7). There are 68 completed projects and 111 ongoing projects in the water security portfolio that satisfy these requirements. With this limited number of projects, case studies must have at least two completed projects and two ongoing projects to be considered.
2. **Shared watersheds or aquifers**. Due to the importance of shared water resources for water security themes and for the International Waters (IW) transboundary focus (IW has the highest share of water security focused projects of any focal area), the evaluation will aim to include multiple case studies that can combine several countries that share a major watershed or aquifer.
3. **Geographical diversity**. Different geographies face unique water security challenges. Therefore, the case studies will strive to achieve a balance among the different regions in which the GEF works.
4. **Focal area and trust fund diversity**. A variety of focal areas have projects that focus on water security, although some (especially multi-focal projects, IW and climate change adaptation projects from the Least Developed Country Fund and Special Climate Change Fund—LDCF and SCCF) have more presence in the portfolio than others. The case studies will strive to include projects from several focal areas while ensuring a strong presence of the main focal areas.
5. **GEF Agency diversity**. 14 GEF Agencies have implemented projects in the water security portfolio, although only the original three Agencies (UNDP, UNEP and the World Bank) have received over 10% of the total share of GEF financing since GEF-4. The case studies will strive to include projects that are implemented by a variety of GEF Agencies in order to consider a variety of implementing styles.

6. **Overlap with previous and other ongoing GEF IEO evaluations**. Several previous GEF IEO evaluations have focused, at least in part, on water security themes in specific geographies including the coastal areas around the South China Sea (GEF IEO 2012) and the Yellow Sea (GEF IEO 2019). In addition, certain ongoing evaluations have overlap with elements of water security, including an ongoing study in the Mekong River basin in southeast Asia. The case studies chosen for the water security evaluation will strive to avoid overlap with geographies previously covered by IEO evaluations, to expand on the geographical knowledge base of the IEO in water security. Additionally, the case studies will strive to overlap with areas of focus of current evaluations to achieve efficiency gains by combining methodological tools such as surveys and interviews.

3. Results

To find potential case study locations, a geographical review of the water security portfolio was first done, resulting in tally of completed and ongoing projects per country. The results were also plotted geographically to get a better sense of which countries could potentially be combined into regional case studies (Figure 4). Results show that China has the greatest number of completed projects (but few ongoing projects), while northern and southeast Africa, southern South America and eastern Europe all have a considerable amount of completed and ongoing projects.

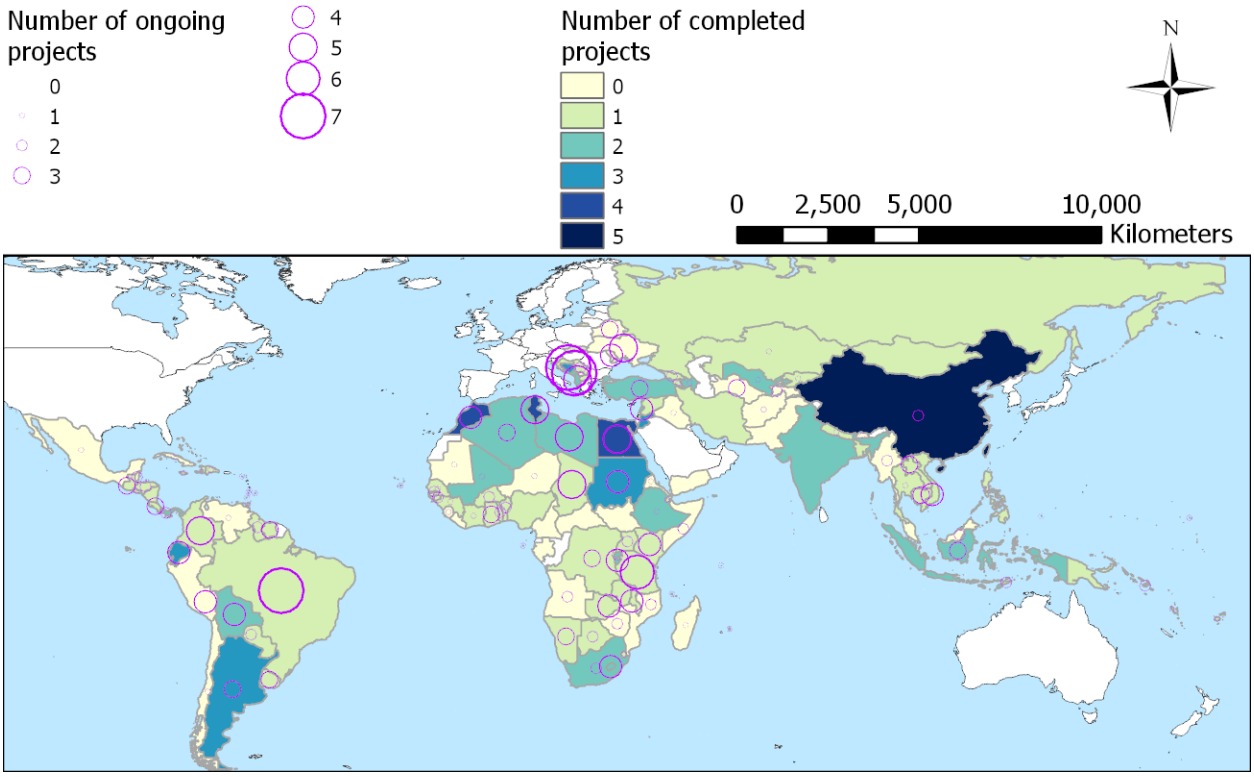

Figure 4. Map of all projects in the water security portfolio considered for case studies (completed projects with reviewed terminal evaluations and ongoing GEF-6 and 7 projects).

Based on these results, several country groups were selected as potential case studies. These country groups were compared against the selection criteria listed previously (Table 4).

Table 4. Comparison of case study selection criteria for potential case study regions.

Potential case study region	# completed	# ongoing	Shared watershed/aquifer	Region	# of focal areas	# of GEF Agencies	Overlap with previous evaluations	Overlap with current evaluations
Egypt/Sudan	5	8	Nile river, Nubian aquifer	Middle East and Northern Africa	3	4	No	No
Morocco/ Tunisia	5	5	Mediterranean Sea	Middle East and Northern Africa	4	4	No	No
China	5	2	None	East Asia	5	4	Yes	No
Argentina/ Bolivia	4	6	Platte River	Latin America	5	5	No	No
Cambodia/ Laos/Thailand/Vietnam	4	7	Mekong river	East Asia	3	4	No	Yes
Burundi/ Rwanda/ Tanzania	3	8	Lakes Kivu and Tanganyika, Kagera river and aquifer	Sub-Saharan Africa	3	6	No	No
Albania/ Bosnia/ Montenegro	3	7	Dinaric Karst Aquifer System	Europe	4	6	No	No
Indonesia	2	3	None	East Asia	4	5	No	No

Based on the results shown above, it was decided that a total of six case studies could satisfy the most number of criteria without overburdening project resources. China, while having a large number of completed projects, has few ongoing projects and has been covered by previous IEO evaluations looking at aspects of water security. Indonesia has relatively few completed projects and doesn't give unique regional representation given that additional opportunity in the southeast Asian countries, which have the benefit of overlapping with another ongoing IEO evaluation.

Among the remaining six remaining potential case study regions, many opportunities for examining transboundary watersheds and aquifers exist. However, including six multi-country case studies would make it difficult to thoroughly include all of the countries in the evaluation and examine all included projects. Therefore, the potential for including single country case studies among the six regions was examined. To qualify for a single-country case study, countries needed to have at least one completed and one ongoing water security focused non-regional project (to ensure coverage of focal areas other than IW). None of the Balkans or Maghreb (Morocco and Tunisia) countries met these criteria, so those regions were kept for transboundary case studies focusing on the Dinaric Karst Aquifer System and the

Mediterranean Sea coastal ecosystems. In the three East African countries, there were no transboundary watersheds that had both a completed and ongoing project, so the region was better suited to a single-country case study (in this case Burundi was the only country with both a completed and ongoing project). The Mekong watershed was kept as a transboundary case study to overlap with the ongoing IEO evaluation of the region. For the other regions, Bolivia and Sudan were the two countries which met the criteria for single-country case studies, rounding out the six chosen case studies:

1. Transboundary case studies:
    a. Dinaric Karst Aquifer (Albania, Bosnia and Montenegro)
    b. Mediterranean Sea coastal watershed – Maghreb region (Morocco and Tunisia)
    c. Lower Mekong River Basin (Cambodia, Laos, Thailand and Vietnam—covered through separate evaluation)
2. Single country case studies:
    a. Bolivia
    b. Burundi
    c. Sudan

The transboundary case studies will focus only on IW projects that specifically address the chosen watershed or aquifer, while the single country case studies will focus on other focal area projects or multi-focal area projects.

The six case studies cover a total of 32 projects that are either completed with reviewed terminal evaluations or GEF-6 or 7 ongoing projects. The geographical representation is high, with Africa receiving the most case studies (three) but Europe, Latin American and Asia all represented. The case studies include projects implemented by nine GEF Agencies and three focal areas in addition to multi-focal area projects. The IW focal area has the highest share of projects with 45% of the case study projects, but some of the included IW projects are in single-country case study regions and thus will not be covered as in depth as the land degradation, climate change and multi-focal projects in those case studies.

4. References

GEF IEO (2012) Impact evaluation: the GEF in the South China Sea and adjacent areas. Evaluation report No. 75. Washington, DC.

GEF IEO (2019) A methodological approach for post-completion verification. 57th GEF Council meeting, GEF/ME/C.57/03.

Technical Document 3: Case Study Methodology Note

1. Introduction

Case studies are a key methodological tool for the water security evaluation, as they will provide a "deep-dive" approach, allowing detailed assessments of how specific GEF projects address water security in specific geographies. Given the detailed nature and the importance of the case study, it is critical to establish a systematic and comprehensive methodology for carrying out case studies. This will ensure consistency and robustness across the geographically diverse case studies, allowing for comparability and ensuring all evaluation questions are sufficiently addressed. This note outlines the common methodology that will be used across all case studies in the water security evaluation.

As outlined in the separate note 'Water security evaluation: case study selection process', the case studies for the evaluation are located in the following geographies:

5. Transboundary case studies:
    a. Dinaric Karst Aquifer (Albania, Bosnia and Montenegro)
    b. Mediterranean Sea coastal watershed – Maghreb region (Morocco and Tunisia)
    c. Lower Mekong River Basin (Cambodia, Laos, Thailand and Vietnam)
6. Single country case studies:
    a. Bolivia
    b. Burundi
    c. Sudan

The case studies will address the following evaluation questions (all evaluation questions are listed in the water security evaluation approach paper):

- **Relevance**: to what extent have GEF interventions with a significant focus on water security responded to beneficiaries' needs, policies and priorities relating to freshwater?
    - Case studies are the main mechanisms to reach and interview country and community-level stakeholders and obtain their perspectives on how well GEF responded to their needs.
- **Coherence**: how does GEF's approach and activities related to water security interact with similar activities and initiatives at the country level?
    - Case study project teams and teams of similar, non-GEF projects in the same region will be interviewed to understand how collaborative the GEF projects are being.
- **Effectiveness**: to what extent have GEF interventions been effective in improving water security within the GEB framework and as co-benefits (or inadvertently decreased water security)?
    - Assessment will be done of case study project's achievement of water security related outcomes and level of compliance with water-security related safeguards. GEF focal points in case study countries can also be queried for any examples of unintended impacts on water security in non-water security focused projects in their countries.
- **Effectiveness**: Have GEF projects focused on water security considered impacts on gender and all stakeholder groups, including the most vulnerable?
    - Case studies allow for a project-level view of how projects address gender and vulnerable populations and how successful they were, according to community-level stakeholders.

- **Sustainability**: to what extent are GEF outcomes related to water security sustained or continued beyond the end of the implementation period?
    - Case study interviews, field visits and associated geospatial analysis will be the main mechanism for understanding the sustainability of water security projects past completion.

2. Post-completion and formative evaluation of case study projects

The six case studies cover a total of 32 projects that are either completed with reviewed terminal evaluations or GEF-6 or 7 ongoing projects, representing 18% of all such projects in the water security portfolio (see Annex 1 for a complete list of case study projects). Some projects are regional are global and were implemented in more than one case study area. With an average of 5-6 projects per case study, it will not be possible to do in-depth project-level evaluation of all 32 projects. Indeed, the evaluation is thematic and thus does not aim to do comprehensive project level evaluation. However, many of the projects will be chosen for post-completion or formative evaluation to obtain a more in-depth view of the water security focused projects. For each case study, at least one project (and ideally more if available) will be selected for post-completion evaluation and one project for formative evaluation. For the transboundary case studies, the specific projects chosen for post-completion and formative evaluation must be related to the transboundary basin (and thus have a high likelihood of being in the international waters focal area) highlighted by the case study. For the single country case studies, non-international waters focal area projects that had heavy implementation in the country will be prioritized.

Post-completion evaluation will utilize the GEF IEO's post-completion tool (GEF IEO 2019) which aims chiefly to verify the outcomes achieved by the project and assess the sustainability of those outcomes today. Formative evaluation will utilize the GEF IEO's formative evaluation tool which focuses on assessing a project's design, including relevance, coherence, monitoring and learning plans and adherence to GEF's policies (such as gender and stakeholder engagement). Utilization of these tools will help answer some of the key evaluation questions while also improving the IEO's cross-cutting understanding of project sustainability and design.

3. Methodological elements of the case study

The following section describes the methodological steps will be taken in each case study.

a. Project document and literature review

The evaluation team, led by the case study lead, will perform a desk review in which the GEF project documents for each of the projects associated with the case study are read in detail. This includes Request for CEO Endorsement documents, Agency project documents (ProDocs), STAP reviews, project implementation reports, mid-term reviews and for completed projects, terminal evaluations. This information will provide the team with an overview of the main objectives of the project related to water security and the associated outcomes (for completed projects).

Additionally, the team will perform a literature review of documents that are associated with the project, including any publications on project websites, GEF-wide knowledge management platforms such as IW Learn, and any technical reports, news articles, scientific journals or other documents found

through an internet search that give evidence of the project's design, implementation, completion or sustainability.

b. Geospatial analysis and water monitoring

Based off of the preliminary document review above, certain completed projects may be deemed candidates for in-depth geospatial analysis or water monitoring. To be a good candidate for geospatial analysis, a project must have an outcome that can be measured by an existing timeseries (starting before the project began and continuing until after completion) of satellite images or other geospatial data layers. Such outcomes would likely be environmental, such as a reduction in deforestation rates, maintenance or improvement of water body levels, improved water quality measurable by chlorophyll levels or improved access to irrigation. The evaluation team, led by the geospatial specialist, will analyze the feasibility of different case study projects and potential geospatial data sources that could be used to assess the project's effectiveness in achieving and sustaining their outcome.

Similarly, projects will be screened for their potential to be evaluated using water monitoring data. Projects that are candidates for evaluation using water monitoring data are projects with outcomes that can be measured using a time series (starting before the project began and continuing until after completion) of either water quantity data (such as river discharge, canal flow or lake levels) or water quality data (periodic or ongoing sampling campaigns of a pollutants of concern to the project in household taps, community boreholes, rivers, lakes or other water bodies). If suitable candidate projects are identified, the evaluation team will attempt to obtain pre- and during-implementation water quality data as well as post-implementation data if available. The project may, in certain instances, perform additional monitoring if single event monitoring data would provide useful data and no post-implementation data exists.

c. Stakeholder interviews

Interviews will be carried out with a number of country and project-level stakeholders, including Operational Focal Points (OFPs) for the countries involved in the case studies, national and regional government officials where the projects are being implemented, trans-governmental watershed organizations, GEF Agency staff involved in the design and implementation of the projects, project execution staff, key civil society partner organizations, staff of other donor projects in the same geographical area as the GEF projects, community leaders and members, key water user groups, vulnerable population groups and other key stakeholders as identified during project document and desk review. Many interviews, especially at the national level, will be carried out remotely as feasible. Others will be carried out during the case study visits (discussed below).

Interview protocols will be created for each stakeholder group for standardized use in all case studies. However, individual interviews maybe altered based at the discretion of the case study lead and interviewer based on information gathered from previous steps and during the interview. Interviewers should aim not to exceed one hour per interview. In some cases, interviewees could be interviewed together as a focus group discussion to gain more voices of the same stakeholder group. Additionally, interviewees should ensure that GEF project staff are not present when interviewing beneficiaries and that confidentiality of interviewee responses are offered to all interviewees.

d. Case study visits

At least one visit will be performed per case study, involving evaluation team members visiting project implementation locations in case study countries. The visits will be approximately two weeks in length and involve international travel in some cases and national travel by in-country evaluation team members in others. Visit itineraries and travel will be subject to change based on travel restrictions due to the ongoing COVID-19 pandemic. Each visit will begin with meetings with key stakeholders in major cities and be followed by visits to project implementation sites. The team will aim to visit at least one site for each project that is undergoing a post-completion evaluation and a formative evaluation. Project site visits should prioritize interviews with community and local level stakeholders and visits to physical locations of project implementation.

Case study visits will be carried out between June 2022 and January 2023.

e. Water user surveys

As part of the document reviews and initial interviews, evaluation team members will assess the potential for carrying out water user surveys for specific communities involved in GEF projects. The goal of the surveys would be to reach a larger number of stakeholders than feasible during individual interviews by 1-2 evaluation team members. Communities would be good candidates for water user surveys if they were heavily involved in a GEF project focusing on water security, have several competing water needs, have active water user groups that can be utilized to facilitate surveys and have local companies that can be hired for carrying out the surveys. The surveys could be carried out via household interviews, mobile phones or text message, considering what method is most feasible in the local context.

f. Case study reports and presentations

Each case study should produce a report and/or a presentation that can be delivered to all stakeholders involved in the case study. The report/presentation should be delivered at the end of the case study visit or afterwards, remotely, when all data for that case study has been gathered and analyzed. The reports/presentations should give an overview of the preliminary findings of the case study and how the findings will be used in the larger evaluation. Opportunity should be given to the stakeholders to ask questions and offer recommendations for use of the findings in the larger evaluation report.

4. Case study team organization

a. Case study staffing

Although subject to change based on preliminary research, it is envisioned that the task team leader (Gabriel Sidman) will lead two case studies, the senior water security consultant (Glen Hearns) will lead two and two additional consultants located in case study countries will be hired to lead the remaining two case studies. Additional consultants located in countries where field visits will take place will also be hired as needed to perform initial research and field visit planning as needed. Other evaluation team members, including the research assistant (Malac Kabir) and junior water security consultant (Veena Ramachandran) may be involved in project document and literature review and/or case study visits.

b. Communication

The task team leader will initially write to each OFP and political focal point of the case study countries to inform them of the evaluation and the case study. The initial letter will also serve to introduce the evaluation team and allow other evaluation team members to begin planning the case studies: gathering data from stakeholders, setting up interviews and planning the logistics of site visits. The task team leader should be copied on all communications between evaluation team members and stakeholders.

Technical Document 4: Bolivia Case Study Report

Global Environment Facility Independent Evaluation Office

March 2023

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Cover photo shows the Tolapampa river, part of the Pilcomayo river watershed, north of the town of Santiago de Cotagaita, Potosi department.

1. Introduction

a. Description of the GEF IEO water security evaluation

Freshwater resources are critical to both humans and ecosystems and the threats to these resources are of great importance to GEF and the wider international development community. Water security has increasingly been used by the global water community to frame the issues relating to freshwater resources. United Nations Environment Programme (2013)[7] defines water security as "the capacity of a population to safeguard sustainable access for sustaining livelihoods, human well-being and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability."

Given the importance and cross-cutting nature of water security and the growing recognition of the issue in the GEF strategies and projects, the GEF IEO is undertaking a comprehensive, multi-focal area evaluation of the topic. The Evaluation of GEF's strategy and portfolio in water security will take a look at the broader "footprint" of the GEF portfolio in terms of water security, in terms of impacts and sustainability. The evaluation began in October 2021 and is scheduled to be completed during 2023.

As part of the evaluation, several case studies were chosen to understand how GEF projects and programs have impacted water security at the country and the basin level. Case studies were designed to address several evaluation topics, including:

- **Relevance** of GEF projects to the water security needs, policies and strategies of beneficiaries and key stakeholders in the countries where they work, including national and local government, communities, vulnerable populations, civil society, the private sector, NGOs and others.
- **Coherence** of GEF's projects with similar donor-funded and government initiatives in the areas where they work.
- **Effectiveness** of GEF projects in achieving improvements in water security, through main project outcomes or co-benefits and compliance with water related safeguards.
- **Effectiveness** of GEF projects in considering the specific water security of vulnerable populations especially women.
- **Sustainability** of the outcomes of completed GEF projects.

The criteria for selecting the case studies included: 1) presence of completed and ongoing GEF projects with relation to water security themes, 2) presence of transboundary watersheds or aquifers, 3) geographical diversity among the chosen case studies, 4) focal area[8] and trust fund[9] diversity among the case studies, 5) diversity in GEF Agencies among the case studies and 6) overlap with previous and other ongoing GEF IEO evaluations.

[7] United Nations Environment Programme (2013) What is water security? UN Water, Water Cooperation 2013.
[8] GEF focal areas include: Biodiversity, Chemicals and Waste, Climate Change, International Waters and Land Degradation.
[9] GEF manages three trust funds: the GEF Trust Fund (which consists of the focal areas mentioned above) and two funds focused on climate change adaptation: the Least Developed Countries Fund and the Special Climate Change Fund.

One of the areas chosen for a case study was the country of Bolivia, which includes GEF projects in several focal areas related to water security that are both regional and entirely within Bolivia. This report summarizes the findings of the Bolivia case study.

b. Description of GEF projects in the case study

The Bolivia case study included six projects (Table 5). The projects include a mix of regional projects focused on transboundary watershed management funded by the International Waters (IW) focal area and multi-focal area projects with funding from the Land Degradation, Biodiversity and Climate Change focal areas. Two of the projects are completed and four ongoing. In the case of regional projects, this case study focused on activities that were implemented in Bolivia or involved Bolivian stakeholders.

Table 5. Overview of Bolivia case study projects.

GEF ID	Project title	Lead Agency	Executing Agency	GEF financing (USD millions)	Co-financing (USD millions)	Period of implementation
2095	Sustainable Management of the Water Resources of the la Plata Basin with Respect to the Effects of Climate Variability and Change	UNEP	OAS, CIC	10.73	51.03	2011-2017
3831	Conservation and Sustainable use of Biodiversity and Land in Andean Vertical Ecosystems	IDB	MMAyA	6.00	8.05	2011-2017
9770	Implementation of the Strategic Action Programme to Ensure Integrated and Sustainable Management of the Transboundary Water Resources of the Amazon River Basin Considering Climate Variability and Change	UNEP	ACTO, MRE	11.74	144.36	2020-2024*
10035	Preparing the Ground for the Implementation of the La Plata Basin Strategic Action Program	CAF	CIC	2.00	2.95	2019-2023*
10554	Transboundary cooperation for the	IDB	MMAyA	8.19	128.57	2022-2026*+

	conservation, sustainable development and integrated management of the Pantanal - Upper Paraguay River Basin					
10627	Programme to sustainably manage and restore land and biodiversity in the Guadalquivir Basin	FAO	MMAyA	1.56	21.55	2023-2027*

*Project is still ongoing; end dates are expected.
+Project was still in the preparation phase at the time of the case study.
ACTO = Amazon Cooperation Treaty Organization
CAF = Development Bank of Latin America
CIC = Intergovernmental Coordination Committee of the La Plata watershed
IDB = Interamerican Development Bank
FAO = Food and Agricultural Organization of the United Nations
MMAyA = Ministry of the Environment and Water of Bolivia
MRE = Ministry of Foreign Affairs of Bolivia
OAS = Organization of American States
UNEP = United Nations Environment Programme

c. Case study methodology

The Bolivia case study was carried out between August 2022 – February 2023. The case study began with a review of all GEF project documents, including CEO Endorsement Request documents, project implementation reports, mid-term reviews (MTRs), terminal evaluations (TEs) and any other reports or data available. Key stakeholders were identified via project documents and by contacting GEF Agency representatives from the evaluation's reference group.

Several virtual interviews were carried out with national level stakeholders, GEF Agencies and former and current case study project staff. These interviews were evaluative and logistical in nature to gather information and plan the case study visit. Geospatial data on project sites were requested and gathered from stakeholders as well.

The case study visit occurred between January 16-27, 2023 and included:

- Visits to national government and GEF Agency stakeholders in La Paz.
- Visits to Llallagua and surrounding municipalities of Chayanta, Chuquihuta, Pocoata and Uncía involved in the 'Conservation and Sustainable use of Biodiversity and Land in Andean Vertical Ecosystems' (GEF ID 3831 hereby referred to as the 'EVAs' project for its acronym in Spanish)
- Visit to Potosí city and Santiago de Cotagaita to interview stakeholders and visit sites from the Pilcomayo watershed pilot project of the 'Sustainable Management of the Water Resources of the la Plata Basin with Respect to the Effects of Climate Variability and Change' project (GEF ID 2095 hereby referred to as the 'Framework La Plata project')

- Visit to the city of Tarija to visit project sites and stakeholders involved in the 'Programme to sustainably manage and restore land and biodiversity in the Guadalquivir Basin' (GEF ID 10627 hereby referred to as the 'Guadalquivir River Basin' project).

Project sites for completed projects were prioritized to better understand sustainability of project results while visits to the ongoing Guadalquivir River Basin project (chosen for a visit due to its proximity to the completed project sites) focused on the project design process. No sites were visited for three of the ongoing projects, but these projects were discussed with GEF Agency staff and national government stakeholders.

After the case study visit, a geospatial analysis was carried out on the EVAs project sites to obtain remote sensing data on the growth of tree planting areas and change in productivity in agricultural plots supported by the project.

Including the pre-visit virtual interviews, a total of at least 156 stakeholders were consulted throughout the case study including national (including the GEF Focal Point's office in Bolivia), regional and local government staff, GEF Agency and executing agency project staff, community members and organizations, NGOs and private sector companies. Remote sensing was utilized to determine sustainability of community activities for the EVAs project.

2. Meeting stakeholder water security needs

a. Water security stakeholder priorities in Bolivia

Key stakeholders in Bolivia raised a variety of priorities related to water security which varied by the diverse geographical contexts of different areas of the country. Issues found in the humid Amazon basin can be quite different from those in the semi-arid mountainous western portion of the country. Stakeholder priorities described here (especially those of local and rural stakeholders) are more detailed for areas visited during the case study visit which were mostly in the mountainous western region of Bolivia. The major issues raised by stakeholders were:

- **Water storage and infrastructure (all stakeholders)** – water for human and livelihood use, especially agriculture, was noted as a key priority for a vast number of stakeholders, especially in rural communities (and echoed by local and national government) in the semi-arid mountainous areas of Bolivia. A few visited communities in very isolated or dry areas did not have sufficient potable water in their communities and needed to travel to obtain it—nationally about 69% of the rural population (and 95% in urban areas) have access to secure potable water.[10] However, most communities visited had secure potable water supplies and their largest challenge was insufficient water storage and distribution infrastructure for agriculture. Few areas had universal irrigation—most had some small irrigation networks but relied heavily on rainfed agriculture. They noted that irrigation allowed them to grow more productively and in a wider area which led to improved resilience from drought, a more diverse diet and larger harvests which could then be sold at a profit.
- **Adaptation to climate change (all stakeholders)**: the region of Potosí was experiencing a drought during the time of the case study visit and it was having a clear impact on rural

[10] Ministry of Development Planning (2021) Economic and Social Development Plan 2021-2025.

livelihoods. Communities noted that in many cases their irrigation systems had gone dry, pests were proliferating due to weakened fruit trees and rainfed crops failed. Additionally, they noted increased incidence of large floods and hail events in recent years which damaged crops (less so in agroforestry systems). In the southeast of the country in the Pantanal wetlands (a focus of GEF ID 10554 'Transboundary cooperation for the conservation, sustainable development and integrated management of the Pantanal - Upper Paraguay River Basin'), drought mixed with uncontrolled fires are leading to decreased access to water and damaged crops. In the Amazon basin (the focus of project GEF ID 9770) and other regions in the humid eastern of the country, floods are the most common extreme event.

- **Sedimentation/land degradation (all stakeholders)**: as a result of a semi-arid ecosystem and large rain events, the visited mountainous area of Bolivia suffered from large amounts of soil erosion in steep areas which caused mudslides, sedimentation build up in valleys and general land degradation exemplified by deep rills and gullies marking riparian areas (especially notable in the Tarija central valley). This leads to loss of fertile topsoil in steep agricultural areas and loss of fertile valley land due to buildup of sand and other sediment from rain events, not to mention mudslides and flooding threatening property and human life.
- **Control of water pollution (all stakeholders)**: as an upstream country in the Plata river watershed, mining waste and sedimentation from mountainous western Bolivia have a major impact on water quality, not only in downstream southeastern Bolivia but also in Paraguay, Argentina and Brazil. This makes addressing these two major sources of pollution a transnational priority as well as a national priority. Many indigenous communities in southeastern Bolivia depend on fish for their diet and livelihood but have noted contamination due to heavy metals from mining. In the Tarija central valley, a lack of reliable urban wastewater treatment leads to mixing of poorly treated sewage with irrigation water (in some irrigation systems) that is used for high-value crops, especially grape vineyards and other fruit trees.
- **Integrated landscape planning (national and regional government)**: the Bolivian government is moving towards more integrated landscape management through its national strategies and plans, most chiefly coordinated through the Plan for Economic and Social Development 2021-2025 developed by the Ministry of Development Planning (which is also the GEF Operational and Political Focal Point). The government also has a Sectoral Plan for Integrated Development and a National Watershed Plan which encourages strategies at the watershed level which cut across political boundaries such as the Guadalquivir River Basin Master Plan in the Tarija area. At the regional and local level, Integrated Territorial Development Plans are critical planning documents.
- **Financing for scaling up action on other priorities (all stakeholders)**: rural communities universally expressed a lack of funding to scale up micro-irrigation, erosion control and water storage (storage tanks and water harvesting) activities. They expressed a need for further interventions that reach more families and communities than recent projects, which they viewed as limited pilots. Local and national government stakeholders recognized this great need (and indeed have their own programs known as "Mi Agua", "Mi Riego" and "Mi Arbol" that address these issues) but expressed that they lack the resources to scale activities to meet the entire need. National government officials also noted a desire to have more on the ground activities as part of IW projects—to move beyond the Transboundary Diagnostic/Strategic Action Program (TDA/SAP) diagnostic and plan creation and begin to implement SAP activities.

- **Monitoring of water resources (national and local government)**: in the Plata River basin, it was noted that Bolivia has relatively fewer water monitoring stations than the other basin countries (which also have more territory in the watershed) and a denser network would be beneficial. In the Cotagaita municipality which is part of the watershed, local officials noted that their monitoring equipment was difficult to maintain due to lack of budget. Groundwater was also noted as a weak spot for monitoring as it is more expensive. Stakeholders have relatively little knowledge of key aquifers around the country compared to surface water. Local stakeholders also wished to have more inventories of water sources in their region to better plan irrigation projects.
- **Biodiversity of aquatic ecosystems (national government)**: national government stakeholders expressed a desire for further integration of aquatic and riparian biodiversity in regional IW projects, such as issues with fish consumption and water contamination.

b. Relevance of GEF projects to stakeholder needs and priorities in Bolivia

Consulted local stakeholders reported mixed levels of stakeholder consultation in the design phases of the ongoing GEF projects. In the Cotagaita region, local stakeholders had no knowledge of the ongoing Plata River basin project (GEF ID 10035 'Preparing the Ground for the Implementation of the La Plata Basin Strategic Action Program') or knowledge of the TDA and SAP documents for the wider watershed (they had little memory of the Framework Plata project either). The ongoing Plata project is known as a "bridge" project because it is a smaller project with a scope only to work with national governments and the transboundary Intergovernmental Coordination Committee (CIC for its acronym in Spanish, an organization that precedes GEF work in the watershed), so it is unsurprising that local stakeholders were unaware of it. Similarly, Pantanal project stakeholders reported that the design phase mostly involved governments.

For the Guadalquivir River Basin project, however, most local stakeholders interviewed noted that they had been briefed on the planned activities during the design phase. Furthermore, a local NGO, PROMETA, was contracted by the GEF Agency, FAO, to carry out community engagement during the design phase to learn about major issues impacting different rural areas of the watershed. This project which has a smaller geographical scope than the IW projects in the region was more able to carry out focused stakeholder engagement.

National government stakeholders were knowledgeable on all case study projects, especially in the Ministry of Environment and Water (MMAyA for its acronym in Spanish) and the Ministry of Foreign Relations (in the case of IW projects), which have historically been the most involved ministries in executing GEF projects. The Ministry of Development Planning, which is now the GEF Focal Point, has more of a coordination and monitoring role, ensuring that GEF projects are harmonized with national strategies and are being implemented in a timely manner. National stakeholders noted that GEF projects had improved recently in involving national government in the design of projects where historically GEF Agencies designed projects by themselves and came to ministries only for light review and signature. The Guadalquivir River Basin project was cited as an example of an inclusive project design by several ministries.

National government officials also mentioned they often had a desire to change the design of GEF projects in the later stages of design but were often not able to do so due to GEF not allowing

modification of project components late in the process. They noted that the design phases of GEF projects tend to be long and sometimes national priorities change over the course of 1-2 years. One example in a water related project was the 'Integrated Water Resources Management in the Titicaca-Desaguadero-Poopo-Salar de Coipasa (TDPS) System' project (GEF ID 5748), in which they would have liked to divert more funds to the Poopó Lake area which became more of a priority by the end of the design phase.

Overall, GEF projects addressed stakeholder priorities quite well. Even though GEF does not finance large **water storage infrastructure** projects, multiple case study projects financed micro-irrigation infrastructure development and improvement, especially the EVAs project which created integrated management demonstration plots (PDMIs for their Spanish acronym) in many communities in the northern Potosí and southern Oruro provinces. The Guadalquivir River Basin project also has plans to do this type of micro-irrigation and water storage work along with **erosion control** activities (also common in the EVAs project and to a lesser degree in the Foundational SAP project) including forestation in erosion-prone steep areas, terracing and agroforestry. This work inherently contributes to **climate change adaptation** as well as the irrigation work builds resilience for droughts and the erosion control for flooding. Climate change adaptation is a key component to the Amazon River Basin project, which hopes to develop forecasting and alert systems for extreme events and use natural infrastructure to protect communities and ecosystems from flood and drought impacts.

The case study IW projects along with the Guadalquivir River Basin projects use **integrated landscape planning** inherently given their watershed approach to planning which connects across several sectors including agriculture, potable water and wastewater infrastructure, land use planning and biodiversity.

Some of the case study project include elements of **financing for scaling up** water storage and erosion control activities. The most prominent example is the Guadalquivir River Basin project, which has an entire component dedicated to building a Tarija Water Fund which will draw financing from several sources including the potable water utility, private wine growing cooperatives, international development donors and municipal governments to finance watershed protection and related interventions. The Amazon River Basin project, which is at the SAP implementation phase, also includes elements of financing including plans to develop incentive-based financing mechanisms for integrated water resource management while the Pantanal project aims to create a sustainable financing strategy to support SAP implementation.

Water resources monitoring is also common in the IW projects—the Foundational Plata River Basin project focused its Pilcomayo watershed pilot project on developing a water monitoring network while the Bridge Plata River Basin project is focused on improving the online decision support tool which includes monitoring data. It is also a key component of the Pantanal and Amazon River Basin projects.

Biodiversity of aquatic ecosystems was not a common theme in the case study projects. The EVAs project did focus on biodiversity of native crops but not aquatic systems. The Pantanal project has the most intersection with biodiversity with its plans to propose a framework for improved management and protection of the aquatic ecosystem in the wetlands.

c. Collaboration and coherence between case study projects and other water security related initiatives

National government stakeholders felt that GEF projects were increasingly becoming more relevant to national strategies and plans. Since the move of the GEF Focal Point to the Ministry of Development Planning, the ministry is making an effort to ensure all new GEF projects are aligned with the overarching Plan for Economic and Social Development 2021-2025. The Bolivian government has many planning mechanisms at the watershed level as well which fit well with the IW approach. For example, the Foundational Plata project's work helped lead to the Cotagaita watershed water classification which is a national law to classify rivers into different use types. The Cotagaita classification was one of the first to be completed nationally. Government programs such as Mi Agua and Mi Riego (translating to "my water" and "my irrigation") do activities very similar to some of the sustainable landscape management activities done by the EVAs project, Guadalquivir River Basin and other GEF projects. However, it is unclear if the GEF projects have any coordination with such national programs in terms of joint capacity building or coordination on geographical areas covered.

Little evidence was found that complete projects collaborated closely with other donor initiatives. The EVAs project was originally supposed to receive significant co-financing and have an overlapping management structure with the IDB-funded Direct Support for the Creation of Rural Agricultural Initiatives (CRIAR for its Spanish acronym) but the terminal evaluation noted that these coordination structures were never built and the two projects didn't have any geographical overlap, reducing the realized cofinancing for the EVAs project. This may have led to missed opportunities to scale up results to additional communities and bring more technical expertise on agricultural production to supplement the micro-irrigation projects.

The terminal evaluation for the Foundational Plata project noted that the project was built on existing projects and "linked" to several other GEF initiatives (including a project on the SAP implementation of the Bermejo river, GEF ID 886; a completed precursor project focusing on the Pantanal ecosystem in Brazil, GEF ID 583; a project on the maritime front of the Plata river in Argentina, GEF ID 3519; and a completed project in the Chaco ecosystem, GEF ID 2505) but gave no details on what these linkages were. Given that the Bermejo, Pantanal and Chaco ecosystem all form part of the Plata watershed, such projects could have been a good data source for the Foundational Plata as part of TDA and SAP development and could have contributed to pilot projects such as the one in the Pilcomayo River Basin.

The Bridge Plata project design documents included an extensive list of lessons learned from the Foundational Plata project, mostly related to project management and practices to improve inter-governmental relations and cooperation. Lessons included reaching consensus between countries in the design phase on project execution structure and responsibilities of key actors, clearly define the number of activities to be carried out and that a high level of national ownership is important for sustainability and future activities.

Otherwise, most ongoing projects took note of the other ongoing projects in their sectors and geographical areas but did not include detailed plans on how collaboration would take place. The Bridge Plata project noted many of the same GEF projects as the Foundational Plata project including the completed Bermejo River Basin Project (which is part of the Plata watershed), the Plata Maritime Front and completed Chaco ecosystem projects along with a global project on tool development for climate

variability (GEF ID 4533) as key GEF projects in the Plata watershed, along with a European Union funded project on the development of a master plan for the Pilcomayo River Basin.

GEF is still quite active in the Bolivian portion of the Plata basin (Figure 5), considering the completed Bermejo, Chaco and Pantanal projects along with ongoing or upcoming projects in all three areas (another IW Bermejo project is in the design phase, GEF ID 10995, an ongoing project on indigenous biodiversity and forest management in the Bolivian Chaco, GEF ID 10393; and the case study Pantanal project) along with the Guadalquivir River Basin project. Another IW Plata project is in design as well (but is not yet GEF Council approved) which will be a follow up to the Bridge Plata project much more focused on SAP implementation (GEF ID 11053). As the Plata-wide IW program moves towards SAP implementation, a great opportunity exists to integrate some of these smaller initiatives going on in parts of the Plata watershed into the implementation program and use the larger programs to fill gaps in areas that do not already have ongoing projects.

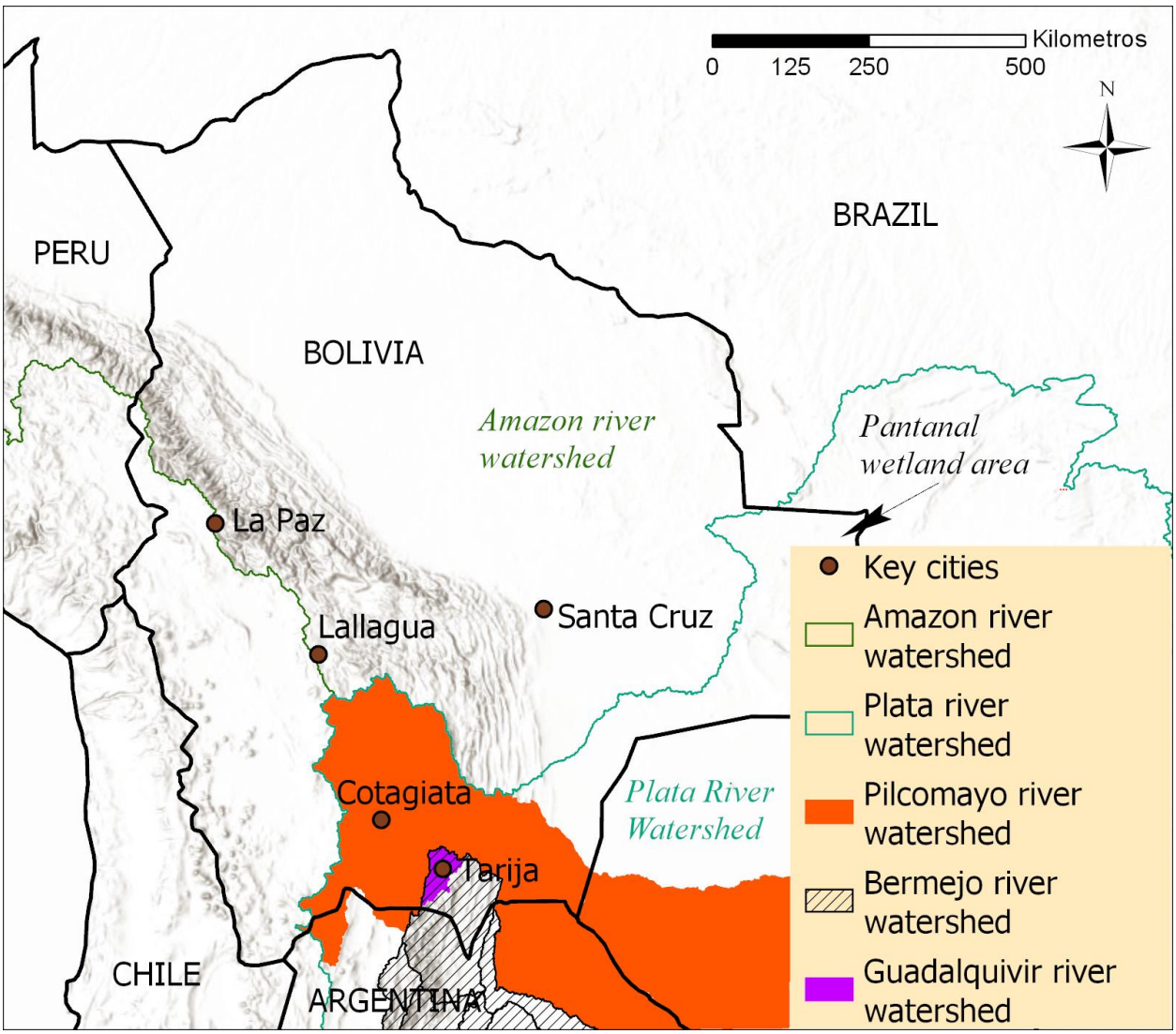

Figure 5. Key locations and watersheds where case study projects focus in Bolivia.

The Guadalquivir River Basin project is designed clearly on the shoulders of other non-GEF initiatives in the Tarija Central Valley. First, the German development agency GIZ has an ongoing project called PROCUENCA which focuses on integrated rural development using a watershed focus with one of the focus watersheds being the Guadalquivir. The project, which began in 2018 and ends late in 2023, has built the Interinstitutional Platform for the Guadalquivir River Basin and created an online Tarija hydrological information system (SIHITA for its Spanish acronym), among other activities. The Guadalquivir River Basin GEF project has specific plans in its design documents to strengthen the Platform's technical working groups and use it as the main stakeholder engagement and governance body for key watershed management decisions. It also aims to maintain and strengthen the SIHITA. Second, the project's component on building the Tarija Water Fund is understood by local stakeholders as the culmination of many years of work to create such a fund in the valley, most recently catalyzed by the valley's potable water utility, COSAALT, and the Natura Foundation, which recently were the first to capitalize a water fund for protection of the Sama Biological Reserve and surrounding mountain range where the valley's potable water is drawn from. The case study project hopes to build off the success of what COSAALT and Natura have created, drawing in further donors (including seed money from the GEF project) and developing an umbrella framework for financing watershed protection or related projects with the fund.

The Amazon River Basin is also an area with extensive GEF and other donor financing related to water security. The case study Amazon project notes at least 11 pertinent GEF projects alone in the region, including the second phase of the Amazon Sustainable Landscapes (ASL) program (GEF ID 9272 was the first phase and GEF ID 10198 is the second). The project does not however note any linkages with the ASL program in Bolivia and national stakeholders note the ASL program doesn't concentrate on water resources. Collaboration between the case study project and the ASL is a key opportunity to ensure coordination between a landscape-based program and a watershed-based project with the same geographical scope.

d. Addressing gender and water security of vulnerable populations

The two completed case study projects did not have a strong focus on gender but the EVAs project especially had clear involvement of women as beneficiaries despite not targeting them specifically. This was due to one of the main gender elements related to water security mentioned by stakeholders—that in the highlands of Bolivia, men from rural areas often migrate seasonally for work, leaving women to manage crops and water in the communities. In many cases, women received benefits from the EVAs project and noted specifically that the increased agricultural production and diversity in theirs and their families' diets that micro-irrigation construction brought them. They were also afforded more economic power by being able to sell excess production to market compared with before the project.

The more recent case study projects have done much more to include gender in their designs, following the latest GEF gender policy[11]. All have a mix of gender analyses and gender action plans and tend to include gender through sex disaggregated indicators especially for participation in trainings and awareness raising activities, promotion of increased representation of women in decision making and governing bodies and specific courses to raise awareness on gender issues in water management. Examples include a gender-sensitive citizens science training program in the Amazon River Basin project

[11] GEF (2017) Policy on Gender Equity. Policy SD/PL/02 approved on November 30, 2017.

and a family production entrepreneurship strategy to finance small scale production initiatives in the Guadalquivir River Basin project which will prioritize financing women-led projects.

Indigenous peoples make up major sections of the populations in all areas where the case study projects work or worked with the exception of the Tarija central valley, where local stakeholders did not identify any particular vulnerable group (some stakeholders considered those furthest away from water sources to be the only vulnerable "group", showing the importance of water security). In the northern Potosí/southern Oruro area of the EVAs project, the Quechua and Aymara indigenous groups made up the vast majority of the population. The project had success working through the indigenous governance network of Ayllus, which helped organize project activities and perform stakeholder engagement. The project at first did not have a project staff located in the region and the staff didn't speak the local languages—but change in project location to Llallagua and hiring of local technicians fluent in Aymara and Quechua greatly improved community engagement. The project also engaged a local radio station, Pio XII, which put out awareness raising and educations programs in Quechua to better reach local communities. Additionally, the project supported Ayllu plans for land use governance which stakeholders noted are still in use today.

Ongoing projects have less focus on indigenous peoples but note they are a key stakeholder to engage through awareness raising and local activities. In the Plata basin, the lower Pilcomayo area has a large Guarani population that depends on fish which have been impacted by heavy metal pollution. The Pantanal project will aim to engage the Ayoreo and Chiquitano indigenous peoples through participation in activities and coordination of pilot projects and local awareness raising activities. In the Amazon, the project notes it "doesn't directly target indigenous peoples" despite the large presence of such groups in the basin, but that they will still be involved in educational and cultural activities.

3. Water security achievements and sustainability

a. Water security related outcomes of case study projects

The Foundational Plata project, as one of the largest in the case study, had a sprawling list of intended outcomes and outputs (almost all of which were related to water security at least indirectly) and made some progress in each output but didn't fully achieve many of them according to the project's terminal evaluation (Table 6). The majority of the intended outputs dealt with transboundary relations on watershed management between countries, including improving governance, carrying out scientific hydrological studies to understand baseline conditions such as water balance, land degradation and groundwater conditions and building an online decision support system (DSS) with visual spatial datasets. The project did also carry out a series of pilot projects, one of which was in the Bolivian portion of the Pilcomayo River Basin. The project did create the DSS but the terminal evaluation reports it was not operational by the end of the project. Water quality information began to be exchanged by countries during the project, but the number of monitoring campaigns were less than anticipated while planned groundwater demonstration activity in the Yrenda-Toba-Tarijeno Aquifer System (SAYTT) which includes a southeastern corner of Bolivia did conduct a hydrogeological diagnostic study but guidelines on integrated management of surface and groundwater were not prepared.

The Pilcomayo River Basin pilot project also was able to carry out some activities in Bolivia but not everything that was originally envisioned. The case study mostly made progress on informational studies

and plans, chiefly a water quality monitoring plan for the Cotagaita watershed that included a spatial prioritization of where ideal monitoring locations should be located. The pilot study report also included a biophysical and socioeconomic diagnostic of the Cotagaita watershed, proposed activities to reduce soil erosion and the creation of a Cotagaita Watershed Social Management Committee. The pilot did not, however, carry out one of the main original goals, which was to create a plan to manage the mine tailings from the legacy Tasna Buen Retiro Tailings Dam nor did the terminal evaluation find any evidence of a best practices manual based on training sessions with farmers on reducing erosion, reforestation and water management practices.

Table 6. Summary of results compared to intended outputs of the Foundational Plata project (GEF ID 2095).

Foundational Plata project intended outputs*	Actual outputs (at project completion)
1.1 Technical institutional capacity for LPB-IWRM is strengthened	**Partially achieved**: An adaptive transboundary IWRM conceptual legal framework was proposed for endorsement. The DSS was made available to the CIC but it wasn't online or operational by project close.
1.2 Engagement of local stakeholders and civil society	**Partially achieved**: The public awareness education program was not conducted at the basin level, only as part of pilot projects.
2.1 Supply and demand Integrated water balance (IWB) created	**Partially achieved**: IWB methodology was developed but the supply and demand IWB instrument was not operational.
2.2 Water quality information exchanged among riparian institutions	**Partially achieved**: Water quality information was exchanged partially among riparian institutions. Monitoring campaigns were fewer than planned (two total rather than four per year). A methodological guide for water quality evaluation was perfected and agreed upon by the countries.
2.3 Yrenda-Toba-Tarijeno Aquifer System (SAYTT) priority activity planned and executed	**Partially achieved**: A hydrogeological diagnostic study of the aquifer was carried out in a joint manner, resulting in an integrated database and geological and hydrogeological maps. Guidelines for integrated surface-groundwater were not prepared.
2.5 Land degradation diagnostic analysis is prepared for adoption by LPB countries. Basin wide land degradation control strategy developed for inclusion in SAP.	**Fully delivered**: created an integrated database on soil type, land use and cover map, a diagnostic analysis on land degradation and erosion with an erodibility map, estimated production of sediments based on present and future climate scenarios. **Partially achieved**: the basin-wide land degradation control strategy was not delivered but project produced guidelines for the Plata Basin land degradation control strategy and they were agreed upon by five countries.
2.6 Plan for clean technologies to protect water resources with plans for scaling up/replication identified, mapped and finances secured.	**Partially achieved**: a broad clean-technology program was included in the SAP but with not detailed plans to scale up replicate. Finance was not secured.
2.7 A pilot demonstration on pollution and erosion control in the Cotagaita micro-basin of the Pilcomayo River	**Partially achieved**: A biophysical and socioeconomic diagnostic of the Cotagaita watershed, a proposal for a water quality monitoring plan by subwatershed, the consolidation of a water quality monitoring network and a proposal of alternatives for reducing soil

	erosion and sediment accumulation were done. Formation of a Cotagaita Watershed Social Management Committee. No evidence of integrated management plan for Tupiza and Cotagaita basins, final feasibility project study for rehab of Tasna-Buen Retiro dam or of farmer training and a best practices manual for reducing mining contamination in sub basins No scaling up strategy was developed.
3.1 Hydrological risk models and climatic scenarios developed for basin-wide adaptation measures to be incorporated into the TDA-SAP	**Partially achieved**: Project modeled climate change scenarios using the ETA regional climate model and an analysis of drought conditions and incorporated climate change scenarios. No evidence of formulation of a set of adaptation measures to be incorporated into the SAP or communication with public on adaptation measures deemed effective.
4.1 A hydro-climatic assessment made for TDA for endorsement by riparian countries. The SAP for the Plata basin is produced for endorsement.	**Fully achieved**: An updated TDA was prepared considering hydro-climatic assessment and containing strategies for the sustainable utilization of land and water resources. **Partially achieved**: The SAP was produced and endorsed by the CIC. But financing plans were not developed and the SAP was not properly communicated to internal or external partners.

*Excludes outputs not implemented in Bolivia.

The EVAs project was smaller in scope and had more success achieving its intended outputs according to the project's terminal evaluation, if after a slow start to the project (Table 7). The project was divided into three major components—the first of which dealt only indirectly with water security through cataloguing and documenting traditional agrobiodiversity of the indigenous communities in the project area. The second component was focused on improving land use planning in the municipalities and Ayllu indigenous governance structures through development of municipal land use plans (PMOTs for their Spanish acronym) and Ayllu bylaws. The third component was focused on constructing the PDMIs in communities that improved soil and water conservation. PDMIs generally followed a schematic of tree planting in "aquifer recharge zones" in the steep hills above the communities, micro-irrigation improvement or installation near water sources and networks to agricultural fields and demonstration farm plots with erosion control, agroforestry and improved seeds planted.

Project stakeholders noted that most of the achievements of the project were carried out in the final two years of implementation (the project received an extension of 21 months) when the project management team was replaced and moved to Llallagua (the closest urban center to the involved communities) and new locally based technicians were hired to improve community engagement. Once that was done, the project achieved many quick successes, meeting targets for establishment of the PDMIs, developing several publications on agrobiodiversity and creating some PMOTs (although only two were adopted in Chayanta and Chuquihuta).

Table 7. Summary of results compared to intended outputs of the EVAs project (GEF ID 3831).

EVAs project intended outputs	Actual outputs (at project completion)

1.1 Research agenda on Ayllus traditional knowledge, practices and techniques systemized for EVA agro-biodiversity conservation and adaptation strategies.	**Partially achieved**: Two studies conducted and published on agro-biodiversity. No evidence in TE on plan of priority adaptation options.
1.2 An operating information system on land, water, biodiversity and climate variations of the EVA integrated to national and subnational information systems.	**Fully achieved**: Four relevant studies for the development of an M&E system for agro-biodiversity, soil, water and the effects of climate change that can be implemented in a spatial information system.
1.3 Monitoring, Evaluation and Geographic Information Systems	**Fully achieved**: A geodatabase has been generated with built-in databases, thematic layers and at least 63 thematic maps proposed during the information gathered in the field. The TE notes that the geodatabase has many inaccuracies.
2.1 The regulatory framework is strengthened through regulatory frameworks and six municipal land use plans (PMOTs).	**Partially achieved**: 2 plans were approved by municipal authorities; four others were created but not approved.
2.2 Two inter-institutional coordination platforms consolidated.	**Partially achieved**: A platform for institutional cooperation was established. Bylaws were delivered to four original authorities.
3.1 Integrated Management Demonstrative Lots (PDMIs) implemented	**Partially achieved**: 93 PDMIs established equating to 710 ha of land under traditional soil management and conservation system including retaining walls and gabion dams, reforestation, micro irrigation systems and water harvesting. No evidence of meeting indicator of 2% of eroded soils reestablished.
3.2 Awareness raising, training and promotion of the use of traditional integrated management of EVA	**Fully achieved**: Four radio spots and 11 training events done and other publications to spread information on climate change, agricultural practices and local regulations.

b. Relationship of results to global environmental benefits, co-benefits and unintended consequences

In general, the four IW focused projects in the case study are larger than other case study projects (with the exception of the Bridge Plata project) and more focused on improving governance, knowledge exchange and engagement of government stakeholders. They relate directly to the GEF-7 IW global environmental benefit (GEB) core indicator, "number of shared water ecosystems (fresh or marine) under new or improved cooperative management." The Foundational Plata project carried out a number of studies that enhanced the basin's TDA and created the SAP, which is now the basis of the future Plata project on SAP implementation. These documents are key for improving the cooperative management of the watershed. The project, along with the Bridge Plata project, have improved the capacity of the CIC, the main transboundary watershed committee, which helps to ensure long term management. Similarly, the Amazon River Basin project will be executed by and improve capacity of the Amazon Cooperation Treaty Organization (ACTO), the transboundary committee for that watershed. Some Bolivian national government stakeholders feel that the regional IW projects, while they do

improve relations between countries, often did not give equal funding to Bolivia, instead focusing on larger downstream countries.

The EVAs and Guadalquivir River Basin projects relate more to the Land Degradation GEBs of "area of land under improved practices" and "area of land and ecosystems under restoration". The third component of the EVAs project directly related to these two indicators through the PDMIs which introduced improved agricultural practices to prevent erosion, maintain soils and use water more efficiently and planting trees to secure soil. The Guadalquivir River Basin project, which is the smallest of the case study projects, similarly relates to the Land Degradation GEBs through its component on carrying out sustainable land management and sustainable biodiversity management (SLM/SBM) actions, many of which are similar to the EVAs activities including micro-irrigation and erosion control.

The EVAs project showed clear co-benefits related to water security as well, mostly due to the installation, improvement and distribution of micro-irrigation systems. The irrigation systems allowed beneficiaries to grow a larger range of crops which improved their families' diets and nutrition. It also allowed for them to have more and larger harvests, meaning they could sell at the market and increase their income, not to mention allowing them to diversify their livelihoods by growing flowers which could be sold and building beehives which could feed on the irrigated flowers, thus producing and selling honey. The irrigation also improved their resilience to drought by providing them with a water storage when rainfed crops perished.

No stakeholders noted any unintended negative consequences in Bolivia of the case study projects.

c. Sustainability of completed case study project water security outcomes

Sustainability for the two completed case study projects was quite high due mostly to a mix of continued donor presence and high local ownership of activities. The Foundational Plata project, which concluded in 2017, saw sustainability mostly due to a continued presence of GEF and other donor projects (Table 8). The Bridge Plata project has maintained transboundary momentum and the upcoming Plata SAP implementation project will continue this along with the permanent presence (located in Buenos Aires, Argentina) of the CIC. Bolivian national government officials have stayed involved in these Plata transboundary organizations including sub-basin committees such as the Pilcomayo Commission.

Through the activities of the Bridge Plata project, the DSS is now operational and available online with an interactive mapping portal which shows data layers on a variety of environmental indicators. The SAP was also given a push by the Bridge project through definition of 15 priority activities and efforts to integrate SAP activities into national government strategies. The SAP implementation project should begin implementing these activities in earnest. Baseline studies and strategy documents created by the Foundational projects were less well known, including the water balance study, land degradation strategies and water modeling. However, the DSS should help keep this data relevant and available.

Sustained evidence of the Foundational Plata project's Pilcomayo pilot project was hard to find—local stakeholders in Cotagaita were mostly unaware of the project and the documents it created. The Social Watershed Management Committee was not functioning according to stakeholders. The only result they were aware of from the project was a small tree plantation done in the nearby rural town of Cotagaitilla in a dry river, which fills with sediment during rain events. The trees planted in this location were still fenced and mostly alive, having grown to an average height of about 2.5 m (with non-native Eucalyptus

trees taller than native pine). This lack of knowledge of the project's results could be due to what the terminal evaluation assessed as a "lack of public awareness/communications strategy". Many project stakeholders noted that the project did a poor job of communicating its results, including the Pilcomayo pilot project.

General watershed management activities in the Cotagaita watershed were continued largely through the 'Integrated Watershed Management' project of the Swiss development organization HELVETAS which carried out erosion control, water quality monitoring and water governance activities up until 2022 in the area. HELVETAS staff noted that the water quality data from the Foundational Plata project was useful to them as they supported the municipal and Potosí regional governments in preparing the water quality classification document for the Cotagaita watershed, one of the first such documents in Bolivia (the watershed was rated Class C, suitable for irrigation but not potable use).

Some project stakeholders said the project supplied the Cotagaita municipality with a multi-parameter monitoring device. The municipality had three devices but thought they had all been provided by the HELVETAS project. None of the devices were functional however, as the municipality lacked the funds to purchase batteries and properly calibrate the equipment. Monitoring biological water quality indicators in the watershed (doesn't include indicators of heavy metals produced by mining waste), presumably still using the monitoring locations from the project's monitoring plan, was still being done twice a year, but only when MMAyA officials came with their own funding and equipment.

Generally, municipal staff thought that water quality had not improved nor worsened since the end of the Foundational Plata project. They noted that some indicators are worsening and some improving and that mining activity is increasing in the watershed. The TASNA mining cooperative in the watershed has constructed a water treatment plan to process their tailings which is a major improvement (the treatment plan was self-funded with non-GEF donor support for the feasibility study) but noted they do not have capacity to treat the legacy tailings from the Buen Retiro tailings dam.

Table 8. Post-completion sustainability of Foundational Plata project outcomes, according to evidence gathered by the case study.

Foundational Plata project outcome status at project completion	Status of outcome at time of case study	Direction of Change since project completion
1.1 DSS and IWRM legal framework: Partially achieved	The DSS website is functioning with an interactive map. The download function seems unreliable and some thematic pages are empty. Bolivian government has benefited from accessing data on other countries' monitoring but noted lack of Bolivian stations in the tool. There was no information on the IWRM legal framework, but Bolivia has integrated a watershed approach to land management through the National Watersheds Plan.	**Improved**
1.2 Public awareness program: Partially achieved	No evidence of the public awareness or participation programs were seen in Bolivia.	**Sustained**
2.1 Integrated water balance: Partially achieved	A publication on the IWB was put out at the very end of the project. Bolivian stakeholders knew of the water	**Sustained**

	balance done and have found it useful generally but no specific examples of how it has been used.	
2.2 Water quality information exchange: Partially achieved	The MMAyA has a water quality monitoring network and the project helped strengthen it. The DSS allows for better sharing of water quality data, but Bolivia has few stations. There seems to be little understanding if water quality has improved in Bolivian portions of the watershed.	**Sustained**
2.3 SAYTT Groundwater management pilot: Partially achieved	No additional progress was reported by stakeholders on the SAYTT aquifer although it is planned for future GEF Plata projects.	**Worsened**
2.5 Land degradation database and strategy: Fully achieved/Partially achieved	No stakeholders were found that were aware of this analysis.	**Worsened**
2.6 Clean technology program: Partially achieved	The evaluator did not ask specifically about this output but it is noted that no stakeholders mentioned it as an output of the project.	**Unable to assess**
2.7 Pilcomayo pilot project: Partially achieved	Watershed management work in the Cotagaita region has continued largely through the work of HELVETAS which noted the utility of the biophysical and socioeconomic diagnostic efforts of the project. HELVETAS has carried out soil erosion prevention and water monitoring support and helped guide the creation of the river classification document for the watershed. Monitoring has continued (likely using the monitoring plan made by the project) but done only through MMAyA as all municipal monitoring equipment cannot be calibrated or charged due to lack of municipal funds. Water quality in general seems to not be improved—additional mining is being done but some cooperatives have built tailings control plants (TASNA) though help from donors and on their own. The Cotagaita Watershed Committee no longer functioning.	**Improved**
3.1 Hydro-climatic modeling: Partially achieved	Climatic scenarios have been incorporated into the DSS but stakeholders did not note the flood frequency/vulnerability maps as a result of the project.	**Sustained**
4.1 Updated TDA and approved SAP: Fully achieved/Partially achieved	The TDA and SAP are well known documents by national government officials. They form the basis for follow on GEF Plata projects so sustainability is ensured through follow on projects.	**Improved**

The EVAs project has had mixed sustainability—sustainability of field activities has been very impressive while sustainability of land management and monitoring was varied (Table 9). Municipal authorities seemed largely unaware of the PMOTs created by the projects although in some cases technicians from the project were now working as environmental officers in the municipalities and noted that the PMOTs did in at least one municipality help with geographical prioritization of government projects. None of the four municipalities that had not approved the PMOTs by project end have since approved them. Government turnover is certainly a factor in this as most municipal authorities interviewed had entered their positions after the end of the EVAs project. However, Ayllu authorities were aware of the land

management bylaws supported by the project and reported reduced inter-Ayllu conflict over natural resources in recent years.

Sustainability of the PDMIs was impressive—virtually all irrigation systems that the project constructed or improved were still functional and greatly appreciated by beneficiaries (Figure 6). In most cases, communities had set up irrigation committees that maintained the systems, which were gravity fed, simple projects that required only locally available materials for repairs. Community members gave many examples of how they have benefitted from increased and more diverse agricultural production due to the systems since the end of the project and noted how the systems had been a critical aide during the ongoing drought. However, the drought was nonetheless impacting them—in some cases the irrigation systems were temporarily unused due to lack of water or being rationed. Some fruit trees were impacted by pests which community members thought was due to drought. Some wealthier neighbors had replicated the irrigation systems, building their own geomembranes with help of NGOs in some cases.

Figure 6. Examples of sustainability of community activities in the EVAs project, clockwise from upper left: community member in Chucarasi community wearing a necklace of flowers and vegetables grown from farmland irrigated by project-provided irrigation system, live barriers and agroforestry system planted by the project and improved by a subsequent project with drip

irrigation system in Chiru-Chiru community, a functioning geomembrane installed by the project in Walkeri community and a tree plantation planted during the project in the Chekene community.

The tree planting was also sustained—the majority of trees were still alive with some losses due to burning or grazing. However, the trees were generally still quite short (ranging from less than a meter in height up to 3-4 m after 6-8 years of growth)—it was noted that terrain was steep and dry and mostly slow growing native trees were planted (Figure 7). Trees were in better condition in communities that had established a formal system of maintenance, usually assigning a community member on a rotational basis to perform trimming and keep watch over the plantations. Project technicians and community members spoke positively about the plantations which ranged from 1-3 ha in size, noting they helped with soil retention, aquifer recharge and bringing moisture and rain. However, because of the relatively small size of the plantations compared with the surrounding, unmanaged vegetation which was mostly bare soil, desert scrub and native grasses, it is unlikely that the trees will make much impact in creating a micro-climate of moisture to attract rain. Furthermore, although there is evidence that intermittent trees increase infiltration in semi-arid areas[12], groundwater recharge from such small areas are unlikely to be impactful. Nonetheless, many examples of replication were observed—tree planting continued in the communities and the municipal nurseries that the project supported or created were all still functional according to visits and interviews. Continued scaling up should improve erosion control and aquifer recharge.

Figure 7. Examples of tree planting areas prior to and post EVAs project intervention. The upper images show a more successful plantation above the Sunuyo community (image in upper left is from May 2016 and upper right from September 2022) and the

[12] Ilstedt U, Bargues Tobella A, Bazie HR, Bayala J, Verbeeten E, Nyberg G, Sanou J, Benegas L, Murdiyarso D, Laudon H, Sheil D and Malmer A (2016) Intermediate tree cover can maximize groundwater recharge in the seasonally dry tropics. *Scientific reports*: 6 (21930).

lower images a less successful plantation above the Llapa Llapa community (image in lower left from June 2016 and lower right from September 2021), although a site visit to Llapa Llapa confirmed most seedlings are still alive, if not tall enough to be seen in the image.

In terms of awareness raising, the local Radio Pio XII radio station was still functional and reported continuing programs on environmental education and climate change topics, especially drought. Community members were very familiar with climate change topics and its impact on their daily lives. They were very keen on continued support for micro-irrigation and tree planting initiatives in the mold of the EVAs project, hoping to reach more families and communities.

Table 9. Post-completion sustainability of EVAs project outcomes, according to evidence gathered by the case study.

EVAs project outcome status at project completion	Status of outcome at time of case study	Direction of Change since project completion
1.1 Research agenda on Ayllus traditional agro-biodiversity: Partially achieved	Stakeholders, especially technicians and authorities, were aware of the publications done by the project although it is not clear if they are being used in any way. They are an object of pride for those involved in the project.	**Sustained**
1.2 An operating information system on land, water, biodiversity and climate variations: Fully achieved	There was no evidence of an M&E system existing in the project area. The studies were noted by technicians but unclear if being used today for any meaningful monitoring.	**Worsened**
1.3 Monitoring, Evaluation and Geographic Information Systems: Fully achieved	The geodatabase does not seem to be accessible publicly although it was provided by project staff to the evaluator. The errors in the PDMI locations have not been corrected.	**Worsened**
2.1 regulatory frameworks and six municipal land use plans (PMOTs): Partially achieved	The PMOTs were not well known by authorities although the project technicians were familiar with them. The only mayor with familiarity of the process was the Llallagua mayor, which noted that the PMOT had not been approved there but was under revision. Some technicians noted that the PMOTs have been utilized for municipal planning but authorities did not seem aware of them.	**Worsened**
2.2 Two inter-institutional coordination platforms consolidated: Partially achieved	Bylaws seem to still be active in Ayllus and conflict between Ayllus seems to have decreased. Ayllu authorities reported that their governance was improved by the project.	**Improved**
3.1 Integrated Management Demonstrative Lots (PDMIs) implemented: Partially achieved	Visited PDMIs were well maintained—geomembranes were still functioning, irrigation systems in good shape, crops still being grown although drought had impacted amount of irrigation that was available—in some places systems were temporarily out of use for this reason. Some fruit trees were damaged by a pest (possible related to drought) but others were bearing fruit and positively impacting community members. There were cases of replicated geomembranes and erosion control terraces. Forest plantations were also mostly alive and growing although some at very slow pace. There was	**Improved**

	replication of these plantations as well. Project established nurseries were still functioning and growing in number of seedlings delivered.	
3.2 Awareness raising, training: Fully achieved	Radio Pio IX has continued to do radio programs on environmental topics after the project completed such as climate change and water shortages. Community members seem to understand climate change and drought topics and note how their environment is changing around them.	**Sustained**

Despite the remarkable sustainability of the EVAs project, community members and local authorities expressed constant need for further financing of similar activities. They viewed the project as a pilot which benefited a limited number of families in select communities, noting that many families in their communities and neighboring communities were still in need and water insecure. They mostly desire improved access to water through expanded irrigation networks, larger water storage infrastructure and more erosion control. This need was reflected in the Cotagaita region, which despite years of support from the Foundational Plata project and HELVETAS was overwhelmed with erosion, sedimentation, extreme weather events and water quality concerns.

This need shows the difficulty of scaling up project activities that improve water security after projects are complete. Neither of the completed projects were able to create workable scaling up plans with financial mechanisms to support transformational change. Government programs, NGOs and community members continue similar activities but not on the scale that is needed to truly control these large environmental issues faced by the communities. Additionally, it is possible that massive upscaling of irrigation infrastructure in this semi-arid landscape could result in unsustainable water withdrawals and stress on natural ecosystems that depend on the intermittent streams in the area.

Newer GEF projects have begun to include sustainable and local financing mechanisms in their project design to try to address this issue of scaling up integrated watershed management activities. The Guadalquivir River Basin project especially has an entire component to create a Tarija Water Fund for just this purpose. The Plata SAP implementation project along with the Amazon River Basin project will investigate financing options as well. The Plata region even has a development bank, FONPLATA, which was created along with the CIC to finance projects in the region.

4. Overall findings

- **GEF case study projects were highly relevant to Bolivian priorities on water security including improved water storage, erosion control and adaptation to climate change**. The two Land Degradation focal area focused projects, EVAs and the Guadalquivir River Basin projects, were and are especially focused on improving the water security of communities in their geographical areas which local stakeholders largely appreciated. The IW projects were also viewed as highly relevant by national stakeholders and transnational commissions (but not well known by local stakeholders) given their focus on improving governance and relations between neighboring countries. Stakeholders noted their desire for IW projects to include more local investments as they move to the SAP implementation phases.

- **Despite a large number of donor projects working on water security themes in Bolivia, case study projects generally did not detail collaboration or coordination efforts with other initiatives**. Most case study project design documents listed a large number of other GEF and non-GEF interventions overlapping with their geographical area and having water management related themes. However, generally there was little detail given on how such interactions would work in practice. Such coordination is especially important where subwatershed projects nest into larger watersheds such as the Guadalquivir River Basin and Bermejo River Basins and Pantanal wetlands forming part of the larger Plata River Basin.
- **Newer case study projects have better integration of gender themes in water security while only the EVAs project dealt in detail with indigenous peoples' groups**. Ongoing GEF projects tended to have gender action plans completed during their design phase, with most common activities planned being inclusion of sex-disaggregated indicators, ensuring participation of women in awareness and water management training events, inclusion of women in water management decision making bodies and prioritization of women's groups for small scale loans. Despite almost all regions of Bolivia having large indigenous populations, only the EVAs project of the case study projects worked intricately with indigenous groups, as it supported Ayllu governance and broadcast environmental education radio programs in the Quechua language.
- **Sustainability of completed projects was very positive for field activities but less so for management plans and technical reports**. The EVAs project's work in rural communities showed very good sustainability largely due to the activities meeting the needs of beneficiaries and high motivation to maintain the micro-irrigation, agroforestry and tree plantation work done performed by the project. In the Cotagaita region, where the Foundational Plata project performed a pilot study, a HELVETAS project continues water monitoring and erosion control activities done by the GEF project. However, municipal management plans in EVAs and technical studies by the Foundational Plata project appeared to be relatively unknown by local stakeholders 6-7 years after project completion. Government turnover and a lack of results dissemination are the likeliest reasons for this.
- **Despite strong community sustainability, water security and erosion control activities have not been done on a level of magnitude corresponding to the scale of the problem.** Local stakeholders in all areas visited expressed a vast need for further financing that would bring more water storage and erosion control activities to their communities and neighboring areas. Even with some replication of project activities and government programs, the scale necessary to ensure communities have sufficient water to irrigate their crops as they wish even in times of drought and prevent damaging floods, soil erosion and sedimentation was clearly beyond the financing capacity of national and local government along with the number of international donor projects. Some newer projects including the Guadalquivir, Pantanal and Amazon River Basin projects have started to include activities designed to build sustainable local funds to invest in such activities, which have the chance to help address this need.

Technical Document 5: Informe sobre el estudio de caso de Bolivia

Oficina de Evaluación Independiente del Fondo para el Medio Ambiente Mundial

Marzo de 2023

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La foto de la portada muestra el rio Tocapampa, parte de la cuenca del rio Pilcomayo cerca de Santiago de Cotagaita en el departamento de Potosí.

1. Introducción

a. Descripción de la evaluación de la seguridad hídrica realizada por la Oficina de Evaluación Independiente del Fondo para el Medio Ambiente Mundial

Los recursos de agua dulce son esenciales para la vida humana y para los ecosistemas, y tanto el Fondo para el Medio Ambiente Mundial (FMAM) como toda la comunidad internacional del desarrollo asignan gran importancia a las amenazas que ponen en peligro estos recursos. La comunidad mundial interesada en los problemas del agua se ha basado, cada vez más, en la seguridad hídrica para definir las cuestiones relacionadas con los recursos de agua dulce. El Programa de las Naciones Unidas para el Medio Ambiente (2013)[13] define la "seguridad hídrica" como "la capacidad de una sociedad para salvaguardar el acceso sostenible a fin de mantener los medios de subsistencia, el bienestar humano y el desarrollo socioeconómico; garantizar la protección contra la contaminación del agua y los desastres relacionados con el agua, y preservar los ecosistemas en un clima de paz y estabilidad política".

En vista de la importancia y la naturaleza transversal de la seguridad hídrica y dado que el FMAM asigna cada vez más importancia a la cuestión en sus estrategias y proyectos, la Oficina de Evaluación Independiente (OEI) del FMAM está llevando a cabo una evaluación integral del tema que abarca varias áreas focales. En la Evaluación de la estrategia y la cartera del FMAM en el área de seguridad hídrica, se analizará la "huella" amplia de la cartera del FMAM en términos de la seguridad hídrica, sus impactos y su sostenibilidad. La evaluación comenzó en octubre de 2021 y se prevé que finalizará durante 2023.

Como parte de la evaluación, se eligieron varios estudios de casos para establecer cuáles han sido los impactos de los proyectos y programas del FMAM en la seguridad hídrica a nivel del país y de la cuenca hidrográfica. Los estudios de casos se diseñaron de modo de abordar varios temas de evaluación, entre ellos:

- La **pertinencia** de los proyectos del FMAM para las necesidades, las políticas y las estrategias de seguridad hídrica de los beneficiarios y de las principales partes interesadas en los países donde se llevan a cabo, incluidos los Gobiernos nacionales y locales, las comunidades, las poblaciones vulnerables, la sociedad civil, el sector privado, las organizaciones no gubernamentales (ONG) y otros actores.
- La **coherencia** de los proyectos del FMAM con iniciativas similares, tanto gubernamentales como financiadas por donantes, en las áreas donde se llevan a cabo.
- La **eficacia** de los proyectos del FMAM para lograr mejoras de la seguridad hídrica, a través de los principales resultados o cobeneficios de los proyectos y del cumplimiento de las salvaguardas relacionadas con el agua.
- La **eficacia** de los proyectos del FMAM para tener en cuenta la seguridad hídrica específica de las poblaciones vulnerables, en particular de las mujeres.
- La **sostenibilidad** de los resultados de los proyectos del FMAM terminados.

[13] Programa de las Naciones Unidas para el Medio Ambiente (2013) "What is water security?" (¿Qué es la seguridad hídrica?), ONU-Agua, Water Cooperation, 2013.

Los criterios para seleccionar los estudios de casos fueron los siguientes: 1) la presencia de proyectos del FMAM, terminados y en curso, relacionados con temas de seguridad hídrica, 2) la presencia de cuencas hidrográficas o acuíferos transfronterizos, 3) la diversidad geográfica de los estudios de casos elegidos, 4) la diversidad de áreas focales[14] y fondos fiduciarios[15] en los estudios de casos, 5) la diversidad de organismos del FMAM en los estudios de casos, y 6) la superposición con evaluaciones previas y otras evaluaciones en curso de la OEI del FMAM.

Una de las zonas elegidas para llevar a cabo un estudio de caso fue Bolivia, que incluye proyectos del FMAM en varias áreas focales relacionadas con la seguridad hídrica, tanto regionales como totalmente dentro del país. En el presente informe se resumen las conclusiones del estudio de caso de Bolivia.

b. Descripción de los proyectos del FMAM incluidos en el estudio de caso

El estudio de caso de Bolivia incluyó seis proyectos (table 5). Los proyectos abarcan una combinación de proyectos regionales centrados en la gestión de las cuencas hidrográficas transfronterizas, financiados por el área focal de aguas internacionales, y proyectos de varias áreas focales, con financiamiento de las áreas de degradación de la tierra, biodiversidad y cambio climático. Dos de los proyectos se han terminado; los otros cuatro se están ejecutando. En el caso de los proyectos regionales, el estudio se centró en las actividades implementadas en Bolivia o relacionadas con partes interesadas bolivianas.

Cuadro 10. Reseña de los proyectos del estudio de caso de Bolivia

N.º de identificación del FMAM	Nombre del proyecto	Organismo principal	Organismo de ejecución	Financiamiento del FMAM (en millones de USD)	Cofinanciamiento (en millones de USD)	Período de ejecución
2095	Gestión Sostenible de los Recursos Hídricos de la Cuenca del Plata en Relación con los Efectos de la Variabilidad y el Cambio Climáticos	PNUMA	OEA, CIC	10,73	51,03	2011-17
3831	Conservación y Uso Sostenible de la Biodiversidad y de la Tierra en los Ecosistemas Verticales Andinos	BID	MMAyA	6,00	8,05	2011-17
9770	Implementación del Programa de Acciones Estratégicas para Garantizar la	PNUMA	OTCA, MRE	11,74	144,36	2020-24*

[14] Las áreas focales del FMAM son, a saber: biodiversidad, productos químicos y desechos, cambio climático, aguas internacionales y degradación de la tierra.

[15] El FMAM administra tres fondos fiduciarios: el Fondo Fiduciario del FMAM (que abarca las mencionadas áreas focales) y dos fondos centrados en la adaptación al cambio climático: el Fondo para los Países Menos Adelantados y el Fondo Especial para el Cambio Climático.

	Gestión Integrada y Sostenible de los Recursos Hídricos Transfronterizos en la Cuenca del Río Amazonas teniendo en cuenta la Variabilidad del Clima y el Cambio Climático					
10035	Preparación del Terreno para la Implementación del Programa de Acciones Estratégicas para la Cuenca del Plata	CAF	CIC	2,00	2,95	2019-23*
10554	Cooperación Transfronteriza para la Conservación, el Desarrollo Sostenible y la Gestión Integrada del Pantanal y la Cuenca del Alto Paraguay	BID	MMAyA	8,19	128,57	2022-26*
10627	Programa de Gestión y Restauración Sostenible de la Tierra y la Biodiversidad en la Cuenca del Guadalquivir	FAO	MMAyA	1,56	21,55	2023-27*

* El proyecto aún se está ejecutando; fechas previstas de finalización.

BID = Banco Interamericano de Desarrollo
CAF = Banco de Desarrollo de América Latina
CIC = Comité Intergubernamental Coordinador de los Países de la Cuenca del Plata
FAO = Organización de las Naciones Unidas para la Alimentación y la Agricultura
MMAyA = Ministerio de Medio Ambiente y Agua de Bolivia
MRE = Ministerio de Relaciones Exteriores de Bolivia
OEA = Organización de los Estados Americanos
OTCA = Organización del Tratado de Cooperación Amazónica
PNUMA = Programa de las Naciones Unidas para el Medio Ambiente

c. Metodología del estudio de caso

El estudio de caso de Bolivia se llevó a cabo entre agosto de 2022 y febrero de 2023. En primer lugar, se realizó un examen de todos los documentos de los proyectos del FMAM, entre ellos las solicitudes de ratificación de la dirección ejecutiva, los informes sobre la ejecución de los proyectos, los exámenes de mitad del período, las evaluaciones finales y todos los demás informes o datos disponibles. Las principales partes interesadas se identificaron a través de los documentos de los proyectos y mediante consultas a los representantes de los organismos del FMAM que integraban el grupo de referencia de la evaluación.

Se llevaron a cabo varias entrevistas virtuales con partes interesadas nacionales, organismos del FMAM y personal, tanto anterior como actual, de los proyectos incluidos en el estudio de caso. Estas entrevistas tenían un propósito evaluativo y logístico para recopilar información y planificar la visita en el marco del estudio de caso. Asimismo, se solicitaron a las partes interesadas datos geoespaciales sobre los emplazamientos de los proyectos, que luego se recopilaron.

La etapa de visitas del estudio de caso tuvo lugar entre el 16 y el 27 de enero de 2023 e incluyó lo siguiente:

- Visitas al Gobierno nacional y a las partes interesadas del organismo del FMAM en La Paz.
- Visitas a Llallagua y a los municipios aledaños de Chayanta, Chuquihuta, Pocoata y Uncía, involucrados en el "Proyecto de Conservación y Uso Sostenible de la Biodiversidad y de la Tierra en los Ecosistemas Verticales Andinos" (número de identificación del FMAM: 3831; denominado en adelante "Proyecto EVA").
- Visita a la ciudad de Potosí y a Santiago de Cotagaita para entrevistar a las partes interesadas y recorrer los emplazamientos del proyecto piloto de la Cuenca del Pilcomayo perteneciente al "Proyecto de Gestión Sostenible de los Recursos Hídricos de la Cuenca del Plata en Relación con los Efectos de la Variabilidad y el Cambio Climáticos" (número de identificación del FMAM: 2095; denominado en adelante "Proyecto Marco de la Cuenca del Plata").
- Visita a la ciudad de Tarija para recorrer los emplazamientos del proyecto y entrevistar a las partes interesadas involucradas en el "Programa de Gestión y Restauración Sostenible de la Tierra y la Biodiversidad en la Cuenca del Guadalquivir" (número de identificación del FMAM: 10627; denominado en adelante "Proyecto de la Cuenca del Guadalquivir").

Con el objeto de entender mejor la sostenibilidad de los resultados, se asignó prioridad a los emplazamientos de los proyectos terminados, mientras que las visitas al Proyecto de la Cuenca del Guadalquivir, actualmente en curso, se centraron en el proceso de diseño del proyecto (este proyecto se visitó por su proximidad a los emplazamientos de los proyectos terminados). Si bien no se realizaron visitas a tres de los proyectos en curso, estos se analizaron con el personal del organismo del FMAM y las partes interesadas del Gobierno nacional.

Tras la visita en el marco del estudio de caso, se llevó a cabo un análisis geoespacial de los emplazamientos del Proyecto EVA para obtener datos de teledetección sobre el crecimiento de las zonas de plantación de árboles y las variaciones en la productividad de las parcelas agrícolas respaldadas por el proyecto.

Se incluyen las entrevistas virtuales que se realizaron antes de la visita, durante el estudio de caso se consultó al menos a 156 partes interesadas, entre ellas miembros del personal del Gobierno nacional (incluida la oficina del coordinador del FMAM en Bolivia) y de los Gobiernos regionales y locales, el personal de los proyectos perteneciente a los organismos del FMAM y los organismos de ejecución, miembros y organizaciones de la comunidad correspondiente, ONG y empresas del sector privado. Se utilizó tecnología de teledetección para determinar la sostenibilidad de las actividades comunitarias del Proyecto EVA.

2. Respuesta a las necesidades en materia de seguridad hídrica de las partes interesadas

a. Prioridades de las partes interesadas en lo que respecta a la seguridad hídrica en Bolivia

Las principales partes interesadas de Bolivia señalaron varias prioridades relacionadas con la seguridad hídrica que variaban en consonancia con los diversos contextos geográficos de las distintas zonas del país. Las cuestiones que se observan en la cuenca húmeda del Amazonas suelen ser muy diferentes a las que se plantean en la zona montañosa semiárida situada en la región occidental del país. La descripción de las prioridades de las partes interesadas que se incluyen en este informe (en particular las de las partes locales y rurales) es más detallada en el caso de las zonas que se recorrieron durante la visita y que, en su mayoría, están situadas en la región occidental montañosa de Bolivia. A continuación se presentan las principales cuestiones planteadas por las partes interesadas:

- **Almacenamiento de agua e infraestructura (todas las partes interesadas):** El agua para uso humano y para medios de subsistencia, especialmente la agricultura, se destacó como una prioridad clave para un gran número de partes interesadas, en particular en las comunidades rurales (y también para el Gobierno nacional y los Gobiernos locales) situadas en las zonas montañosas semiáridas de Bolivia. Algunas comunidades visitadas en zonas muy aisladas o secas no tenían agua potable suficiente en su localidad y debían desplazarse para obtenerla. A nivel nacional, alrededor del 69 % de la población rural (y el 95 % en las zonas urbanas) tiene acceso a agua potable segura[16]. No obstante, la mayoría de las comunidades visitadas contaba con suministros de agua potable segura, y su principal desafío era la falta de infraestructuras de almacenamiento y distribución de agua suficientes para la agricultura. Pocas zonas disponían de un sistema de riego universal; en la mayoría existían algunas redes de riego pequeñas, pero la comunidad dependía en gran medida de la agricultura de secano. Las partes interesadas señalaron que el riego les permitía cultivar la tierra de manera más productiva y en una zona más amplia, lo que propiciaba una mayor resiliencia a la sequía, una dieta más diversa y cosechas más grandes, que luego podían vender para obtener una ganancia.
- **Adaptación al cambio climático (todas las partes interesadas):** Al momento de la visita, la región de Potosí estaba sufriendo una sequía que tenía un claro impacto en los medios de subsistencia rurales. Las comunidades señalaron que, en muchos casos, sus sistemas de riego se habían secado, las plagas proliferaban debido al debilitamiento de los árboles frutales y los cultivos de secano no habían prosperado. En los últimos años, además, las grandes inundaciones

[16] Ministerio de Planificación del Desarrollo (2021), Plan de Desarrollo Económico y Social 2021-2025.

y las granizadas eran más frecuentes, lo que dañaba los cultivos (en menor medida en los sistemas de agrosilvicultura). En los humedales del Pantanal situados en la región sudoriental del país (uno de los objetivos del "Proyecto de Cooperación Transfronteriza para la Conservación, el Desarrollo Sostenible y la Gestión Integrada del Pantanal y la Cuenca del Alto Paraguay"; número de identificación del FMAM: 10554), la sequía combinada con incendios descontrolados está ocasionando una disminución del acceso al agua y está dañando los cultivos. En la cuenca del Amazonas (en la que se centra el proyecto del FMAM 9770) y en otras zonas de la región oriental húmeda del país, las inundaciones son el fenómeno atmosférico extremo más común.

- **Sedimentación/degradación de la tierra (todas las partes interesadas):** A raíz del ecosistema semiárido y las grandes lluvias, la región montañosa visitada en Bolivia estaba afectada por un alto grado de erosión del suelo en las zonas escarpadas, lo que causaba deslizamientos de tierra, acumulación de sedimentos en los valles y degradación de la tierra en general, y se podía observar en los profundos surcos y quebradas que marcaban las zonas ribereñas (especialmente notables en el valle central de Tarija). Esto genera una pérdida de la capa vegetal fértil en las zonas agrícolas escarpadas y la pérdida de tierras fértiles en los valles debido a la acumulación de arena y de otros sedimentos arrastrados por las lluvias, por no mencionar los deslizamientos de tierra y las inundaciones que ponen en peligro las propiedades y la vida humana.
- **Control de la contaminación del agua (todas las partes interesadas):** Dado que el país está situado aguas arriba en la cuenca del Plata, los desechos de la minería y los sedimentos provenientes de la zona occidental montañosa de Bolivia afectan marcadamente la calidad del agua, no solo en la zona sudoriental del país situada aguas abajo, sino también en Paraguay, Argentina y Brasil. A raíz de ello, la necesidad de abordar estas dos grandes fuentes de contaminación constituye una prioridad transnacional, así como una prioridad nacional. En la zona sudoriental de Bolivia, muchas comunidades indígenas que dependen de la pesca para su alimentación y como medio de subsistencia han observado que el agua está contaminada con metales pesados provenientes de la actividad minera. En el valle central de Tarija no existe un sistema confiable de tratamiento del agua residual urbana. En consecuencia, en algunos sistemas de riego, el agua residual tratada de manera deficiente se mezcla con el agua de riego que se utiliza para los cultivos de alto valor, en particular los viñedos y otros árboles frutales.
- **Planificación integrada del paisaje (Gobierno nacional y Gobiernos regionales):** El Gobierno de Bolivia está avanzando hacia una gestión más integrada del paisaje a través de sus estrategias y planes nacionales, coordinados principalmente en el marco del Plan de Desarrollo Económico y Social 2021-2025, elaborado por el Ministerio de Planificación del Desarrollo (que, además, es el coordinador a nivel político y de operaciones del FMAM). Asimismo, el Gobierno ha implementado un Plan Sectorial de Desarrollo Integral y un Plan Nacional de Cuencas, que promueve estrategias a nivel de las cuencas que trascienden las fronteras políticas, como el Plan Maestro de la Cuenca del Guadalquivir en la zona de Tarija. A nivel regional y local, los Planes Territoriales de Desarrollo Integral son documentos de planificación fundamentales.
- **Financiamiento para aumentar las medidas relacionadas con otras prioridades (todas las partes interesadas):** Todas las comunidades rurales señalaron que no contaban con financiamiento para ampliar las actividades de microrriego, de control de la erosión y de almacenamiento de agua (depósitos de almacenaje y recolección de agua). Con ese fin, se necesitaban nuevas intervenciones que llegaran a más familias y comunidades que los proyectos

recientes, los que, en su opinión, eran proyectos piloto limitados. Las partes interesadas del Gobierno nacional y los Gobiernos locales reconocieron que esto era sumamente necesario (y, por cierto, han establecido diversos programas que abordan estas cuestiones, entre ellos Mi Agua, Mi Riego y Mi Árbol), pero manifestaron que carecían de recursos para ampliar las actividades de modo de satisfacer por completo estas necesidades. Por su parte, los funcionarios del Gobierno nacional indicaron su interés en que se llevaran a cabo más actividades sobre el terreno como parte de los proyectos del área de aguas internacionales, a fin de pasar de la elaboración de diagnósticos y planes en el marco del análisis de diagnóstico transfronterizo (ADT) y el programa de acciones estratégicas (PAE) a la implementación de las actividades del PAE.

- **Monitoreo de los recursos hídricos (Gobierno nacional y Gobiernos locales):** Se señaló que el número de estaciones de monitoreo de agua de Bolivia en la cuenca del río de la Plata era relativamente menor que el de los otros países que la integraban (que también tienen más territorio en la cuenca) y que sería conveniente contar con una red más densa. En el municipio de Cotagaita, que forma parte de la cuenca, los funcionarios locales explicaron que no podían mantener adecuadamente su equipo de monitoreo debido a la falta de presupuesto. Además, indicaron que el monitoreo del agua subterránea era deficiente porque su costo era más elevado. La información que poseen las partes interesadas acerca de los principales acuíferos del país es relativamente escasa en comparación con la relativa al agua superficial. A su vez, las partes interesadas locales deseaban contar con un inventario más amplio de las fuentes de agua de su región a fin de planificar mejor los proyectos de riego.
- **Biodiversidad de los ecosistemas acuáticos (Gobierno nacional):** Las partes interesadas del Gobierno nacional señalaron su interés en lograr una mayor integración de la biodiversidad acuática y ribereña en los proyectos regionales del área de aguas internacionales, como las cuestiones relativas al consumo de pescado y la contaminación del agua.

b. Pertinencia de los proyectos del FMAM en lo referente a las necesidades y las prioridades de las partes interesadas en Bolivia

Las partes interesadas locales entrevistadas indicaron que el nivel de consulta en las etapas de diseño de los proyectos en curso del FMAM no había sido uniforme. En la región de Cotagaita, las partes interesadas locales no conocían el proyecto en curso en la cuenca del río de la Plata (“Preparación del Terreno para la Implementación del Programa de Acciones Estratégicas para la Cuenca del Plata”; número de identificación del FMAM: 10035), ni los documentos del ADT y del PAE para la cuenca en su conjunto (tampoco recordaban con claridad el Proyecto Marco de la Cuenca del Plata). El Proyecto de la Cuenca del Plata, actualmente en curso, se considera un proyecto “puente” debido a que es pequeño y su alcance solo abarca trabajar con los Gobiernos nacionales y el CIC, organización transfronteriza que precede la labor del FMAM en la cuenca, para mejorar la coordinación de los datos y una herramienta de apoyo en línea al proceso decisorio, por lo cual no sorprende que las partes interesadas locales no lo conocieran. De igual modo, las partes interesadas del Proyecto Pantanal indicaron que en la etapa de diseño intervinieron, principalmente, los Gobiernos y que, en general, se realizarán estudios de referencia durante la ejecución.

Con respecto al Proyecto de la Cuenca del Guadalquivir, sin embargo, la mayoría de las partes interesadas locales entrevistadas resaltaron que durante la etapa de diseño habían recibido información

acerca de las actividades previstas. Asimismo, el organismo del FMAM, la Organización de las Naciones Unidas para la Alimentación y la Agricultura (FAO), había contratado a una ONG local, PROMETA, para que llevara a cabo un proceso de participación comunitaria durante la etapa de diseño a fin de conocer los problemas importantes que afectaban a las diversas zonas rurales de la cuenca. Este proyecto, que tiene un alcance geográfico menor que el de los proyectos del área de aguas internacionales en la región, resultó más adecuado para implementar un proceso específico de participación de las partes interesadas.

Las partes interesadas del Gobierno nacional estaban al tanto de todos los proyectos incluidos en el estudio de caso, en particular los funcionarios del Ministerio de Medio Ambiente y Agua (MMAyA) y del Ministerio de Relaciones Exteriores (en el caso de los proyectos del área de aguas internacionales), que históricamente han sido los ministerios más involucrados en la ejecución de proyectos del FMAM. El Ministerio de Planificación del Desarrollo, que en la actualidad es el coordinador del FMAM, cumple funciones de coordinación y seguimiento con la finalidad de verificar que los proyectos del FMAM estén armonizados con las estrategias nacionales y se ejecuten de manera oportuna. Las partes interesadas nacionales señalaron que se había registrado una mejora reciente en los proyectos del FMAM en lo referente a la participación del Gobierno nacional en el diseño de los proyectos, ya que históricamente los organismos del FMAM diseñaban los proyectos y solo los presentaban a los ministerios para que estos los examinaran superficialmente y los firmaran. El Proyecto de la Cuenca del Guadalquivir se mencionó como ejemplo de un proyecto inclusivo diseñado por varios ministerios.

Asimismo, los funcionarios del Gobierno nacional aclararon que, si bien a menudo habían deseado modificar el diseño de los proyectos del FMAM en etapas posteriores, con frecuencia no lo habían podido hacer debido a que el FMAM no permitía modificar los componentes cuando el proceso ya estaba en marcha. Señalaron también que las etapas de diseño de los proyectos del FMAM suelen ser prolongadas y que, algunas veces, las prioridades nacionales cambian en el curso de uno o dos años. Como ejemplo de un proyecto relacionado con el agua, mencionaron el “Proyecto de Gestión Integrada de los Recursos Hídricos del Sistema Titicaca-Desaguadero-Poopó-Salar de Coipasa” (número de identificación del FMAM: 5748), en cuyo marco hubieran deseado destinar más fondos a la zona del lago Poopó, dado que se había convertido en prioritaria cuando finalizó la etapa de diseño.

En general, en los proyectos del FMAM se abordaron las prioridades de las partes interesadas de manera adecuada. Si bien el FMAM no financia grandes proyectos de **infraestructura de almacenamiento de agua**, en varios de los proyectos incluidos en el estudio de caso se financió el desarrollo y la mejora de infraestructura de microrriego, en particular en el Proyecto EVA, en cuyo marco se crearon parcelas demostrativas de manejo integral (PDMI) en muchas comunidades situadas en el norte del departamento de Potosí y en el sur del departamento de Oruro. El Proyecto de la Cuenca del Guadalquivir contiene planes para realizar este tipo de obras de microrriego y almacenamiento de agua, junto con actividades de **control de la erosión** (también comunes en el Proyecto EVA y, en menor medida, en el PAE del Proyecto Marco), incluida la forestación en las zonas escarpadas afectadas por la erosión, la construcción de terrazas y la agrosilvicultura. Estas obras contribuyen de manera inherente a la **adaptación al cambio climático**, dado que las obras de riego generan resiliencia a las sequías y el control de la erosión a las inundaciones. La adaptación al cambio climático es un componente muy importante del Proyecto de la Cuenca del Río Amazonas, en cuyo marco se prevé crear sistemas de pronosticación y alerta para fenómenos extremos, así como utilizar la infraestructura natural para proteger a las comunidades y los ecosistemas frente a los impactos de las inundaciones y las sequías.

En los proyectos del área de aguas internacionales incluidos en el estudio de caso y en el Proyecto de la Cuenca del Guadalquivir se utiliza esencialmente la **planificación integrada del paisaje** debido a su enfoque de planificación centrado en las cuencas, que abarca varios sectores, entre ellos la agricultura, la infraestructura de agua potable y de aguas residuales, la planificación del uso de la tierra y la biodiversidad.

Algunos de los proyectos incluidos en el estudio de caso contienen elementos de **financiamiento para ampliar** las actividades de almacenamiento de agua y de control de la erosión. El ejemplo más destacado es el Proyecto de la Cuenca del Guadalquivir, que consta de un componente totalmente dedicado a la creación de un Fondo de Agua de Tarija, que recibirá financiamiento de varias fuentes, entre ellas la empresa pública de agua potable, cooperativas vitivinícolas privadas, donantes internacionales para el desarrollo y Gobiernos municipales, para financiar medidas de protección de la cuenca e intervenciones conexas. El Proyecto de la Cuenca del Río Amazonas, que se encuentra en la etapa de implementación del PAE, también incluye elementos de financiamiento, así como planes para crear mecanismos de financiamiento basados en incentivos para la gestión integrada de los recursos hídricos, mientras que el objetivo del Proyecto Pantanal consiste en elaborar una estrategia de financiamiento sostenible para respaldar la implementación del PAE.

El **monitoreo del agua** también es un elemento común en los proyectos del área de aguas internacionales: el Proyecto Marco de la Cuenca del Plata estableció su proyecto piloto de la cuenca del Pilcomayo para crear una red de monitoreo del agua, a la vez que el objetivo del Proyecto Puente de la Cuenca del Plata consiste en mejorar la herramienta de apoyo en línea al proceso decisorio, que incluye los datos del monitoreo. Además, es un componente importante del Proyecto Pantanal y del Proyecto de la Cuenca del Río Amazonas.

La **biodiversidad de los ecosistemas acuáticos** no fue un tema común en los proyectos incluidos en el estudio de caso. En el Proyecto EVA se abordó la biodiversidad de los cultivos autóctonos, pero no se tuvieron en cuenta los sistemas acuáticos. En el Proyecto Pantanal se registra la mayor intersección con la biodiversidad en el contexto de sus planes para proponer un marco de gestión mejorada y protección del ecosistema acuático de los humedales.

c. Colaboración y coherencia entre los proyectos incluidos en el estudio de caso y otras iniciativas relacionadas con la seguridad hídrica

Las partes interesadas del Gobierno nacional consideraban que los proyectos del FMAM se ajustaban cada vez más a las estrategias y los planes nacionales. Desde el traslado de la oficina del coordinador del FMAM al Ministerio de Planificación del Desarrollo, el ministerio está adoptando medidas para garantizar que todos los nuevos proyectos del FMAM estén alineados con el Plan de Desarrollo Económico y Social 2021-2025. Asimismo, el Gobierno de Bolivia cuenta con numerosos mecanismos de planificación a nivel de las cuencas que son coherentes con el enfoque del área de aguas internacionales. Por ejemplo, la labor del Proyecto Marco de la Cuenca del Plata fue útil para elaborar la clasificación de los cuerpos de agua de la cuenca del Cotagaita, que tiene carácter de ley nacional y se emplea para clasificar los ríos según diversos tipos de uso. La clasificación de Cotagaita fue una de las primeras que se terminó a nivel nacional. A través de los programas gubernamentales Mi Agua y Mi Riego, se llevan a cabo actividades muy similares a algunas de las actividades de gestión sostenible del paisaje que se realizan en el Proyecto EVA, el Proyecto de la Cuenca del Guadalquivir y otros proyectos

del FMAM. Sin embargo, no se puede establecer con claridad que los proyectos del FMAM estén coordinados de algún modo con dichos programas nacionales en términos del fortalecimiento conjunto de la capacidad o la coordinación en las zonas geográficas cubiertas.

Se encontró poca evidencia de que los proyectos terminados colaboraran estrechamente con otras iniciativas que no han contado con el apoyo y financiamiento del FMAM. Si bien inicialmente se suponía que el Proyecto EVA recibiría un monto importante de cofinanciamiento y que existiría una superposición entre su estructura administrativa y el Programa de Apoyos Directos para la Creación de Iniciativas Agroalimentarias Rurales (CRIAR), financiado por el Banco Interamericano de Desarrollo (BID), en la evaluación final se observó que estas estructuras de coordinación no se habían creado y que no existía ninguna superposición geográfica entre los dos proyectos, lo que redujo el cofinanciamiento obtenido para el Proyecto EVA. A raíz de ello, es posible que se hayan perdido oportunidades de ampliar los resultados a otras comunidades y de incorporar más conocimientos técnicos especializados en la producción agrícola para complementar los proyectos de microrriego.

En la evaluación final del Proyecto Marco de la Cuenca del Plata, se señaló que el proyecto se había basado en proyectos existentes “vinculados” a otras iniciativas del FMAM (entre ellas, un proyecto sobre la implementación del PAE del río Bermejo [número de identificación del FMAM: 886]; un proyecto precursor terminado focalizado en el ecosistema del Pantanal en Brasil [número de identificación del FMAM: 583]; un proyecto sobre el frente marítimo del río de la Plata en Argentina [número de identificación del FMAM: 3519], y un proyecto terminado en el ecosistema del Chaco [número de identificación del FMAM: 2505]), pero no se incluyeron detalles acerca de dichos vínculos. Dado que los ecosistemas del Bermejo, del Pantanal y del Chaco forman parte de la cuenca del Plata, los mencionados proyectos podrían haber sido una buena fuente de datos para la elaboración del ADT y el PAE del Proyecto Marco de la Cuenca del Plata y podrían haber contribuido a los proyectos piloto, como el correspondiente a la cuenca del Pilcomayo.

Los documentos de diseño del Proyecto Puente de la Cuenca del Plata contenían una extensa lista de lecciones derivadas del Proyecto Marco de la Cuenca del Plata, que en su mayoría estaban relacionadas con la gestión de proyectos y con las prácticas para mejorar las relaciones y la cooperación intergubernamental. Las lecciones indicaron que los países deben llegar a un consenso en la etapa de diseño respecto de la estructura de ejecución y las responsabilidades de los principales actores, que se debe establecer claramente el número de actividades que se llevarán a cabo y que un alto nivel de identificación nacional favorece la sostenibilidad y las actividades futuras.

Por otra parte, la mayoría de los proyectos en curso señalaron que conocían los otros proyectos en curso en sus sectores y zonas geográficas, pero no incluyeron planes detallados acerca del modo en que se encararía la colaboración. El Proyecto Puente de la Cuenca del Plata indicó que muchos de los mencionados proyectos del FMAM, como el Proyecto Marco de la Cuenca del Plata, que incluía el proyecto terminado de la cuenca del Bermejo (que forma parte de la cuenca del Plata), el proyecto sobre el frente marítimo del río de la Plata y el proyecto terminado sobre los ecosistemas del Chaco, y un proyecto de alcance mundial sobre la elaboración de una herramienta relacionada con la variabilidad del clima (número de identificación del FMAM: 4533), eran proyectos clave del FMAM en la cuenca del Plata, junto con un proyecto financiado por la Unión Europea que tenía por objeto elaborar un plan maestro para la cuenca del Pilcomayo.

El FMAM aún está muy activo en el sector boliviano de la cuenca del Plata (figure 5), teniendo en cuenta los proyectos terminados del Bermejo, el Chaco y el Pantanal, así como los proyectos en curso o inminentes en las tres áreas (otro proyecto del área de aguas internacionales en el Bermejo, que se encuentra en la etapa de diseño [número de identificación del FMAM: 10995]; un proyecto en curso sobre biodiversidad autóctona y gestión forestal en el Chaco boliviano [número de identificación del FMAM: 10393], y el Proyecto Pantanal incluido en el estudio de caso) y el Proyecto de la Cuenca del Guadalquivir. Además, se está diseñando otro proyecto del área de aguas internacionales en la cuenca del Plata, que complementará el Proyecto Puente de la Cuenca del Plata y se centrará en mayor medida en la implementación del PAE (número de identificación del FMAM: 11053). Dado que en el programa del área de aguas internacionales que abarca toda la cuenca del Plata se avanza hacia la implementación del PAE, existe una gran oportunidad de integrar en el programa de implementación algunas de estas iniciativas más pequeñas que se están llevando a cabo en partes de dicha cuenca, y de utilizar los programas más grandes para cubrir las deficiencias en las zonas en las que aún no hay proyectos en curso.

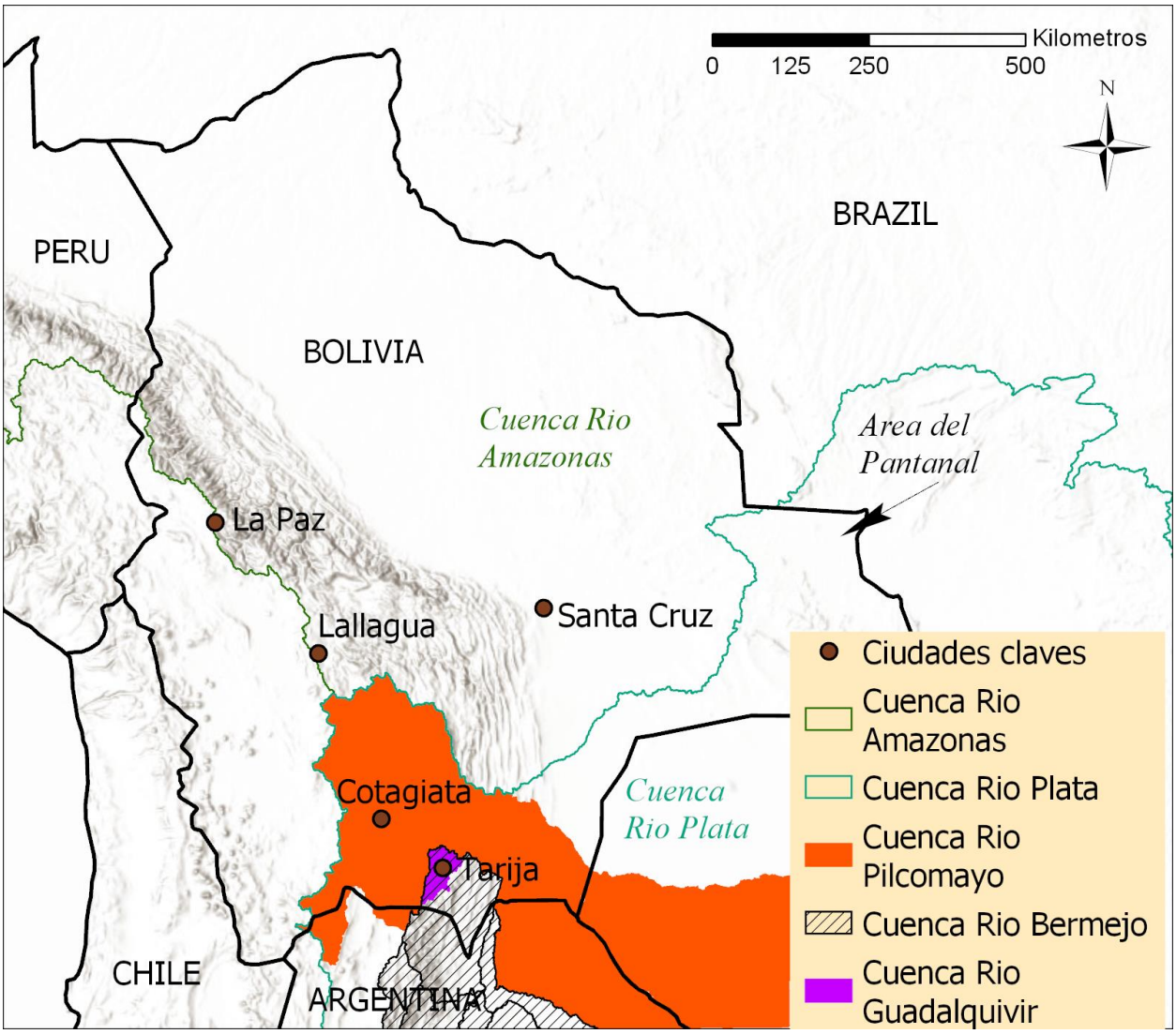

Figura 8. Principales lugares y cuencas donde los proyectos incluidos en el estudio de caso se centran en Bolivia

El Proyecto de la Cuenca del Guadalquivir se basa claramente en otras iniciativas que no corresponden al FMAM en el valle central de Tarija. En primer lugar, la Agencia Alemana de Cooperación Internacional (GIZ) está ejecutando un proyecto denominado PROCUENCA que aborda el desarrollo rural integrado utilizando un enfoque de cuencas e incluye a la cuenca del Guadalquivir entre sus objetivos. El proyecto, que comenzó en 2018 y terminará a fines de 2023, ha realizado varias actividades, entre ellas la elaboración de la Plataforma Interinstitucional de la Cuenca del Río Guadalquivir y la creación en línea del Sistema de Información Hídrica de Tarija (SIHITA). En los documentos de diseño del Proyecto del FMAM en la Cuenca del Guadalquivir, se incluyen planes específicos para fortalecer los grupos de trabajo técnico de la plataforma y para utilizarla como el principal órgano a cargo de la participación de las partes interesadas y de la dirección en lo referente a las principales decisiones sobre gestión de la cuenca. Asimismo, otro de sus objetivos consiste en mantener y consolidar el SIHITA. En segundo lugar, las partes interesadas locales consideran que el componente del proyecto relacionado con la creación del Fondo de Agua de Tarija es la culminación de muchos años de trabajo para alcanzar esa meta. La labor se aceleró en los últimos tiempos gracias a la empresa pública de agua potable local, COSAALT, y a la Fundación Natura, que recientemente fueron las primeras en capitalizar un fondo de agua para la protección de la Reserva Biológica de la Cordillera de Sama y la cadena montañosa que la rodea, de donde proviene el agua potable del valle. El proyecto incluido en el estudio de caso confía en que se podrá basar en el éxito del fondo creado por COSAALT y Natura para atraer nuevos donantes (incluso capital simiente del proyecto del FMAM) y elaborar un marco general para financiar la protección de la cuenca o proyectos conexos con el fondo.

La cuenca del río Amazonas es otra zona con amplio financiamiento del FMAM y de otros donantes relacionado con la seguridad hídrica. En el Proyecto de la Cuenca del Río Amazonas incluido en el estudio de caso se observan al menos 11 proyectos pertinentes del FMAM tan solo en la región, incluida la segunda etapa del Programa Paisajes Sostenibles de la Amazonia (PSA) (número de identificación del FMAM para la primera etapa: 9272; número de identificación del FMAM para la segunda etapa: 10198). No obstante, en el proyecto no se observan vinculaciones con el programa PSA en Bolivia, y las partes interesadas nacionales indican que dicho programa no se concentra en los recursos hídricos. La colaboración entre el proyecto incluido en el estudio de caso y el PSA ofrece una oportunidad importante para garantizar la coordinación entre un programa basado en el paisaje y un proyecto basado en una cuenca con el mismo alcance geográfico.

d. Medidas relacionadas con cuestiones de género y con la seguridad hídrica de las poblaciones vulnerables

Los dos proyectos terminados incluidos en el estudio de caso no se centraban específicamente en las cuestiones de género, pero el Proyecto EVA, en particular, entrañaba una clara participación de las mujeres como beneficiarias, aunque no estaba focalizado en ellas de manera específica. Esto obedeció a uno de los principales elementos de género relacionados con la seguridad hídrica mencionados por las partes interesadas, quienes explicaron que en las tierras altas de Bolivia los hombres de las zonas rurales suelen migrar según la estación por razones de trabajo, y las mujeres quedan a cargo del manejo de los cultivos y del agua en la comunidad. En muchos casos, las mujeres recibieron beneficios del Proyecto EVA y señalaron de manera específica que la construcción de sistemas de microrriego había generado un aumento de la producción agrícola y de la diversidad de alimentos que ellas y sus familias ingerían.

Además, como podían vender la producción excedente en el mercado, su poder económico aumentó en comparación con el que tenían antes del proyecto.

En los proyectos más recientes incluidos en el estudio de caso se adoptaron muchas más medidas para incluir las cuestiones de género en el diseño, en consonancia con la Política sobre la Igualdad de Género del FMAM[17]. Todos contienen una combinación de análisis de género y planes de acción sobre cuestiones de género, y suelen incluir el género a través de indicadores desglosados por sexo, en particular en lo referente a las actividades de capacitación y concientización, la promoción de una mayor representación de las mujeres en el proceso decisorio y en los órganos rectores, y los cursos específicos para crear conciencia acerca de las cuestiones de género en la gestión de los recursos hídricos. Como ejemplo cabe citar un programa de capacitación en ciencias con perspectiva de género dirigido a los ciudadanos en el marco del Proyecto de la Cuenca del Río Amazonas, y una estrategia empresarial en materia de producción familiar para financiar iniciativas de producción en pequeña escala en el Proyecto de la Cuenca del Guadalquivir, en la que se priorizará el financiamiento de proyectos impulsados por mujeres.

Los pueblos indígenas conforman grandes segmentos de la población en todas las zonas en las que se están llevando o se llevaron a cabo los proyectos incluidos en el estudio de caso, con la salvedad del valle central de Tarija, donde las partes interesadas locales no identificaron a ningún grupo vulnerable en particular (algunas de ellas consideraron que las personas más alejadas de las fuentes de agua eran el único "grupo" vulnerable, lo que puso de relieve la importancia de la seguridad hídrica). En la zona norte de Potosí y la zona sur de Oruro del Proyecto EVA, los grupos indígenas quechua y aimara constituían la amplia mayoría de la población. En el marco del proyecto, se trabajó de manera satisfactoria a través de la red de gobernanza indígena formada por Ayllus, que ayudó a organizar las actividades del proyecto y a lograr la participación de las partes interesadas. En un principio, el proyecto no tenía personal situado en la región, y el personal no hablaba las lenguas locales. No obstante, el traslado del emplazamiento del proyecto a Llallagua y la contratación de técnicos locales que hablaban con fluidez el aimara y el quechua permitieron mejorar marcadamente la participación de la comunidad. El proyecto también contrató una estación de radio local, Pío XII, que transmitió programas de concientización y educación en quechua para llegar mejor a las comunidades locales. Además, el proyecto respaldó los planes de los Ayllus para la gestión del uso de la tierra, que según indicaron las partes interesadas todavía se utilizan actualmente.

Si bien los proyectos en curso se centran menos en los pueblos indígenas, se considera que estos son partes interesadas clave cuya participación se debe lograr a través de actividades locales y de concientización. En la cuenca del Plata, en la zona del bajo Pilcomayo existe una extensa población guaraní que depende de la pesca, la que se ha visto afectada por la contaminación con metales pesados. En el Proyecto Pantanal, se procurará atraer a los pueblos indígenas ayoreo y chiquitano a través de la participación en actividades y en la coordinación de proyectos piloto, y mediante actividades de concientización a nivel local. En la cuenca del Amazonas, en el proyecto se indica que, si bien "los pueblos indígenas no son beneficiarios directos", a pesar de la gran presencia de dichos grupos en la cuenca, de todos modos se los incluirá en los eventos de participación pública y concientización.

[17] FMAM (2017), Política sobre la Igualdad de Género. Política SD/PL/02, aprobada el 30 de noviembre de 2017.

3. Logros en materia de seguridad hídrica y su sostenibilidad

a. Resultados de los proyectos incluidos en el estudio de caso relacionados con la seguridad hídrica

El Proyecto Marco de la Cuenca del Plata, uno de los más grandes incluidos en el estudio de caso, contenía una extensa lista de resultados y productos previstos (casi todos relacionados con la seguridad hídrica, al menos de manera indirecta). En la evaluación final del proyecto se estableció que, si bien se habían producido algunos avances en cada producto, en muchos casos estos no se habían concretado totalmente (table 6). La mayoría de los productos previstos se vinculaban con las relaciones transfronterizas en materia de gestión de cuencas entre los países, e incluían el mejoramiento de la gobernanza; la realización de estudios hidrológicos científicos para entender las condiciones de base, como el balance hídrico, la degradación de la tierra y las condiciones de las aguas subterráneas, y la creación de un sistema en línea de apoyo al proceso decisorio con conjuntos de datos espaciales visuales. Además, a través del proyecto se llevó a cabo una serie de proyectos piloto, uno de los cuales se ejecutó en el segmento boliviano de la cuenca del Pilcomayo. Aunque se creó el sistema de apoyo, en la evaluación final se estableció que no estaba en funcionamiento al finalizar el proyecto. Durante el proyecto, los países comenzaron a intercambiar información sobre la calidad del agua, pero el número de campañas de monitoreo fue inferior al previsto y, si bien las actividades de demostración relacionadas con las aguas subterráneas planificadas para el sistema de acuíferos Yrenda-Toba-Tarijeño (SAYTT), que abarca parte de la región sudoriental de Bolivia, incluyeron un estudio de diagnóstico hidrogeológico, no se elaboraron directrices sobre la gestión integrada de las aguas superficiales y subterráneas.

A través del proyecto piloto de la cuenca del Pilcomayo, también se llevaron a cabo algunas actividades en Bolivia, pero no todas las que se habían previsto originalmente. En el estudio de caso se utilizaron principalmente estudios y planes informativos, en particular un plan de monitoreo de la calidad del agua para la cuenca del Cotagaita, que incluyó una priorización espacial de los lugares más adecuados para establecer las estaciones de monitoreo. Además, el informe sobre el estudio del proyecto piloto incluyó un diagnóstico biofísico y socioeconómico de la cuenca del Cotagaita, las actividades propuestas para reducir la erosión del suelo y la creación del Comité Social de Gestión de la Cuenca del Río Cotagaita. Sin embargo, no se abordó uno de los principales objetivos originales del proyecto piloto, que consistía en elaborar un plan para gestionar los relaves del antiguo dique de colas Tasna-Buen Retiro. Por otra parte, en la evaluación final se señaló que no existían evidencias de un manual de mejores prácticas basado en las sesiones de capacitación sobre la reducción de la erosión, la reforestación y las prácticas de gestión de los recursos hídricos, que se llevaron a cabo con los agricultores.

Cuadro 11. Resumen de los resultados en comparación con los productos previstos del Proyecto Marco de la Cuenca del Plata (número de identificación del FMAM: 2095)

Productos previstos* del Proyecto Marco de la Cuenca del Plata	Productos reales (al finalizar el proyecto)
1.1 Fortalecimiento de la capacidad institucional técnica para la gestión integrada de los recursos hídricos de la cuenca del Plata.	**Logrado parcialmente**: Se propuso la aprobación de un marco jurídico conceptual flexible de la gestión integrada de los recursos hídricos transfronterizos. Aunque el CIC tenía acceso al sistema de apoyo al proceso decisorio, dicho sistema no estaba en línea ni en funcionamiento al cierre del proyecto.
1.2 Participación de la sociedad civil y las partes interesadas locales.	**Logrado parcialmente**: El programa educativo de concientización pública no se llevó a cabo a nivel de la cuenca, sino que formó parte de los proyectos piloto.
2.1 Creación de un balance hídrico integrado de la oferta y la demanda.	**Logrado parcialmente**: Se elaboró la metodología de balance hídrico integrado, pero el instrumento de balance hídrico integrado de la oferta y la demanda no se puso en práctica.
2.2 Intercambio de información sobre la calidad del agua entre las instituciones ribereñas.	**Logrado parcialmente**: Las instituciones ribereñas intercambiaron información parcial sobre la calidad del agua. El número de campañas de monitoreo fue inferior al previsto (en total fueron dos, en vez de cuatro al año). Se completó una guía metodológica para la evaluación de la calidad del agua, que fue aprobada por los países.
2.3 Planificación y ejecución de las actividades prioritarias del sistema de acuíferos Yrenda-Toba-Tarijeño.	**Logrado parcialmente**: Se llevó a cabo, en forma conjunta, un estudio de diagnóstico hidrogeológico del acuífero, que permitió elaborar una base de datos integrada y mapas geológicos e hidrogeológicos. No se elaboraron directrices para la gestión integrada de las aguas superficiales y subterráneas.
2.5 Preparación de un análisis de diagnóstico de la degradación de la tierra, para su aprobación por los países de la cuenca del Plata. Elaboración de una estrategia de control de la degradación de la tierra en toda la cuenca, para su inclusión en el PAE.	**Logrado totalmente**: Se creó una base de datos integrada sobre tipos de suelo; se elaboró un mapa del uso de la tierra y la cubierta vegetal; se realizó un análisis de diagnóstico sobre la degradación y la erosión de la tierra con un mapa del grado de erosión, y se elaboraron estimaciones de la producción de sedimentos teniendo en cuenta escenarios climáticos actuales y futuros. **Logrado parcialmente**: Si bien no se elaboró la estrategia de control de la degradación de la tierra en toda la cuenca, el proyecto formuló directrices para la estrategia de control de la degradación de la tierra en la cuenca del Plata, que fueron aprobadas por cinco países.
2.6 Elaboración de un plan de tecnologías limpias para proteger los recursos hídricos, que incluya la identificación y el mapeo de los planes para su ampliación/repetición, y el financiamiento obtenido.	**Logrado parcialmente**: Se incluyó un programa general de tecnología limpia en el PAE, pero sin planes detallados para su ampliación y repetición. No se obtuvo financiamiento.
2.7 Demostración piloto sobre el control de la contaminación y la erosión en la microcuenca del Cotagaita, en el río Pilcomayo.	**Logrado parcialmente**: Se realizaron varias actividades, entre ellas un diagnóstico biofísico y socioeconómico de la cuenca del Cotagaita; una propuesta para un plan de monitoreo de la calidad del agua, por subcuenca; la consolidación de una red de monitoreo de la calidad

	del agua, y una propuesta de alternativas para reducir la erosión del suelo y la acumulación de sedimentos. Se creó el Comité Social de Gestión de la Cuenca del Río Cotagaita. No se encontró evidencia de un plan de gestión integrada para las cuencas del Tupiza y del Cotagaita, ni de un estudio final de la factibilidad del proyecto para la rehabilitación del dique Tasna-Buen Retiro, ni de actividades de capacitación para agricultores, como así tampoco de un manual de mejores prácticas para reducir la contaminación causada por la minería en las subcuencas. No se elaboró una estrategia de ampliación.
3.1 Elaboración de modelos del riesgo hidrológico y escenarios climáticos para las medidas de adaptación en toda la cuenca que se incluirán en el ADT y el PAE.	**Logrado parcialmente**: A través del proyecto, se elaboraron escenarios de cambio climático utilizando el modelo climático regional ETA y un análisis de las condiciones de sequía, y se incorporaron escenarios de cambio climático. No se encontró evidencia de la formulación del conjunto de medidas de adaptación que se debían incluir en el PAE ni de comunicaciones con el público acerca de las medidas de adaptación que se consideraban eficaces.
4.1 Elaboración de una evaluación hidroclimática para el ADT, y su aprobación por los países ribereños. El PAE para la cuenca del Plata se presenta para su aprobación.	**Logrado totalmente**: Se preparó una versión actualizada del ADT en la que se incorporaron los resultados de la evaluación hidroclimática y se incluyeron estrategias para la utilización sostenible de los recursos terrestres e hídricos. **Logrado parcialmente**: El PAE se elaboró y fue aprobado por el CIC. Sin embargo, no se formularon planes de financiamiento, y el PAE no fue comunicado de la manera adecuada a los asociados internos o externos.

* No se incluyen los productos que no se implementaron en Bolivia.

El Proyecto EVA tenía un alcance más pequeño y, de acuerdo con la evaluación final, logró en mayor medida sus productos previstos, si bien al inicio avanzó con lentitud (table 7). El proyecto estaba dividido en tres grandes componentes. En el primero, se abordó en forma indirecta la seguridad hídrica a través de la catalogación y documentación de la agrobiodiversidad tradicional de las comunidades indígenas situadas en la zona del proyecto. El segundo se centró en el mejoramiento de la planificación del uso de la tierra en los municipios y las estructuras de gobierno de los Ayllus de la comunidad indígena a través de la elaboración de planes municipales de ordenamiento territorial (PMOT) y de estatutos orgánicos de los Ayllus. El tercer componente se centró en la construcción de las PDMI en las comunidades en las que había mejorado la conservación del suelo y del agua. Por lo general, en las PDMI se aplicaba un enfoque esquemático que incluía la plantación de árboles en las “zonas de recarga del acuífero” situadas en los cerros escarpados que rodean las comunidades, la mejora o la instalación de sistemas de microrriego cerca de fuentes de agua y de redes hacia los campos de cultivo y las parcelas agrícolas demostrativas con control de la erosión, agrosilvicultura y plantación de semillas mejoradas.

Las partes interesadas del proyecto coincidieron en que la mayoría de los logros se concretaron en los dos años finales de su ejecución (el proyecto recibió una prórroga de 21 meses), cuando el equipo de gestión del proyecto fue reemplazado y se trasladó a Llallagua (el centro urbano más próximo a las comunidades involucradas) y se contrataron nuevos técnicos locales para mejorar la participación comunitaria. Una vez que se concretaron dichos cambios, el proyecto logró con rapidez muchos éxitos;

por ejemplo, se alcanzaron las metas para la creación de las PDMI, se elaboraron varias publicaciones sobre agrobiodiversidad y se formularon algunos PMOT (aunque solo se adoptaron dos, en Chayanta y Chuquihuta).

Cuadro 12. Resumen de los resultados en comparación con los productos previstos del Proyecto EVA (número de identificación del FMAM: 3831)

Productos previstos del Proyecto EVA	Productos reales (al finalizar el proyecto)
1.1 Sistematización de la agenda de investigación sobre los conocimientos, las prácticas y las técnicas tradicionales de los Ayllus para las estrategias de conservación de la agrobiodiversidad y de adaptación del Proyecto EVA.	**Logrado parcialmente**: Se llevaron a cabo dos estudios sobre agrobiodiversidad, que se publicaron. En la evaluación final no se encontró evidencia respecto de un plan de opciones de adaptación prioritarias.
1.2 Integración de un sistema de información operativo sobre la tierra, el agua, la biodiversidad y las variaciones climáticas del Proyecto EVA, en los sistemas de información nacionales y subnacionales.	**Logrado totalmente**: Se realizaron cuatro estudios importantes para la creación de un sistema de seguimiento y evaluación de la agrobiodiversidad, el suelo, el agua y los efectos del cambio climático, que se puede implementar en un sistema de información espacial.
1.3 Sistemas de seguimiento, evaluación e información geográfica.	**Logrado totalmente**: Se ha creado una base de datos geoespaciales que incluye bases de datos, capas temáticas y al menos 63 mapas temáticos propuestos durante la recopilación de información sobre el terreno. En la evaluación final se señala que la base de datos geoespaciales contiene muchas inexactitudes.
2.1 Fortalecimiento del marco regulatorio mediante marcos regulatorios y seis PMOT.	**Logrado parcialmente**: Las autoridades municipales aprobaron dos planes; se formularon otros cuatro, pero no fueron aprobados.
2.2 Consolidación de dos plataformas de coordinación interinstitucional.	**Logrado parcialmente**: Se creó una plataforma de cooperación institucional. Se entregó el estatuto orgánico a cuatro autoridades originarias.
3.1 Implementación de PDMI.	**Logrado parcialmente**: Se establecieron 93 PDMI, equivalentes a 710 hectáreas de tierra sujetas a un sistema tradicional de gestión y conservación del suelo, con muros de contención y presas de gavión, reforestación, sistemas de microrriego y recolección de agua. No se encontró evidencia de que se hubiera alcanzado el indicador de recuperación del 2 % de los suelos erosionados.
3.2 Concientización, capacitación y promoción del uso de la gestión integrada tradicional en el marco del Proyecto EVA.	**Logrado totalmente**: Se transmitieron 4 anuncios radiales y se realizaron 11 eventos de capacitación y otras publicaciones para divulgar información sobre el cambio climático, las prácticas agrícolas y las reglamentaciones locales.

b. Relación de los resultados con los beneficios para el medio ambiente mundial, los cobeneficios y las consecuencias no previstas

En general, los cuatro proyectos de aguas internacionales incluidos en el estudio de caso son más grandes que los proyectos de otros estudios de casos (con excepción del Proyecto Puente de la Cuenca del Plata) y se centran en mayor medida en mejorar la gestión, el intercambio de conocimientos y la

participación de las partes interesadas gubernamentales. Están relacionados en forma directa con el indicador básico del beneficio para el medio ambiente mundial del área focal de aguas internacionales en el séptimo período de reposición de los recursos del FMAM (FMAM-7): "número de ecosistemas acuáticos compartidos (de agua dulce o marinos) sujetos a una gestión cooperativa nueva o mejorada". En el ámbito del Proyecto Marco de la Cuenca del Plata, se llevaron a cabo varios estudios que permitieron mejorar el ADT de la cuenca y elaborar el PAE, que en la actualidad es la base del futuro proyecto sobre la implementación del PAE en la cuenca del Plata. Estos documentos son fundamentales para mejorar la gestión cooperativa de la cuenca. El proyecto, junto con el Proyecto Puente de la Cuenca del Plata, ha permitido mejorar la capacidad del CIC, el principal comité de la cuenca transfronteriza, lo que permite velar por la gestión a largo plazo. De igual modo, el Proyecto de la Cuenca del Río Amazonas será ejecutado por la Organización del Tratado de Cooperación Amazónica (OTCA), el comité transfronterizo para esa cuenca, y mejorará su capacidad. Algunas partes interesadas del Gobierno nacional de Bolivia consideran que, si bien los proyectos regionales del área de aguas internacionales mejoran las relaciones entre los países, a menudo no proporcionan el mismo volumen de financiamiento a Bolivia y se centran en los países más grandes situados aguas abajo.

El Proyecto EVA y el Proyecto de la Cuenca del Guadalquivir están más relacionados con los beneficios para el medio ambiente mundial del área de degradación de la tierra: "superficie de tierra en la que se aplican prácticas mejoradas" y "superficie de tierra y ecosistemas sujetos a restauración". El tercer componente del Proyecto EVA está relacionado directamente con estos dos indicadores a través de las PDMI, en las que se comenzaron a aplicar prácticas agrícolas mejoradas para evitar la erosión, mantener los suelos, utilizar el agua de manera más eficiente y plantar árboles para fijar el suelo. El Proyecto de la Cuenca del Guadalquivir, que es el más pequeño de los incluidos en el estudio de caso, también se relaciona con los beneficios para el medio ambiente mundial del área de degradación de la tierra a través de su componente que abarca la puesta en marcha de actividades de gestión sostenible de la tierra y de gestión sostenible de la biodiversidad, muchas de las cuales son similares a las actividades del Proyecto EVA, como el microrriego y el control de la erosión.

Asimismo, el Proyecto EVA generó claros cobeneficios relacionados con la seguridad hídrica, que en su mayoría se derivan de la instalación, la mejora y la distribución de sistemas de microrriego. Los sistemas de riego permitieron a los beneficiarios producir una mayor variedad de cultivos, lo que mejoró las dietas y la nutrición de sus familias. A su vez, las cosechas fueron mayores y más numerosas, lo que les permitió vender productos en el mercado y aumentar sus ingresos; asimismo, el riego les permitió diversificar sus medios de subsistencia cultivando flores para la venta y construyendo colmenas de abejas que se alimentaban de las flores y producían miel que los beneficiarios podían vender. El riego también mejoró su resiliencia a las sequías, pues les proporcionaba un depósito de agua cuando los cultivos de secano cumplían su ciclo.

En lo referente a los proyectos incluidos en el estudio de caso, las partes interesadas no mencionaron ninguna consecuencia negativa no deseada en Bolivia.

c. Sostenibilidad de los resultados de los proyectos terminados incluidos en el estudio de caso en el área de seguridad hídrica

La sostenibilidad de los dos proyectos terminados fue muy elevada debido, principalmente, a una combinación de la presencia constante de los donantes y un alto grado de identificación local con las

actividades. La sostenibilidad del Proyecto Marco de la Cuenca del Plata, que finalizó en 2017, obedeció en gran medida a la presencia constante de proyectos del FMAM y de otros donantes (table 8). El Proyecto Puente de la Cuenca del Plata permitió mantener el impulso transfronterizo, que continuará a través del próximo proyecto de implementación del PAE de la cuenca del Plata y la presencia permanente del CIC (situado en Buenos Aires, Argentina). Los funcionarios del Gobierno nacional de Bolivia han continuado trabajando en estas organizaciones transfronterizas de la cuenca del Plata, incluso en los comités de las subcuencas, como la Comisión Trinacional para el Desarrollo de la Cuenca del Río Pilcomayo.

Gracias a las actividades del Proyecto Puente de la Cuenca del Plata, el sistema de apoyo al proceso decisorio ya está funcionando en línea, con un portal de mapas interactivos que contiene varias capas de datos sobre una amplia gama de indicadores ambientales. Este proyecto también contribuyó al PAE mediante la definición de 15 actividades prioritarias y a través de diversas medidas para integrar las actividades del PAE en las estrategias del Gobierno nacional. El proyecto de implementación del PAE deberá comenzar a ejecutar estas actividades con firmeza. Los estudios de referencia y los documentos de estrategia elaborados por el Proyecto Marco de la Cuenca del Plata eran menos conocidos, por ejemplo, el estudio sobre el balance hídrico, las estrategias de degradación de la tierra y la elaboración de modelos del agua. No obstante, el sistema de apoyo al proceso decisorio contribuirá a que estos datos sigan siendo pertinentes y estén disponibles.

Fue difícil encontrar pruebas sólidas del proyecto piloto de la cuenca del Pilcomayo, que forma parte del Proyecto Marco de la Cuenca del Plata, dado que la mayoría de las partes interesadas locales de Cotagaita no conocían el proyecto ni los documentos que se elaboraron en él. Según las partes interesadas, el Comité Social de Gestión de la Cuenca del Río Cotagaita no estaba en funcionamiento. El único resultado del proyecto que conocían era una pequeña plantación de árboles que se realizó en un río seco en Cotagaitilla, un pueblo rural cercano, que se llena de sedimentos cuando llueve. Los árboles plantados en ese lugar todavía estaban vallados y la mayoría estaban vivos y habían alcanzado una altura de alrededor de 2,5 metros (los eucaliptos no autóctonos eran más altos que los pinos autóctonos). El desconocimiento de los resultados del proyecto podría obedecer a la “falta de una estrategia de concientización pública de comunicaciones”, según lo indicado en la evaluación final. En muchos casos, las partes interesadas señalaron que el proyecto no había comunicado bien sus resultados, incluido el proyecto piloto de la cuenca del Pilcomayo.

Gran parte de las actividades generales de gestión de la cuenca del Cotagaita prosiguieron a través del proyecto Gestión Integrada de la Cuenca, de la organización de desarrollo suiza HELVETAS, que llevó a cabo actividades de control de la erosión, monitoreo de la calidad del agua y gestión del agua en la zona hasta 2022. El personal de HELVETAS indicó que los datos de la calidad del agua aportados por el Proyecto Marco de la Cuenca del Plata fueron útiles para orientar la ayuda que HELVETAS proporcionaba al Gobierno municipal y al Gobierno regional de Potosí en la elaboración del documento de clasificación de la calidad del agua para la cuenca del Cotagaita, uno de los primeros documentos de ese tipo en Bolivia (la cuenca se clasificó “clase C”, esto es, apta para riego pero no para uso potable).

Algunas partes interesadas afirmaron que el proyecto le había proporcionado al municipio de Cotagaita un dispositivo de monitoreo de múltiples parámetros. El municipio tenía tres dispositivos, pero sus funcionarios consideraban que todos habían sido proporcionados por el proyecto de HELVETAS. Sin embargo, ninguno de los dispositivos estaba en funcionamiento, pues el municipio carecía de fondos

para comprar baterías y calibrar correctamente los equipos. El seguimiento de los indicadores biológicos de la calidad del agua en la cuenca (esto no incluye los indicadores de metales pesados producidos por desechos de la minería), probablemente utilizando las estaciones de monitoreo establecidas en el plan de monitoreo del proyecto, se seguía llevando a cabo dos veces al año, pero solo cuando llegaban funcionarios del MMAyA con financiamiento y equipos propios.

En general, el personal municipal consideraba que la calidad del agua no había mejorado ni empeorado desde la terminación del Proyecto Marco de la Cuenca del Plata. Manifestaron también que algunos indicadores estaban empeorando y otros mejorando, y que la actividad minera estaba aumentando en la cuenca. La cooperativa minera TASNA, situada en la cuenca, ha construido una planta de tratamiento del agua para procesar sus relaves, lo que constituye una importante mejora (la cooperativa financió la planta de tratamiento con apoyo de donantes distintos del FMAM para el estudio de factibilidad), pero señaló que no dispone de la capacidad necesaria para tratar los relaves antiguos del dique de colas Buen Retiro.

Cuadro 13. Sostenibilidad de los resultados del Proyecto Marco de la Cuenca del Plata después de su terminación, de acuerdo con las evidencias recopiladas en el estudio de caso

Estado de los resultados del Proyecto Marco de la Cuenca del Plata al momento de su terminación	Estado de los resultados durante el estudio de caso	Dirección del cambio desde la terminación del proyecto
1.1 Sistema de apoyo al proceso decisorio y marco jurídico de la gestión integrada de los recursos hídricos: Logrado parcialmente	El sitio web del sistema de apoyo al proceso decisorio está en funcionamiento y cuenta con un mapa interactivo. La función de descarga no parece ser confiable, y algunas páginas temáticas están vacías. El Gobierno de Bolivia se ha beneficiado con el acceso a los datos del monitoreo realizado por otros países, pero resaltó que faltan estaciones bolivianas en la herramienta. Aunque no existía información acerca del marco jurídico de la gestión integrada de los recursos hídricos, Bolivia ha incorporado un enfoque de cuencas en la gestión de la tierra a través del Plan Nacional de Cuencas.	**Mejor**
1.2 Plan de concientización pública: Logrado parcialmente	No se encontró evidencia de los programas de concientización o participación pública en Bolivia.	**Constante**
2.1 Balance hídrico integrado: Logrado parcialmente	Se publicó un informe sobre el balance hídrico integrado en oportunidad de la terminación del proyecto. Las partes interesadas bolivianas estaban al tanto del balance hídrico realizado y, en general, consideraban que era útil, pero no proporcionaron ejemplos concretos del modo en que se había utilizado.	**Constante**
2.2 Intercambio de información sobre la calidad del agua: Logrado parcialmente	El MMAyA cuenta con una red de monitoreo de la calidad del agua, y el proyecto contribuyó a su fortalecimiento. El sistema de apoyo al proceso decisorio permite un mejor intercambio de los datos de la calidad del agua, pero Bolivia tiene pocas estaciones.	**Constante**

	Al parecer, existe poca información para determinar si la calidad del agua ha mejorado en los segmentos bolivianos de la cuenca.	
2.3 Proyecto piloto de gestión de las aguas subterráneas en el SAYTT: Logrado parcialmente	Las partes interesadas no indicaron avances adicionales en los acuíferos del SAYTT; no obstante, se prevé incluirlos en los futuros proyectos del FMAM en la cuenca del Plata.	**Peor**
2.5 Base de datos y estrategia en materia de degradación de la tierra: Logrado totalmente/logrado parcialmente	No se encontraron partes interesadas que conocieran este análisis.	**Peor**
2.6 Programa de tecnología limpia: Logrado parcialmente	El evaluador no formuló preguntas concretas sobre este producto, pero cabe señalar que ninguna de las partes interesadas lo mencionó como un producto del proyecto.	**No se pudo evaluar**
2.7 Proyecto piloto de la cuenca del Pilcomayo: Logrado parcialmente	En gran medida, las actividades de gestión de la cuenca en la región de Cotagaita continuaron a través de la labor de HELVETAS, que destacó la utilidad de los diagnósticos biofísicos y socioeconómicos del proyecto. HELVETAS ha proporcionado apoyo para la prevención de la erosión del suelo y para el monitoreo del agua y ha contribuido a la elaboración del documento de clasificación de los ríos para la cuenca. Si bien el monitoreo ha continuado (probablemente utilizando el plan de monitoreo preparado por el proyecto), solo se ha llevado a cabo a través del MMAyA, debido a que el municipio carece de fondos para calibrar o recargar sus equipos de monitoreo. La calidad del agua en general no parece haber mejorado. Se están ejecutando nuevas actividades mineras, pero algunas cooperativas han construido plantas de control de relaves (TASNA) con ayuda de donantes y con fondos propios. El Comité Social de Gestión de la Cuenca del Río Cotagaita ha dejado de funcionar.	**Mejor**
3.1 Elaboración de modelos hidroclimáticos: Logrado parcialmente	Si bien se han incorporado escenarios climáticos en el sistema de apoyo al proceso decisorio, las partes interesadas no mencionaron los mapas de frecuencia de las inundaciones y de vulnerabilidad como un resultado del proyecto.	**Constante**
4.1 Versión actualizada del ADT y aprobación del PAE: Logrado totalmente/logrado parcialmente	Los funcionarios del Gobierno nacional conocían ampliamente el ADT y el PAE. Estos documentos sientan las bases para proyectos complementarios del FMAM en la cuenca del Plata, que permitirán garantizar la sostenibilidad.	**Mejor**

En el Proyecto EVA, la sostenibilidad no ha sido homogénea. La sostenibilidad de las actividades sobre el terreno ha sido notable, mientras que la de la gestión y el monitoreo de la tierra ha variado (table 9). Las autoridades municipales no parecían conocer los PMOT elaborados por los proyectos, aunque algunos técnicos del proyecto, que en oportunidad del estudio trabajaban como oficiales ambientales en los municipios, señalaron que dichos planes fueron útiles para llevar a cabo la priorización geográfica de los proyectos del Gobierno, al menos en un municipio. Ninguno de los cuatro municipios que no habían aprobado los PMOT antes de la terminación del proyecto los ha aprobado desde entonces. Sin dudas, el cambio de Gobierno incidió en dicha situación, dado que la mayoría de las autoridades municipales entrevistadas habían entrado en funciones después de la finalización del Proyecto EVA. No obstante, las autoridades de los Ayllus conocían los estatutos de gestión de la tierra respaldados por el proyecto y detallaron que los conflictos entre Ayllus por cuestiones relacionadas con los recursos naturales habían disminuido en los últimos años.

La sostenibilidad de las PDMI fue notable. Casi todos los sistemas de riego construidos o mejorados por el proyecto seguían funcionando y eran muy valorados por los beneficiarios (figure 6). En la mayoría de los casos, las comunidades habían establecido comités de riego que se ocupaban del mantenimiento de los sistemas, que eran proyectos sencillos por gravitación, para cuya reparación solo se requerían materiales disponibles en el ámbito local. Los miembros de la comunidad mencionaron muchos ejemplos de los beneficios que habían obtenido gracias al aumento del volumen y la diversidad de la producción agrícola generado por los sistemas desde la terminación del proyecto, y destacaron que estos eran de gran ayuda durante la sequía en curso. De todos modos, aun así la sequía los estaba afectando; en algunos casos, los sistemas de riego no se podían usar temporalmente debido a la falta de agua o a su racionamiento. Algunos árboles frutales estaban infectados por plagas, y los miembros de la comunidad consideraban que esto era causado por la sequía. Algunos vecinos más ricos habían replicado los sistemas de riego mediante la construcción de sus propias geomembranas, en algunos casos con ayuda de diversas ONG.

Figura 9. Ejemplos de sostenibilidad de las actividades comunitarias del Proyecto EVA. En el sentido de las agujas del reloj, desde arriba a la izquierda: una mujer de la comunidad Chucarasi luciendo un collar de flores y vegetales cultivados en tierras agrícolas que cuentan con un sistema de riego proporcionado por el proyecto; barreras vivas y sistema de agrosilvicultura plantados por el proyecto y mejorados por un proyecto posterior con un sistema de riego por goteo en la comunidad Chiru-Chiru; una geomembrana en funcionamiento instalada por el proyecto en la comunidad Walkeri, y una arboleda plantada durante la vigencia del proyecto en la comunidad Chekene.

La plantación de árboles tampoco sufrió modificaciones; la mayoría de los árboles todavía estaban vivos, aunque algunos se perdieron por la quema o el pastoreo. No obstante, los árboles en general todavía eran muy bajos (con alturas que oscilaban entre menos de 1 metro y unos 3 o 4 metros al cabo de 6 a 8 años). Se observó que el terreno era escarpado y seco y que se habían plantado principalmente árboles autóctonos de crecimiento lento (figure 7). Los árboles estaban en mejores condiciones en las comunidades que habían implementado un sistema formal de mantenimiento, en cuyo marco se solía asignar a un miembro de la comunidad, en forma rotativa, para que se ocupara de la poda y vigilara las plantaciones. Los técnicos del proyecto y los miembros de la comunidad hablaron de manera positiva acerca de las plantaciones, que ocupaban entre 1 y 3 hectáreas, y señalaron que los árboles habían aumentado la capacidad de retención del suelo, la recarga del acuífero y la captación de humedad y lluvia. A pesar de ello, debido a que las plantaciones son relativamente pequeñas en comparación con la

vegetación descontrolada que las rodea, compuesta principalmente por el suelo desnudo, maleza desértica y pastos autóctonos, es improbable que los árboles incidan en gran medida en la creación de un microclima húmedo para atraer la lluvia. Asimismo, si bien existen pruebas de que los árboles distribuidos de forma intermitente aumentan la infiltración en las zonas semiáridas[18], es improbable que la recarga de las aguas subterráneas en superficies tan pequeñas sea significativa. De todos modos, se observaron muchos ejemplos de repetición. La plantación de árboles continuó en las comunidades y, de acuerdo con las visitas y las entrevistas, los viveros municipales respaldados o creados por el proyecto todavía estaban en funcionamiento. La ampliación constante debería mejorar el control de la erosión y la recarga del acuífero.

Figura 10. Ejemplos de zonas de plantaciones de árboles antes y después de la intervención del Proyecto EVA. Las imágenes superiores muestran una plantación más exitosa próxima a la comunidad Sunuyo (la imagen superior izquierda es de mayo de 2016 y la superior derecha es de septiembre de 2022); las imágenes inferiores muestran una plantación menos exitosa próxima a la comunidad Llapa Llapa (la imagen inferior izquierda es de junio de 2016 y la inferior derecha es de septiembre de 2021). No obstante, en una visita a dicha comunidad se confirmó que la mayoría de las plántulas estaban vivas, aunque no eran lo suficientemente altas como para que quedaran registradas en las imágenes.

[18] Ilstedt U., Bargués Tobella A., Bazié H. R., Bayala J., Verbeeten E., Nyberg G., Sanou J., Benegas L., Murdiyarso D., Laudon H., Sheil D. y Malmer A. (2016), "Intermediate tree cover can maximize groundwater recharge in the seasonally dry tropics" (La cubierta arbórea intermedia puede maximizar la recarga de las aguas subterráneas en los trópicos estacionalmente secos), *Scientific Reports*: 6 (21930).

En lo referente a la concientización, la estación de radio local Pío XII seguía transmitiendo en forma permanente programas sobre temas de educación ambiental y cambio climático, en particular, sobre la sequía. Los miembros de la comunidad estaban muy familiarizados con los temas referidos al cambio climático y sus efectos en la vida cotidiana. Estaban muy satisfechos con el apoyo constante de las iniciativas de microrriego y plantación de árboles similares al Proyecto EVA y esperaban que se ampliaran a más familias y comunidades.

Cuadro 14. Sostenibilidad de los resultados del Proyecto EVA después de su terminación, de acuerdo con las evidencias recopiladas en el estudio de caso

Estado de los resultados del Proyecto EVA al momento de su terminación	Estado de los resultados durante el estudio de caso	Dirección del cambio desde la terminación del proyecto
1.1 Agenda de investigación sobre la agrobiodiversidad tradicional de los Ayllus: Logrado parcialmente	Las partes interesadas, en particular los técnicos y las autoridades, conocían las publicaciones realizadas en el marco del proyecto, aunque no se pudo establecer claramente si se utilizaban de algún modo. Esas publicaciones son un motivo de orgullo para todas las personas involucradas en el proyecto.	Constante
1.2 Un sistema de información operativo sobre la tierra, el agua, la biodiversidad y las variaciones climáticas: Logrado totalmente	No se encontró evidencia de la existencia de un sistema de seguimiento y evaluación en la zona del proyecto. Los técnicos mencionaron los estudios, pero no se pudo establecer claramente si se utilizaban en la actualidad para realizar algún seguimiento significativo.	Peor
1.3 Sistemas de seguimiento, evaluación e información geográfica: Logrado totalmente	Al parecer, la base de datos geoespaciales no está disponible al público, aunque el personal del proyecto se la entregó al evaluador. Los errores en los emplazamientos de las PDMI no se han corregido.	Peor
2.1 Marcos regulatorios y seis planes municipales de uso de la tierra (PMOT): Logrado parcialmente	Si bien los técnicos del proyecto estaban familiarizados con los PMOT, las autoridades no los conocían cabalmente. El único alcalde que conocía ampliamente el proceso era el alcalde de Llallagua, quien señaló que, aunque el PMOT no se había aprobado en su municipio, estaba en la etapa de revisión. Algunos técnicos mencionaron que los PMOT se habían utilizado para la planificación municipal, pero las autoridades no parecían estar al tanto de dichos planes.	Peor
2.2 Consolidación de dos plataformas de coordinación interinstitucional: Logrado parcialmente	Todo indica que los Ayllus siguen aplicando el estatuto orgánico y que los conflictos entre ellos han disminuido. Las autoridades de los Ayllus destacaron que el proyecto había mejorado su gestión.	Mejor
3.1 Implementación de PDMI: Logrado parcialmente	El mantenimiento de las PDMI visitadas era adecuado: las geomembranas aún funcionaban, los sistemas de riego estaban en buen estado y se seguían produciendo cultivos, aunque la sequía había reducido el volumen de riego disponible y en algunos lugares los sistemas estaban temporalmente fuera de uso por ese motivo. Algunos árboles frutales estaban infectados por una	Mejor

	plaga (posiblemente relacionada con la sequía), pero otros daban fruto y beneficiaban a los miembros de la comunidad. Se observaron algunos casos de replicación de las geomembranas y las terrazas de control de la erosión. Asimismo, la mayoría de las plantaciones forestales estaban vivas y seguían creciendo, aunque algunas lo hacían a un ritmo muy lento. También se observaron casos de replicación de estas plantaciones. Los viveros creados en el marco del proyecto seguían funcionando, y el número de plántulas que producían estaba aumentando.	
3.2 Concientización, capacitación: Logrado totalmente	Después de la terminación del proyecto, la radio Pío XII siguió transmitiendo programas sobre temas ambientales, como el cambio climático y la escasez de agua. Al parecer, los miembros de la comunidad entienden los temas relacionados con el cambio climático y la sequía y notan que el entorno que los rodea está cambiando.	**Constante**

A pesar de la notable sostenibilidad del Proyecto EVA, los miembros de la comunidad y las autoridades locales manifestaron que existía una necesidad constante de nuevo financiamiento para actividades similares. En su opinión, el proyecto era una iniciativa piloto que beneficiaba a un número limitado de familias en algunas comunidades, mientras que muchas familias de sus comunidades y de las comunidades vecinas aún tenían necesidades y sufrían inseguridad hídrica. Su principal deseo era contar con mejor acceso al agua a través de redes de riego ampliadas, mayor infraestructura de almacenamiento de agua y más control de la erosión. Esa necesidad se reflejó en la región de Cotagaita, donde, a pesar del apoyo proporcionado durante varios años por el Proyecto Marco de la Cuenca del Plata y por HELVETAS, los problemas causados por la erosión, la sedimentación, los fenómenos atmosféricos extremos y la calidad del agua eran abrumadores.

Esto pone de manifiesto las dificultades que plantea la ampliación de las actividades orientadas a mejorar la seguridad hídrica una vez que los proyectos han terminado. Ninguno de los proyectos terminados logró elaborar planes de ampliación viables con mecanismos de financiamiento para respaldar un cambio transformador. Los programas gubernamentales, las ONG y los miembros de la comunidad siguen llevando a cabo actividades similares, si bien no en la escala necesaria para controlar realmente estas grandes cuestiones ambientales que enfrentan las comunidades. Además, es posible que la ampliación masiva de la infraestructura de riego en este paisaje semiárido genere extracciones insostenibles de agua y estrés en los ecosistemas naturales que dependen de los cursos de agua intermitentes de la zona.

En el diseño de los proyectos más recientes del FMAM, se han comenzado a incluir mecanismos de financiamiento sostenible y local para intentar abordar esta cuestión relacionada con la ampliación de las actividades de gestión integrada de las cuencas. El Proyecto de la Cuenca del Guadalquivir, en particular, consta de un componente centrado en la creación del Fondo de Agua de Tarija para este único propósito. Asimismo, en el marco del proyecto de implementación del PAE en la cuenca del Plata y del Proyecto de la Cuenca del Río Amazonas, se investigarán otras opciones de financiamiento. La región

de la cuenca del Plata incluso cuenta con un banco de desarrollo, FONPLATA, que se creó junto con el CIC para financiar proyectos en la región.

4. Conclusiones generales

- **Los proyectos del FMAM incluidos en el estudio de caso fueron sumamente pertinentes para las prioridades de Bolivia en materia de seguridad hídrica, entre ellas la mejora del almacenamiento de agua, el control de la erosión y la adaptación al cambio climático.** Los dos proyectos del área focal de degradación de la tierra, el Proyecto EVA y el Proyecto de la Cuenca del Guadalquivir, estaban y están centrados especialmente en mejorar la seguridad hídrica de las comunidades comprendidas en sus zonas geográficas, una medida muy valorada por las partes interesadas locales. Las partes interesadas nacionales y las comisiones transnacionales consideraban que los proyectos del área de aguas internacionales eran sumamente pertinentes (si bien poco conocidos por las partes interesadas locales) debido a su objetivo de mejorar la gestión y las relaciones entre los países vecinos. Las partes interesadas expresaron interés en que los proyectos del área de aguas internacionales incluyeran más inversiones locales a medida que se avanzaba a las etapas de implementación del PAE.
- **A pesar del gran número de proyectos de donantes que se ocupan de los temas relacionados con la seguridad hídrica en Bolivia, en general los proyectos incluidos en el estudio de caso no contenían información detallada sobre medidas de colaboración o coordinación con otras iniciativas.** En la mayoría de los documentos de diseño de los proyectos del estudio de caso se mencionaba una larga lista de intervenciones del FMAM y no correspondientes al FMAM que se superponían con su respectiva zona geográfica y que abarcaban temas relacionados con la gestión del agua. No obstante, en general se proporcionaban pocos detalles acerca del modo en que dichas interacciones funcionaban en la práctica. Esta coordinación reviste especial importancia cuando los proyectos de subcuencas se sitúan en cuencas hidrográficas más grandes, como las cuencas del Guadalquivir y del Bermejo y los humedales del Pantanal, que forman parte de la cuenca más extensa del río de la Plata.
- **En los proyectos más recientes incluidos en el estudio de caso, existe una mejor integración de las cuestiones de género en la seguridad hídrica, mientras que solo el Proyecto EVA se ocupó en forma detallada de los grupos de pueblos indígenas.** Los proyectos del FMAM en curso suelen incluir planes de acción sobre cuestiones de género que se elaboran durante su etapa de diseño, donde las actividades planificadas más comunes abarcan la inclusión de indicadores desglosados por sexo, la participación de las mujeres en eventos de concientización y de capacitación en materia de gestión del agua, la inclusión de las mujeres en los órganos decisorios relacionados con la gestión del agua y la priorización de los grupos de mujeres para el otorgamiento de préstamos en pequeña escala. A pesar de que en casi todas las regiones de Bolivia existen grandes poblaciones indígenas, entre los proyectos incluidos en el estudio de caso, solo el Proyecto EVA trabajó estrechamente con los grupos indígenas, dado que proporcionó apoyo para la gestión de los Ayllus y para la transmisión de programas de radio sobre educación ambiental en idioma quechua.
- **En los proyectos terminados, la sostenibilidad de las actividades sobre el terreno fue muy positiva, pero fue menor en el caso de los planes de gestión y los informes técnicos.** La labor del Proyecto EVA en las comunidades rurales mostró un elevado grado de sostenibilidad porque, en gran medida, las actividades satisfacían las necesidades de los beneficiarios y porque existía

una gran motivación para mantener el trabajo realizado por el proyecto en las áreas de microrriego, agrosilvicultura y plantación de árboles. En la región de Cotagaita, donde el Proyecto Marco de la Cuenca del Plata elaboró un estudio piloto, un proyecto de HELVETAS sigue llevando a cabo las actividades de monitoreo del agua y de control de la erosión realizadas por el proyecto del FMAM. No obstante, al cabo de 6 o 7 años de la terminación de cada proyecto, las partes interesadas locales tenían poca información acerca de los planes municipales de gestión elaborados por el Proyecto EVA y los estudios técnicos realizados por el Proyecto Marco de la Cuenca del Plata. Muy probablemente, esto obedece al cambio de Gobierno y a la falta de difusión de los resultados.

- **A pesar de la sólida sostenibilidad comunitaria, la magnitud de las actividades realizadas en materia de seguridad hídrica y control de la erosión no fue acorde a la escala del problema.** Las partes interesadas locales de todas las zonas visitadas señalaron que existía una gran necesidad de nuevo financiamiento para implementar más actividades de almacenamiento de agua y control de la erosión en sus comunidades y en las zonas aledañas. Incluso si se repitieran algunas actividades de los proyectos y programas gubernamentales, la escala necesaria para garantizar que las comunidades cuenten con agua suficiente para regar sus cultivos aún en épocas de sequía, y prevenir las inundaciones perjudiciales, la erosión del suelo y la sedimentación, supera claramente la capacidad de financiamiento del Gobierno nacional y de los Gobiernos locales, así como el número de los proyectos de donantes internacionales. En algunos proyectos más recientes, como los proyectos de las cuencas del Guadalquivir, del Amazonas y del Pantanal, se han comenzado a incluir actividades que tienen por objeto crear fondos locales sostenibles para invertir en dichas actividades, que pueden ayudar a abordar esta necesidad.

Technical Document 6: Burundi Case Study Report

Global Environment Facility Independent Evaluation Office

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Cover photo shows erosion on the banks of the Ntahangwa River in the city of Bujumbura.

1. Introduction

a. Brief description of overall evaluation

Given the importance and cross-cutting nature of water security and the growing recognition of the issue in the GEF strategies and projects, the GEF IEO is undertaking a comprehensive, multi-focal area evaluation of the topic. The Evaluation of GEF's strategy and portfolio in water security will take a look at the broader "footprint" of the GEF portfolio in terms of water security, in terms of impacts and sustainability. The evaluation began in October 2021 and is scheduled to be completed during 2023. The objective is to provide GEF stakeholders with evaluative evidence of the relevance, coherence, effectiveness, and sustainability of interventions that directly or indirectly impact water security and provide lessons.

As part of the evaluation, several case studies were chosen to understand how GEF projects and programs have impacted water security at the country and the basin level. Case studies were designed to address several evaluation topics, including:

- **Relevance** of GEF projects to the water security needs, policies and strategies of beneficiaries and key stakeholders in the countries where they work, including national and local government, communities, vulnerable populations, civil society, the private sector, NGOs and others.
- **Coherence** of GEF's projects with similar donor-funded and government initiatives in the areas where they work.
- **Effectiveness** of GEF projects in achieving improvements in water security, through main project outcomes or co-benefits and compliance with water related safeguards.
- **Effectiveness** of GEF projects in considering the specific water security of vulnerable populations especially women.
- **Sustainability** of the outcomes of completed GEF projects.

The criteria for selecting the case studies included: 1) presence of completed and ongoing GEF projects with relation to water security themes, 2) presence of transboundary watersheds or aquifers, 3) geographical diversity among the chosen case studies, 4) focal area[19] and trust fund[20] diversity among the case studies, 5) diversity in GEF Agencies among the case studies and 6) overlap with previous and other ongoing GEF IEO evaluations. This report summarizes the findings of the Burundi case study.

[19] GEF focal areas include: Biodiversity, Chemicals and Waste, Climate Change, International Waters and Land Degradation.

[20] GEF manages three trust funds: the GEF Trust Fund (which consists of the focal areas mentioned above) and two funds focused on climate change adaptation: the Least Developed Countries Fund and the Special Climate Change Fund.

b. Description of GEF projects in the case study

GEF ID / Focal Area[21]	Title	Approved / completed	GEF Phase	GEF Fin ($M)	Co-Fin ($M)	Description
3321 IW	Mainstreaming Groundwater Considerations into the Integrated Management of the Nile River Basin	2009 / 2016	4	1	2.89	Implemented by **UNDP** across nine countries**.** The goal was to improve understanding and awareness of groundwater-surface water interaction and the need for conjunctive management in the Nile Basin. Did not conduct sampling or pilots in Burundi as built upon information from BGR (German Federal Institute for Geosciences and Natural Resources) project. Capacity building occurred for management and institutional development.
4631 LD	Watershed Approach to Sustainable Coffee Production in Burundi	2013 / 2019	5	4.2	20.8	Implemented by **World Bank**. The goal was to promote sustainable land and water management on the country's coffee farms in Bubanza, Bururi, and Muyinga provinces. It involved promoting shade grown coffee and wastewater treatment from 6 coffee washing stations. Project acronym is PADZOC. The project prompted the World Bank Burundi Coffee Sector Competitive Project (BPCSC) – not a GEF funded project.
9912 IW	Enhancing Conjunctive Management of Surface and Groundwater Resources in Selected Transboundary Aquifers: Case Study for Selected Shared Groundwater	2019 / Ongoing	6	5.33	25.85	Implemented by **UNDP**. Focusing on the Kagera aquifer between Burundi, Rwanda, Uganda and Tanzania. Developing TDA and SAP for the aquifer, identifying pilot projects, institutional development. Builds upon GEF 3321.

[21] IW-International Waters; LD- Land Degradation; CC – Climate change; BD – Biodiversity; LDCF – Least Developed Country Fund

GEF ID / Focal Area[21]	Title	Approved / completed	GEF Phase	GEF Fin ($M)	Co-Fin ($M)	Description
	Bodies in the Nile Basin					
10099 LDCF	Landscape restoration for increased resilience in urban and peri-urban areas of Bujumbura	Project preparation phase	7	8.93	16.02	Implemented by the **UNDP.** Focus on improving slope stability, reduce erosion, and flood protection through green area and tree planting in specific communities of Isare and Kanyosha. Follow up from GEF 4990 Community Disaster Risk Management in Burundi.
10388 IW & LD	Biodiversity conservation, sustainable land management and enhanced water security in Lake Tanganyika basin	Project preparation phase	7	14.6	60.77	Implemented by **UNEP**. Regional project on protection of Lake Tanganyika. Builds on previous GEF Projects: 398[22] and 1017[23]. It focuses on strengthening fisheries management institutions and upstream erosion – which particularly relevant for Burundi where most fishing occurs and where the highest density of population exists in the riparian watersheds. The project builds on the Lake Tanganyika Water Management (LATAWAMA I) project (2019-2022), funded by the European Union and implemented by Enabel.
10566 IW	Lake Kivu and Rusizi River Basin Water Quality Management Project	Project preparation phase	7	5.74	26.15	Implemented by **African Development Bank**. The project will look at augment cooperation through the Kivu and River Rusizi Authority (ABAKIR), adopting an SAP, community-based monitoring in one site in Burundi (not yet chosen); promoting investment for hazard reduction and implementing codes of good practice for pollution. Builds on Integrated management of water resources of Lake Kivu and the Rusizi River (2019-2021) funded by EU and implemented by GIZ.[24] The objective of which is to improve the hydrological and operational management of Lake Kivu and Rusizi River basin and produced a TDA (2020). A SAP and operationalization of ABAKIR.

[22] Pollution Control and Other Measures to Protect Biodiversity in Lake Tanganyika. http://thegef.org/projects-operations/projects/398

[23] Partnership Interventions for the Implementation of the Strategic Action Programme (SAP) for Lake Tanganyika. http://thegef.org/projects-operations/projects/1017

[24] https://abakir.org/support-to-the-integrated-management-of-water-resources-of-lake-kivu-and-the-ruzizi-river/

Other related projects include:

i) Community Disaster Risk Management in Burundi (Community DRM; GEF 4990). The project is implemented by UNDP under the climate change focal area and is close to closing. It focused on improving provincial, communal services and local communities capacity for disaster risks preparedness and responses to ensure long term and sustainable emergency and reconstruction. The project focused on Bugesera, Mumirwa and Imbo Lowlands' regions. It has included installation of early warning systems, training, community tree planting, flood control in Bujumbura, and 25km of anti-erosion infrastructure (ditches, terraces, stone alignment).

ii) The Burundi Landscape Restoration and Resilience (GEF 10594). The project is implemented by World Bank, under the biodiversity, land degradation, and climate change focal areas. It includes effective planning for Integrated Landscape Management (ILM) and improved agricultural production and management across the targeted degraded coffee landscape. The project focuses on rehabilitation including: reduced erosion and sedimentation, and increased resilience of natural forests (Kibira National Park). It builds on PADZOC project (GEF 4631) in extending areas and augments the $30M IDA-financed Burundi Landscape Restoration and Resilience Project (BLRRP) which began in 2000. GEF funds would also be used to support replication. Two local coffee washing stations will undertake the initial audit towards ecological certification towards the submission of a request for investment funding to relevant sources. BLRRP is conceived as the first phase of a large-scale, long-term program, with subsequent needs estimated to be over US$200 million, including US$100 million for coffee areas.

iii) Support for sustainable food production and enhancement of food security and climate resilience in Burundi's highlands (GEF ID 9178). The project is being implemented by the FAO since 2017, under the biodiversity, land degradation and climate change focal areas. The objective is to increase adoption of resilient, improved production systems for sustainable food security and nutrition through integrated landscape management and sustainable food value. It focusses on agro-silviculture Mwaro, Gitega and Muramvya provinces. This is an on-going project and was referred to in discussions with MINEAGRIE and when discussing coffee cultivation in Muyinga

Seedlings at ISABU research station, Kayanga for shade grown coffee

ISABU research plot, used to provide seedlings for Mwakiro community (GEF 4631)

c. Case study methodology

The case study was analyzed using a mixed methods approach, whereby information gleaned from an initial literature review was triangulated with 36 interviews (34 being in country - see Annex A). Site visits included those in Bujumbura to ministries and a water testing lab, as well as the following site visits outside of the capital Bujumbura:

Location	Date	Project Affiliation
ISABU – Institut des Sciences Agrononomiques du Burundi, Kayanza	10 Nov 2022	PADZOC project (GEF 4631) field testing station for shade grown coffee, provided seeding plants for communities
IGEBU – Institut Géographique du Burundi, Gitega.	10 Nov 2022	GEF 3321 & 9912 – primary institute in Burundi addressing groundwater issues. Staff are involved with implementation of project activities in Burundi.
Coffee Washing Station "Association Alcanoverakikawa" (Tasty Coffee Association) – Mwakiro Community, Muyinga Province	11 Nov 2022	One of the coffee washing stations upgraded under the PADZOC project.
Coffee Washing Station, Cooperative Dukorere Ikawa, Burunga Community, Bururi	14 Nov 2022	One of the coffee washing stations upgraded under the PADZOC project.
BATWA community, Kiganda, Bururi	14 Nov, 2022	Community that was re-located under the PADZOC project. Received housing, arable land for subsistence, water supply, and part time employment as relocation benefits.
Kanyosha Commune (colline), Bujumbura Mairie	16 Nov, 2022	The Colline has several villages that were involved in GEF 4990 and two others to be involved in GEF 10099.
Makengo Coffee Station - Coffee Cooperative Babiribarutumwe Gatere, Kivyuka, Bobanza	17 Nov, 2022	Community received training under the PADZOC project. Adopted shade grown coffee production and are seeking funds to up-grade wastewater treatment.
Musigati Coffee Station – Kayange, Bobanza	17 Nov, 2022	One of the coffee washing stations upgraded under the PADZOC project.

2. Meeting stakeholder water security needs

a. National and local level priorities in case study region (relevance)

Overall, the water security elements of the GEF projects assessed in the evaluation align well with national and local priorities. Water security priorities for Burundi at a national level are found within the Water Strategy and Action Plan, a National development Plan, and mostly detailed within the Environmental, Agricultural and Livestock Policy Guidance Document (DOPAE [25]), July 2020 for the Ministry of Environment, Agriculture and Livestock (MINEAGRIE[26]). The DOPEAE has priorities to improve agriculture (including irrigation) and livestock; as well as protection of water sources, rivers, lakes, and wetlands; manage water use for multiple uses; and the fight against climate change impacts

[25] Document d'orientation de la politique environnementale, agricole et d'élevage (Juillet 2020)
[26] Ministère de l'Environnement, de l'Agriculture et de l'Elevage

(particularly increased incidence of strong rain events causing erosion and landslides). Additionally, improving the water quality of Lake Tanganyika, which is a major supply of drinking water for Bujumbura, and enhancing fisheries are major priorities.

Interviews with local officials and community members emphasized the need for improved sediment and erosion control, particularly in relation to small-scale agriculture on steep slopes and reducing the impact of landslides from heavy rains. Access to and sustainability of sources for potable water for small vulnerable communities, in particular the Batwa people, was seen as a priority at the local level as vulnerable communities often rely only on surface water which can be unsafe to drink. Also on enhancing water quality in general, including the importance of reducing contamination from coffee washing stations as they affect downstream users. Additionally, community members noted the importance of maintaining soil health within rainfed agriculture (particularly assessed for coffee plantations), by companion planting with trees (such as papaya, banana or other species, amongst others) to improve water infiltration, provide shade to reduce soil moisture evaporation, and provide slope stability. This agroforestry also provides the additional socio-economic benefit of improved quality and yield of coffee production.

b. Perceptions of GEF meeting water security needs (relevance)

- **Erosion and sedimentation control:** 4 of 6 of the projects reviewed addressed water security through erosion and sediment control to varying degrees. Notably, the Landscape Restoration for Increased Resilience in Urban and Peri-urban Areas of Bujumbura (GEF 10099, hereby referred to as the Bujumbura Landscape Restoration project), and its predecessor the Community DRM project, have primary goals of improving sediment retention and reducing erosion in streams and watersheds that run into Lake Tanganyika. These are achieved through reforestation and slope stability (terracing and sediment ditches on steep slopes where soil is too thin for terracing). The earlier project has improved slope stability and channelization in certain areas of the Ntahangwa watershed in Bujumbura and the and several communities in Bujumbura Mairie. Stakeholders interviewed agreed that the Community DRM project helped communities in Kanyosha Collline reduce sediment runoff and landslides, though did not complete all the communities that were hoped. The newer Bujumbura Landscape Restoration project is intended to continue to address these issues in the communities of Isare Colline and Kanyosha Colline, where one community information meeting took place in November 2022. Those interviewed noted that the communities were quite keen on advancing projects in their communities as erosion is considered a major issue.
- The Lake Kivu and Rusizi River Basin Water Quality Management Project (Lake Kivu and RRB project; GEF 10566), while in its preparation stage, will promote hazard reduction including excessive erosion and flooding in the Risizi River which feeds into Lake Tanganyika. The Biodiversity Conservation, Sustainable Land Management and Enhanced Water Security in Lake Tanganyika basin project (GEF 10388) is in the preparation stage, but seeks to reduce upstream erosion and discharge of sediment load into nearshore lake habitats by containing land degradation, reducing soil loss, rehabilitating degraded habitats and strengthening the protection of intact biodiverse natural habitats, in the lake catchment areas – though these catchment areas have not yet been identified in Burundi. Those interviewed noted that soil deposition into Lake Tanganyika is a priority and this project will help develop strategies for reversing land degradation.

- As a secondary priority, the PADZOC promoted improved management of coffee landscapes through shade grown coffee which additionally helps soil health and by increasing organic content as well as improving soil retention. The approaches promoted in Bubanza, Bururi, and Muyinga provinces are now being promoted in Kayunga province with Burundi Landscape Restoration and Resilience project (GEF 10594). Discussions with local coffee growers in Mwakiro, Burunga, Kivyuka, and Kayange all agreed that the introduction of trees with deeper root systems to provide shade also helped to stabilize slopes in steeper coffee plantations. Also, that the leaves they deposited decomposed to help soil health.

	
Channeling for flood control in Bujumbura (GEF 4990)	Seedlings for slope stabilization GEF (4990)

- **Early warning systems for disaster**. Under the Community DRM project, 30 hydromet stations were installed in the Ntahangwa watershed and Bujumbura with information collected by IGEBU. Under the Bujumbura Landscape Restoration project, government capacity will be expanded to use climate information to better understand ecosystem health and deliver services for local governments and communities. In discussing the projects with local stakeholders, they were pleased that early warning systems were established, but they would like to better understand how to benefit from them and use the information to enhance community resilience. The new project is designed to address this at a watershed level.

- **Water quality:** Water quality was addressed directly through PADZOC project through the promotion of the treatment of water emerging as part of the coffee washing process. The project established treatment facilitates at six coffee washing stations to address biological pollutants. In the process of washing only approximately 15% by weight of the raw coffee is coffee bean, while the rest is husk. At the end of the PADZOC project, while 5-day biological oxygen demand, chemical oxygen demand, and total dissolved solids had not improved significantly since the beginning of the project, there was significant improvement in pH, total nitrogen, total phosphorous, oil and fats – the latter three improved to meet national standards. It should be noted that there was concern

amongst ODECA officials that the “national standards” for wastewater needed to be reviewed in light of the local environmental context and should not be simply imported from abroad. It was also noted that taking water samples from infiltration ponds is difficult as one needs to take the water emerging from after infiltration. As a consequence, there is less sampling being undertaken.

	
One of three inline infiltration ditches for water treatment, coffee washing station, Mwakiro Community.	Waste water treatment tanks at the coffee washing station in Burunga, Buriburi (GEF 4631)

Additionally, under the Conjunctive Management in the Nile project- Kagera Aquifer Project (GEF 9912) monitoring wells are to be established and water quality testing will be conducted; and, good practices for pollution control are intended to be one of the focusses of the Lake Kivu and RRB project.

- **Water supply:** The Conjunctive Management in the Nile project is specifically promoting sustainable water management of the Kagera aquifer, which includes addressing water supply for vulnerable communities focusing on the Indigenous Batwa by i) helping to determine sustainable yields and management guidelines for sensitive areas of the aquifer, and ii) developing awareness material within the Indigenous Batwa communities. Stakeholders interviewed noted the importance of developing cost effective solutions to maintain community taps – educational and awareness material will be targeted towards maintaining community taps and sustainable use of water . 10 communities have so far been interviewed under the project. Under the PADZOC project as part of an incentive to move away from Bururi National Park, the Batwa community in Kiganda was given a year round central water supply tap which the community confirmed has created consistent and simple access to clean water. The Bujumbura Landscape Restoration project, the Lake Tanganyika basin project and the Lake Kivu and RRB project all seek to reduce erosion and thus sediment entering into Lake Tanganyika which will potentially help limit the cost of treatment for water supply for the city of Bujumbura.
- **Aquatic-ecosystem preservation.** As part of the sustainable management of the Kagera aquifer, the Conjunctive Management in the Nile project is also looking at surface water connection with important wetlands in the region. Under the PADZOC project, the aquatic ecosystem benefited through promoting protect area management of Bururi National Park. A similar approach is being used in Kayunga province along with increasing the resilience of national forests (and subsequently the rivers within them) in Kibira national park under Landscape Restoration project (GEF 10594). The

Biodiversity conservation, sustainable land management and enhanced water security in Lake Tanganyika basin project is also promoting improved ecosystem services (and thus health) in core conservation zones.

c. Collaboration and coherence between GEF projects and other donor-funded projects (coherence)

Burundi is a small country and many of the professionals working in the water sector know each other and are aware of the different ongoing and proposed projects. As a consequence there is a good degree of collaboration, coherence and supportive actions between different projects. Examples include:

Lake Tanganyika Water Management (LATAWAMA I) project (2019-2022), is a large project funded by the European Union and implemented by Enabel to support water quality monitoring, and wastewater management in coastal towns. As such, it is implementing part of the actions identified by the Lake Tanganyika SAP, updated under a previous Partnership Interventions for the Implementation of the Strategic Action Programme (SAP) for Lake Tanganyika (GEF 1017). Likewise, the newer case study Lake Tanganyika basin project will align activities to complement other regional initiatives, such as LATAWAMA, amongst others. Stakeholders also noted that the case study Lake Tanganyika basin project is also anticipated to collaborate with the case study Lake Kivu and RRB project in particular to provide experience learned in the Tanganyika basin in the development of a basin wide management authority in the latter project.

The Lake Kivu and RRB project is intending to create a Strategic Action Programme based upon the Transdiagnostic Analysis developed by the "Support to the Integrated Management of Water Resources of Lake Kivu and the Rusizi River project" – an EU project, implemented by GIZ, to promote integrated water resources management in the transboundary basin.

In Burundi, the Mainstreaming Groundwater in the Nile project (GEF 3321) used information generated from the long-term BGR program of groundwater in Burundi (2012-2022) which focused on mapping and protection of groundwater. The Conjunctive Management in the Nile project is building on this data base with specific focus on the Kagera aquifer.

Shade grown coffee and water treatment which were promoted under PADZOC were advanced and replicated through other donors, such as the EU's "Mark Up" project (2018-2022) and are being replicated through the Landscape Restoration and Resilience project (GEF 10594). Other donors are also assisting in the development of the coffee sector and working with local communities, such as USAID which supported the promotion of associations of women coffee growers in 2016 and have continued to assist coffee producers ensuring women participate in the activities. During a visit Kayange, Bobabza, it was noted that about 30% of the workers upgrading the Musigati coffee washing station were women who noted that this was fairly standard now. Unfortunately, there was no documentation or mention from interviewees of collaboration between the GEF funded coffee projects and either the EU Mark-UP project or the USAID interventions.

d. Addressing water security of vulnerable populations (effectiveness)

- Under PADZOC, incentives were provided to an Indigenous Batwa community near Bururi National Park to relocate. This was not part of the project design, but rather was developed

during project implementation to help facilitate relocation. The incentives included housing, some subsistence farm land, and a water supply, amongst others. During a visit to the community in Kiganda, Bururi Province women confirmed that they are happy as they have good water even during the dry season and the central location of the community tap saves a lot of time. It is still working, with signs of having been partially repaired with a bicycle inner tube tire. There is a minor leak and they are able to self-maintain it. Unfortunately, the houses provided by the project, two in particular, have walls that have been severely damaged by weather as the location is up on an exposed ridge. There is evidence that other buildings which have cracks are being maintained. A similar system of incentives to relocate Indigenous Batwa from Kibira protected area is being considered for the Landscape and Resilience project (GEF 10594).

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Water point, tap left slightly on, Batwa Kiganda Community, Province Bururi (GEF 4631)</td><td>Discussion with Batwa Kiganda Community, Province Bururi (GEF 4631).</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>House in severe state of decay in Bururi Batwa community</td><td>Attempts to repair cracking before it becomes severe.</td></tr>
</table>

Under the Conjunctive Management in the Nile project, Batwa communities have been specifically targeted for inclusion and so far 11 communities have been interviewed in a socio-economic survey for the Kagera aquifer. Specific pilot communities to participate in the project have not yet been identified.

Gender. The PADZOC project benefited some 17,970 people – 40% of whom were women. While below the target of 50% women beneficiaries it is still a solid advance forward. Ferdiane Ndikumana in Kiviyka – Makengo Coffee Station – noted that she, and others women she knows,

have benefited from applying shade grown coffee techniques as they improve the coffee crop yield as well as producing other produce, such as bananas. In the Community DRM project, interviews indicated that women were involved in community-decision making meetings as well as associations such as the ADF – Association pour le Development da la Femme. In the newer Bujumbura Landscape Restoration project, project proponents are hoping to give land certifications to all the plots that have been improved throughout the project. The title on the land certification would be the women, and would be able to be used possibly for micro financing.

3. Water security achievements and sustainability

a. Water security related outcomes of GEF projects (planned and achieved) (effectiveness)

Overview of water security related outcomes from completed GEF projects, mostly from the Terminal Evaluation (TE). Divide or at least discuss how the outcomes fit into the four main dimensions and the outcome groups from the water security evaluation theory of change.

The UNEP definition of water security[27] outlines four key areas to consider when seeking to achieve water security. The table below outlines how the reviewed projects align with the four key areas.

Water Security Areas	Project Outcomes and Objectives
Drinking water and human well-being	GEF 4631 established a drinking water system for the Batwa community, that is still functioning and effective. GEF 9912 - Management of the Kagera aquifer plan to include a number of pilots to ensure sustainable use of the aquifer, including use of the aquifer for water supply for communities as the aquifer is quite shallow. The pilot communities have not yet been chosen but 10 communities were interviewed. Project addressing sediment into Lake Tanganyika could indirectly improve water supply for Bujumbura.
Ecosystems	GEF 4631 improved management and reduced impact on Bururi National Park, and therefore the rivers and associated riparian areas within the park. GEF 10594 is intending to do the same in Kibira National Park. GEF 10388 intends to improve conservation and aquatic ecosystems in several areas to be determined. Overall the ecosystem benefits from reduced sediment load in numerous of the GEF projects, and addressing sedimentation is one of the key issues facing Lake Tanganyika and highlighted in the SAP. GEF 4631 worked to directly improve water quality downstream of CWS. GEF 10566 aims to improve pollution control in the Rusizi River and Lake Kivu.
Water hazards and climate change	GEF 4990 has helped reduce sedimentation and improved slope stability, and put in place early warning systems in the areas around Bujumbura and GEF 10099 is continuing this in outlying communities of Isare and Kanyosha.
Economic Development and activities	GEF 4631, 10599, 4990 and 10099 are all improving agriculture of local communities through improved soil retention. GEF 10388 is improving fisheries through reduced sedimentation in certain areas of Lake Tanganyika (as secondary priority).

[27] https://www.unwater.org/publications/what-water-security-infographic

In addition to four key areas, the water security evaluation has identified six key outcome groups for water security that could be addressed by GEF projects:

Greater Stakeholder Involvement & Awareness Building; particularly within local communities, women, & youth, private sector,

The majority of the projects reviewed either succeeded or are planning to involve local communities in building understanding and awareness of issues. The PADZOC project delivered capacity and training at the community level and involved coffee cooperatives in the design and building of upgrades to the coffee washing stations. The approach is being expanded under the Landscape Restoration and Resilience project (GEF 10594). The Bujumbura Landscape Restoration project is involving communities at an early stage (Stakeholder meeting held in November 2022) and building on the engagement model of its predecessor- Community DRM project. The Conjunctive Management – Kagera Aquifer Project (GEF 9921) has conducted a socio economic survey and engaged 11 indigenous Batwa communities to date. Other projects are in early stages of project development and have not engaged local communities in any concrete way so far.

No projects reviewed had specific activities focussed on youth, and women are included primarily through promoting gender equity within community engagement. The Landscape Restoration and Resilience project (GEF 10594) has specifically targeted women to acquire land titles in areas that will be restored.

Strong Knowledge & Communication, regarding water resources, uses, climate impacts, & early warning indicators; value of water

Knowledge of water resources is strongly supported several of the projects reviewed, primarily dealing with water management. For example, the Conjunctive Management in the Nile project which is developing groundwater modelling of the aquifer based on shared data between Burundi, Rwanda, Uganda and Tanzania; the Lake Kivu and RRB project is intending to develop a community-based monitoring program and improve laboratories for water quality monitoring; the Lake Tanganyika basin project is planning to develop a knowledge platform – albeit for fisheries co-management not water resources management specifically. PADZOC enhanced the science of shade grown coffee through the work of ISEBU – though not necessarily with respect to water issues.

Consistent & Sufficient Access to Finance; including access to private sector financing, green bonds, environmental funds, etc

PADZOC promoted different approaches to coffee growing and the treatment of water from coffee washing stations with the goal of increasing the quality and reputation of coffee from Burundi, obtaining environmental certification and claiming a higher price in the market. This would in turn help fund replication of activities that benefit the environment including water and aquatic ecosystem. As previously noted, subsequent projects have also advanced this approach. Unfortunately, global coffee prices have fluctuated significantly over the past decade (high of $2.80 in 2011 to a low of $0.93 in 2019) making it difficult to attach economic incentives to infrastructure works. Approaches such as being advanced under the Land Restoration for Resilience project (GEF 10594) where land restored would have women as title holders allowing them to access loans for micro financing could have significant effects in maintaining project goals in the medium term.

Under the Conjunctive Management in the Nile project, the socio-economic survey conducted has identified several modes of community payment for creating Community Water Taps, including having a local maintenance operator to ensure equitable use all paid by way of a locally run system to charge nominal rates for water at the tap.

Strong Governance Systems; Decision making, transparency, appropriate policy & regulations, and agreements, human right, access

The Lake Kivu and RRB project is helping to support the ABAKIR authority; the Lake Tanganyika basin is supporting the Lake Tanganyika Authority; and the Conjunctive Management in the Nile project is supporting transboundary governance of the Kagera Aquifer.

Active Adaptive Management; (learning, planning & implementation – and re-learning)

None of the projects reviewed specifically noted adaptive management as a theme. However, PADZOC was able to advance an approach that was adopted by subsequent projects. Interviews revealed that in terms of companion plants for shade grown coffee there continues to be learning. For example, ODECA is studying the relative impact of coffee interplanted alongside plants with deeper roots, such as papaya or hardwoods, versus those with shallower root systems, such as squash and beans. Other projects have built into their design "lessons learned' either from other projects in the design of the project, or to share data and information with.

Optimized Physical Nature & Capacity of environment and water systems including green and gray infrastructure

PADZOC promoted water treatment of effluent of coffee washing stations and constructed facilities in six locations. The projects focussing on slope stabilization through planting trees or ditching are also having localized impacts on the hydrological dynamics of the watershed and increasing the resilience to heavy rainfall and flooding.

Impact discussion

The national parks near project areas are relatively small and their aquatic environments are highly impacted by agricultural activities outside their boundaries, such as Rusizi national park at the mouth of the Rusizi River. Projects addressing sediment control through slope stabilization are likely to have lasting impacts as the communities see direct benefits to their own safety and improved livelihoods. However, the scale of areas that need slope stabilization and number the kilometers of streams that need rehabilitation is very large. The slope stabilization activities will have impact in a localized area but are unlikely to have meaningful impact on the sediment load to Lake Tanganyika unless stabilization activities are undertaken on a basin wide scale.

The approach to develop water treatment for coffee washing stations under PADZOC was to be continued with the World Bank's Coffee Sector Competitive Project; however, this project was closed early in 2020. Nevertheless, treatment of coffee washing station waste water has been promoted and is a requirement to obtain a certificate from the Office for Coffee Development (ODECA), and is supported by other funders, such as the EU's "Mark Up" project which started in 2018, as well in Kayunga province with Burundi Landscape Restoration and Resilience project (GEF 10594).

b. Relationship of results to GEBs, co-benefits and unintended consequences (effectiveness)

Livelihoods. Improved slope stability and erosion control under the Community DRM and Bujumbura Landscape Restoration projects, and improved soil health and soil moisture retention under the PADZOC and the Landscape and Resilience project (GEF 10594) have the benefit of improving agricultural production and quality of produce and improve the livelihoods of the community members - as confirmed by local coffee growers. Water treatment facilities for coffee washing stations resulted in Fairtrade certification for two of the stations, whereby coffee can command a higher price.

The PADZOC project had benefits associated with improved wastewater from coffee washing stations, as well as capacity development in terms of community awareness and interest. Additionally, at a landscape level the project affected land degradation through improved soil retention and soil health associated with shade grown coffee production and companion planting. A co-benefit was the creation of the water supply and subsistence farmland for the Indigenous Batwa community in Kiganda, Bururi.

The Mainstreaming Groundwater in the Nile project did not have any specific activities in Burundi, although training sessions for these were conducted and attended by staff from IGEBU; unfortunately, training materials and tools were not made available in French limiting their applicability in Burundi. Interviews with project proponents and stakeholders confirmed that this is being rectified in the Conjunctive **Management in the Nile project.**

c. Sustainability of water security outcomes in completed projects (sustainability)

PADZOC was completed in 2019. The Office for the Development of Coffee in Burundi (ODECA[28]) was created in 2020 to oversee coffee production, processing and promotion of coffee sales internationally. Coffee accounts for 75+% of export earnings and is a very important element in Burundi's economy. ODECA is also responsible for issuing permits and has adopted a policy to install water treatment at Coffee washing stations (CWS). Consequently, they issue environmental certifications, and are responsible to check wastewater treatment at washing stations. CWS are supposed to have facilities in place for water treatment to receive an environmental certification to operate. Approximately 70% of the 350 CWS in Burundi are private or run by cooperatives. The coffee washing stations visited either had certification, or were working to obtain certification such as the Musigati Coffee Station. It was noted, that while most CWS continued to maintain infiltration pits and input treatment additives, such as chalk, at least one CWS visited did not, claiming it was too costly to add chalk each year for no perceived benefit. Also, no one interviewed was aware if ODECA had conducted any monitoring to verify if treatment methods are effective. Other initiatives, such as the EU's "Mark Up" project are also promoting water treatment at CWS. One point that was noted during the country assessment was the fact that while ODECA is under the Ministry of Water, Agriculture, and Livestock it is designed to promote the coffee sector (and thus could have a conflict of interest by also being the sector's regulator). Testing of water from CWS could alternatively therefore be under the role of the Directorate of Water Resource and The Office for the Protection of the Environment (OBPE) which is legally responsible for testing water quality from effluents, as opposed to ODECA.

[28] Office pour le Développement du Café du Burundi

There appears to be an improvement in the quality of effluent water from coffee washing stations since the end of the project, which was illustrated by initial testing during the project, and supported by anecdotal evidence from communities despite water testing not being conducted. There appears to be a willingness of most cooperative coffee producers to continue to maintain and improve effluent emerging from the coffee washing stations and an agreed understanding of its benefits on the downstream environment. This awareness and willingness, particularly in the face of improved coffee prices from international certifications that require improved CWS practices, suggests a positive trend and provides the fiscal incentive to maintain sustainability.

	
2 year old infiltration pits for water treatment in private CSW, Bururi. Operator confirmed that the owner digs out and cleans each season and adds charcoal and chalk.	Unfinished treatment pits in the Coffee Washing station, Makengo Coffee Station, Bubanza Province. The 1st treatment pit is missing – it was never built due to Coffee Competitive project closing.

The Mainstreaming Groundwater Considerations in the Nile project helped to advance awareness of transboundary ground water issues in the Nile basin, and in particular in the Kagera aquifer which is shared between Tanzania, Uganda, and Burundi. Assuming that the following Conjunctive Management in the Nile project will achieves a trans diagnostic analysis and strategic action program for the Kagera aquifer then there is a potential that improved water management of the aquifer will be achieved, and if benefits are delivered at the community level then there will be a stronger likelihood of sustained 'good practices'.

4. Overall findings

Water security is being addressed through GEF interventions in Burundi with apparently positive results, despite not necessarily being the specific focus of all the projects reviewed. Projects dealing with slope stability in the Bujumbura region are helping to reduce the risk associated with climate induced hazards such as landslides in a localized area, and are also reducing sediment load into Lake Tanganyika which in turn should enhance water supply for Burundi's major city. However, the actual impact on sediment load into Lake Tanganyika has not been assessed and is likely minor based on the extent and intensity of agriculture in the Ntahangwa and surrounding watersheds. Nevertheless, the projects which are achieving their goals for enhancing slope stability and soil retention in the project sites, are -at some level- reducing sediment load into Lake Tanganyika.

The projects associated with treating effluent from coffee washing stations have made progress in terms of building infrastructure. Full maintenance and operations of the systems appears to be generally continued, although in at least one case the addition of pH reducing lime has ceased due to costs. On the ground changes to the way effluent is treated is evidenced by the number of CWS who were not part of the PADZOC but which have or are in the process of adopting treatment facilities. Consequently, even though effluent water may not reach national standards for all parameters it is undoubtedly improved from practices used prior to 2014. Moreover, they have succeeded in building awareness nationally, but particularly at the local level, for the need to make efforts to treat effluent. The extent to which water has improved is anecdotal as no sampling has been conducted to determine pollution levels in the effluent waters.

Projects have displayed a sensitivity for vulnerable and marginalized communities, in particular the Indigenous Batwa people. In the case of PADZOC, a community was supplied with a sustainable drinking water source, and in the case of the Conjunctive Management in the Nile project, engagement with 11 communities in the Kagera aquifer region has been undertaken so far.

Stakeholders interviewed confirmed that there is a good level of coordination or compatibility with GEF projects and other donor activities, for example with BGR in terms of groundwater projects; the EU-LATAWAMA water quality monitoring project with the Lake Tanganyika and Lake Kivu -Rusizi River project. However, more effort may be needed for the Landscape and Resilience project (GEF 10594) to link with other donor initiatives, at least in the coffee production sector of the project.

In terms of local level stakeholder involvement, the international waters focal area projects do not bring local stakeholders into discussions during project design, but rather they are engaged once the project has been initiated and surveys are conducted or pilot areas being chosen. In the national level projects addressing slope stability, the Community DRM and Bujumbura Landscape Restoration projects involved local communities early in the project, including during project design. Local stakeholders interviewed for the PADZOC project were positive about the project and their experience, including training and capacity building, and those who did not receive material benefits, such as nearby communities, are enthusiastic for more similar projects. In particular, as coffee is not paying as much as people have hoped, local community members interviewed noted that they are keen to adopt an inter-cultivation approach where they can produce other crops alongside coffee.

Overall, national staff interviewed viewed the GEF funded projects positively, with the suggestion that the GEF process for accessing funds could be simplified, and in the case of the Lake Tanganyika the time between follow up projects has been long –there has been 6 years between the Partnership Intervention project (GEF 1017) which ended in 2015 and the newer the Lake Tanganyika basin which is still in the project preparation phase. Such time gaps undermine momentum of the efforts – fortunately, the Lake Tanganyika Authority have been able to generate other donor interest such as EU's LATAWAMA monitoring project. Although the Mainstreaming Groundwater Considerations in the Nile project did not conduct any activities in Burundi, and training materials were not available in French, those interviewed noted that there was benefit in building relationships with other groundwater agencies in the Nile Basin. Additionally, the newer Conjunctive Management in the Nile project has already begun to develop a form of transdiagnostic analysis regarding the Kagera Aquifer and is generating closer cooperation with neighboring agencies in Rwanda, Tanzania and Uganda. Also, national level agency staff were also positive with respect to the work being conducted on slope

stabilization in the urban and peri-urban areas around Bujumbura, noting that addressing the climate change stresses associated with erosion and landslides was a major priority.

Technical Document 7: Rapport d'étude de cas sur le Burundi

Bureau indépendant d'évaluation du Fonds pour l'environnement mondial

Mars 2023

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L'étude de cas du Burundi a été dirigée et rédigée par Glen Hearns avec l'appui de Rénovat Nimpaye. L'équipe d'évaluation remercie toutes les parties prenantes pour leur participation à l'évaluation et adresse des remerciements particuliers à Deo Bukeyeneza, Maha Abdelraheem Ismail et Julien Simery pour leur soutien logistique et l'identification des principales parties prenantes.

La photo de couverture montre l'érosion sur les rives de la rivière Ntahangwa dans la ville de Bujumbura.

1. Introduction

a. Brève description de l'évaluation globale

Compte tenu de l'importance et du caractère transversal de la sécurité de l'eau, ainsi que de la prise en compte croissante de cette question dans les stratégies et les projets du FEM, le BIE du FEM effectue une évaluation complète de ce thème dans plusieurs domaines d'intervention. L'évaluation de la stratégie et du portefeuille du FEM en matière de sécurité de l'eau portera sur l'« empreinte » plus large du portefeuille du FEM en matière de sécurité de l'eau, du point de vue des répercussions et de la durabilité. L'évaluation a débuté en octobre 2021 et devrait s'achever courant 2023. Elle vise à fournir aux parties prenantes du FEM des éléments d'évaluation de la pertinence, de la cohérence, de l'efficacité et de la durabilité des interventions qui ont des répercussions directes ou indirectes sur la sécurité de l'eau et d'en tirer des enseignements.

Dans le cadre de l'évaluation, plusieurs études de cas ont été choisies pour comprendre comment les projets et programmes du FEM ont eu des répercussions sur la sécurité de l'eau au niveau du pays et du bassin. Les études de cas visaient à aborder plusieurs sujets d'évaluation, notamment les suivants :

- **Pertinence** des projets du FEM par rapport aux besoins, politiques et stratégies en matière de sécurité de l'eau des bénéficiaires et des principales parties prenantes dans les pays où ils sont exécutés, notamment les pouvoirs publics nationaux et locaux, les communautés, les populations vulnérables, la société civile, le secteur privé, les ONG et autres.
- **Cohérence** des projets du FEM avec des initiatives similaires financées par des bailleurs de fonds et des gouvernements dans les zones où ils interviennent.
- **Efficacité** des projets du FEM en matière d'amélioration de la sécurité de l'eau, par le biais des principaux résultats ou avantages annexes des projets et de la conformité aux mesures de protection liées à l'eau.
- **Efficacité** des projets du FEM du point de vue de la prise en compte de la sécurité de l'eau spécifique des populations vulnérables, notamment des femmes.
- **Durabilité** des résultats des projets achevés du FEM.

Les critères de sélection des études de cas comprenaient les suivants : 1) la présence de projets du FEM, achevés ou en cours, liés aux thèmes de la sécurité de l'eau, 2) la présence de bassins versants ou d'aquifères transfrontaliers, 3) la diversité géographique des études de cas choisies, 4) la diversité des domaines d'intervention[29] et des fonds fiduciaires[30] parmi les études de cas, 5) la diversité des Entités d'exécution du FEM parmi les études de cas, et 6) le chevauchement entre les études de cas et les évaluations antérieures et d'autres évaluations en cours du BIE du FEM. Le présent rapport résume les conclusions de l'étude de cas sur le Burundi.

[29] Les domaines d'intervention du FEM sont les suivants : biodiversité, produits chimiques et déchets, changement climatique, eaux internationales et dégradation des sols.
[30] Le FEM gère trois fonds fiduciaires : la Caisse du FEM (qui comprend les domaines d'intervention mentionnés ci-dessus) et deux fonds axés sur l'adaptation au changement climatique : le Fonds pour les pays les moins avancés et le Fonds spécial pour le changement climatique.

b. Description des projets du FEM figurant dans l'étude de cas

Identité/ domaine d'intervention du FEM[31]	Titre	Approuvé/ achevé	Phase du FEM	Fin. du FEM (MM$)	Cofin. (MM$)	Description
3321 EI	Intégration des considérations relatives aux eaux souterraines dans la gestion intégrée du bassin du Nil	2009/ 2016	4	1	2,89	Exécuté par le **PNUD.** L'objectif était d'améliorer la compréhension et la prise de conscience de l'interaction entre les eaux souterraines et les eaux de surface et de la nécessité d'une gestion conjointe du bassin du Nil. Il n'y a pas eu d'échantillonnage ou de projets pilotes au Burundi, car les informations du projet BGR (Institut fédéral allemand pour les géosciences et les ressources naturelles) ont été utilisées. Le renforcement des capacités a eu lieu pour la gestion et le développement institutionnel.
4631 DT	Approche du bassin versant pour la production durable de café au Burundi	2013/ 2019	5	4,2	20,8	Exécuté par la **Banque mondiale**. L'objectif était de promouvoir la gestion durable des terres et de l'eau dans les exploitations de café du pays, dans les provinces de Bubanza, Bururi et Muyinga. Il s'agissait de promouvoir le café cultivé à l'ombre et le traitement des eaux usées de six stations de lavage du café. L'acronyme du projet est PADZOC. Le projet a entrainé le Projet d'appui à la compétitivité du secteur du café au Burundi (PACSC) de la Banque mondiale - pas un projet financé par le FEM.
9912 EI	Amélioration de la gestion conjointe des ressources en eau de surface et souterraine dans certains aquifères transfrontaliers : Étude de cas pour certaines masses d'eau souterraine partagées dans le bassin du Nil	2019/ En cours	6	5,33	25,85	Exécuté par le **PNUD**. Se concentre sur l'aquifère de Kagera entre le Burundi, le Rwanda, l'Ouganda et la Tanzanie. Élaboration de l'état des lieux transnational et de la stratégie et plan d'action pour l'aquifère, identification de projets pilotes, développement institutionnel. S'appuie sur le FEM 3321.

[31]EI - Eaux internationales ; DT - Dégradation des terres ; CC - Changement climatique ; BD - Biodiversité ; FPMA - Fonds pour les pays les moins avancés.

Identité/ domaine d'intervention du FEM[31]	Titre	Approuvé/ achevé	Phase du FEM	Fin. du FEM (MM$)	Cofin. (MM$)	Description
10099 FPMA	Restauration de paysages pour une résilience accrue dans les zones urbaines et périurbaines de Bujumbura	Proposition approuvée	7	8,93	16,02	Exécuté par le **PNUD.** L'accent est mis sur l'amélioration de la stabilité des pentes, la réduction de l'érosion et la protection contre les inondations grâce à des espaces verts et à la plantation d'arbres dans certaines communautés d'Isare et de Kanyosha. Suivi du FEM 4990 - Gestion communautaire des risques de catastrophes au Burundi.
10388 EI et DT	Conservation de la biodiversité, gestion durable des terres et amélioration de la sécurité de l'eau dans le bassin du lac Tanganyika	Phase de préparation du projet	7	14,6	60,77	Exécuté par le **PNUE**. Projet régional sur la protection du lac Tanganyika. S'appuie sur les projets précédents du FEM : 398[32] et 1017[33]. Il se concentre sur le renforcement des institutions de gestion de la pêche et sur l'érosion en amont - ce qui est particulièrement pertinent pour le Burundi où la plupart des activités de pêche ont lieu et où la plus forte densité de population existe dans les bassins versants riverains. Le projet tire parti du Projet de gestion des eaux du lac Tanganyika (LATAWAMA I) (2019-2022), financé par l'Union européenne et exécuté par Enabel.
10566 EI	Projet de gestion de la qualité de l'eau dans le bassin du lac Kivu et de la rivière Rusizi	Phase de préparation du projet	7	5,74	26,15	Exécuté par la **Banque africaine de développement**. Le projet visera à accroître la coopération par l'intermédiaire de l'Autorité du bassin du lac Kivu et de la rivière Rusizi (ABAKIR), en adoptant une stratégie et plan d'action, un suivi communautaire sur un site au Burundi (pas encore choisi) ; à promouvoir l'investissement pour la réduction des risques et à mettre en œuvre des codes de bonnes pratiques pour la pollution. S'appuie sur le projet de gestion intégrée des ressources en eau du lac Kivu et de la rivière Rusizi (2019-2021) financé par l'UE et exécuté par la GIZ[34]. Dont l'objectif est d'améliorer la gestion hydrologique et opérationnelle du bassin du lac Kivu et de la rivière Rusizi et produit un état des lieux transnational (2020). Une stratégie et plan d'action et l'opérationnalisation d'ABAKIR.

[32] Lutte contre la pollution et autres mesures visant à protéger la biodiversité du lac Tanganyika. http://thegef.org/projects-operations/projects/398

[33] Interventions en partenariat pour la mise en œuvre du Programme d'actions stratégiques (PAS) pour le lac Tanganyika. http://thegef.org/projects-operations/projects/1017

[34] https://abakir.org/support-to-the-integrated-management-of-water-resources-of-lake-kivu-and-the-ruzizi-river/

D'autres projets connexes incluent :

iv) Gestion communautaire des risques de catastrophes au Burundi (FEM 4990). Le projet est exécuté par le PNUD dans le cadre du domaine d'intervention du changement climatique et il est sur le point d'être clôturé. Il s'est concentré sur l'amélioration de la capacité des provinces, des services communaux et des populations locales à se préparer aux risques de catastrophes et à y faire face, afin d'assurer des mesures d'urgence et de reconstruction durables et à long terme. Le projet se concentrait sur les régions de Bugesera, Mumirwa et les basses terres de l'Imbo. Il a inclus la mise en place de systèmes d'alerte précoce, la formation, la plantation d'arbres communautaires, la lutte contre les inondations à Bujumbura, et 25 km d'infrastructures de lutte contre l'érosion (fossés, terrasses, alignement de pierres).

v) Restauration et résilience du paysage du Burundi (FEM 10594). Le projet est exécuté par la Banque mondiale, dans le cadre des domaines d'intervention de la biodiversité, de la dégradation des sols et du changement climatique. Il comprend la planification efficace de la gestion intégrée du paysage (GIP) et une amélioration de la production et de la gestion agricoles dans le paysage dégradé ciblé du café. Le projet se concentre sur la remise en état, notamment la réduction de l'érosion et de la sédimentation, et le renforcement de la résilience des forêts naturelles (parc national de Kibira). Il tire parti du projet PADZOC (FEM 4631) en élargissant les zones d'intervention et amplifie le Projet de restauration et de résilience du paysage du Burundi (PRRPB), financé par l'IDA à hauteur de 30 millions de dollars, qui a débuté en 2000. Les ressources du FEM serviront également à financer la reproduction du projet ailleurs. Deux stations de lavage de café locales effectueront l'audit initial en vue de la certification écologique, avant de soumettre une demande de financement d'investissement aux sources pertinentes. Le PRRPB est conçu comme la première phase d'un programme à grande échelle et à long terme, les besoins ultérieurs étant estimés à plus de 200 millions de dollars, dont 100 millions pour les zones caféières.

vi) Appui à la production alimentaire durable et renforcement de la sécurité alimentaire et de la résilience climatique dans les hauts plateaux du Burundi (FEM 9178). Le projet est exécuté par la FAO depuis 2017, dans le cadre des domaines d'intervention biodiversité, dégradation des terres et changement climatique. Il vise à accroître l'adoption de systèmes de production résilients et améliorés pour une sécurité alimentaire et une nutrition durables, grâce à la gestion intégrée du paysage et à la valorisation durable des aliments. Il se concentre sur l'agro-sylviculture dans les provinces de Mwaro, Gitega et Muramvya. Il s'agit d'un projet en cours auquel il a été fait référence lors des discussions avec le MINEAGRIE et lors de la discussion sur la caféiculture à Muyinga.

	
Semis à la station de recherche de l'ISABU, Kayanga, pour le café cultivé à l'ombre.	Parcelle de recherche de l'ISABU, utilisée pour fournir des semis aux populations de Mwakiro (FEM 4631)

c. Méthodologie des études de cas

L'étude de cas a été analysée par une méthodologie mixte, dans laquelle les informations recueillies dans une première analyse documentaire ont été recoupées avec 36 entretiens (34 étant dans le pays - voir Annexe A). Les visites sur site comprenaient celles effectuées à Bujumbura dans les ministères et dans un laboratoire d'analyse de l'eau, ainsi que les visites sur site suivantes en dehors de la capitale Bujumbura :

Lieu	Date	Affiliation au projet
ISABU - Institut des sciences agronomiques du Burundi, Kayanza	10 nov. 2022	Projet PADZOC (FEM 4631) station d'essai sur le terrain pour le café cultivé à l'ombre, fourniture de plants de semis aux communautés
IGEBU - Institut géographique du Burundi, Gitega.	10 nov. 2022	FEM 3321 et 9912 - institut principal au Burundi traitant des questions d'eaux souterraines. Le personnel est associé à l'exécution des activités du projet au Burundi.
Station de lavage du café « Association Alcanoverakikawa » (Association des cafés savoureux) - Communauté de Mwakiro, province de Muyinga	11 nov. 2022	Une des stations de lavage du café modernisée dans le cadre du projet PADZOC.
Station de lavage du café, Coopérative Dukorere Ikawa, Communauté Burunga, Bururi	14 nov. 2022	Une des stations de lavage du café modernisée dans le cadre du projet PADZOC.
Communauté BATWA, Kiganda, Bururi	14 nov. 2022	Communauté qui a été relocalisée dans le cadre du projet PADZOC. Elle a reçu des logements, des terres arables pour la subsistance, un approvisionnement en eau et des emplois à temps partiel comme avantages de la relocalisation.
Commune de Kanyosha (Colline), Mairie de Bujumbura	16 nov. 2022	La Colline compte plusieurs villages qui ont participé au FEM 4990 et deux autres qui participeront au FEM 10099.
Station de café de Makengo - Coopérative de café Babiribarutumwe Gatere, Kivyuka, Bobanza	17 nov. 2022	La communauté a reçu une formation dans le cadre du projet PADZOC. Elle a adopté la production de café à l'ombre et cherche des fonds pour améliorer le traitement des eaux usées.

Station de café Musigati - Kayange, Bobanza	17 nov. 2022	Une des stations de lavage du café modernisée dans le cadre du projet PADZOC.

2. Répondre aux besoins des parties prenantes en matière de sécurité de l'eau

a. Priorités aux niveaux national et local dans la région de l'étude de cas (pertinence)

Dans l'ensemble, les éléments relatifs à la sécurité de l'eau des projets du FEM évalués s'alignent bien sur les priorités nationales et locales. Les priorités du Burundi en matière de sécurité de l'eau au niveau national figurent dans la Stratégie et le Plan d'action pour l'eau, un plan de développement national, et sont essentiellement présenté en détail dans le Document d'orientation de la politique environnementale, agricole et d'élevage (DOPAE)[35] de juillet 2020 pour le Ministère de l'Environnement, de l'Agriculture et de l'Elevage (MINEAGRIE)[36]. Les priorités du DOPEAE consistent à améliorer l'agriculture (y compris l'irrigation) et l'élevage ; gérer la protection des sources d'eau, des rivières, des lacs et des zones humides ; gérer l'utilisation de l'eau pour des usages multiples ; et lutter contre les effets du changement climatique (en particulier l'incidence accrue de fortes pluies provoquant l'érosion et les glissements de terrain). En outre, l'amélioration de la qualité de l'eau du lac Tanganyika, qui constitue une source importante d'eau potable pour Bujumbura, et l'amélioration de la pêche constituent des priorités de premier rang.

Les entretiens avec les responsables locaux et les membres des communautés ont souligné la nécessité d'améliorer la lutte contre la sédimentation et l'érosion, notamment en ce qui concerne l'agriculture à petite échelle sur les pentes raides et la réduction des effets des glissements de terrain imputables aux fortes pluies. L'accès et la durabilité des sources d'eau potable pour les petites communautés vulnérables, en particulier les Batwa, ont été considérés comme une priorité au niveau local, car ces communautés dépendent souvent des eaux de surface uniquement, qu'il peut être dangereux de boire. De même concernant l'amélioration de la qualité de l'eau en général, il importe de réduire la contamination des stations de lavage de café, car cela affecte les utilisateurs en aval. En outre, les membres de la communauté ont noté la nécessité de maintenir la santé du sol dans le cadre de l'agriculture pluviale (particulièrement évaluée pour les plantations de café), par la plantation complémentaire d'arbres (comme le papayer, le bananier ou d'autres espèces, entre autres), en vue d'améliorer l'infiltration de l'eau, fournir de l'ombre pour réduire l'évaporation de l'humidité du sol, et assurer la stabilité des pentes. Cette agroforesterie présente également l'avantage socio-économique supplémentaire d'améliorer la qualité et le rendement de la production de café.

b. Perception de la réponse du FEM aux besoins en matière de sécurité de l'eau (pertinence)

- **Lutte contre l'érosion et la sédimentation :** Quatre des six projets examinés abordaient la sécurité de l'eau par le biais de la lutte contre l'érosion et la sédimentation, à des degrés divers. En particulier, le Projet de restauration du paysage pour une résilience accrue dans les zones urbaines et périurbaines de Bujumbura (FEM 10099, ci-après dénommé Projet de restauration du paysage de Bujumbura) et son prédécesseur, le Projet de gestion communautaire des risques de catastrophe,

[35] Document d'orientation de la politique environnementale, agricole et d'élevage (juillet 2020)
[36] Ministère de l'Eau, de l'Agriculture et de l'Élevage

ont pour principaux objectifs d'améliorer la rétention des sédiments et de réduire l'érosion dans les cours d'eau et les bassins versants qui se jettent dans le lac Tanganyika. Ces objectifs sont atteints grâce au reboisement et à la stabilisation des pentes (construction de terrasses et de fossés à sédiments sur les pentes raides où le sol est trop mince pour être aménagé en terrasses). Le projet précédent a amélioré la stabilité des pentes et la canalisation dans certaines zones du bassin versant de Ntahangwa à Bujumbura et dans plusieurs communautés de Bujumbura Mairie. Les parties prenantes interrogées ont convenu que le projet de gestion communautaire des risques de catastrophe a aidé les communautés de Kanyosha Collline à réduire le ruissellement des sédiments et les glissements de terrain, bien qu'il n'ait pas atteint toutes les communautés espérées. Le projet plus récent de restauration du paysage de Bujumbura doit continuer à traiter ces questions dans les communautés d'Isare Colline et de Kanyosha Colline, où une réunion d'information communautaire a eu lieu en novembre 2022. Les personnes interrogées ont noté que les populations étaient assez désireuses de faire avancer les projets dans leurs communautés, l'érosion étant considérée comme un problème de taille.

- Le Projet de gestion de la qualité de l'eau dans le bassin du lac Kivu et le bassin de la rivière Rusizi (projet Lac Kivu et BRR ; FEM 10566), bien qu'en phase de préparation, favorisera la réduction des risques, notamment l'érosion excessive et les inondations dans la rivière Rusizi qui se jette dans le lac Tanganyika. Le Projet de conservation de la biodiversité, de gestion durable des terres et d'amélioration de la sécurité de l'eau dans le bassin du lac Tanganyika (FEM 10388) est en phase de préparation, mais vise à réduire l'érosion en amont et le déversement de la charge sédimentaire dans les habitats lacustres proches du rivage en freinant la dégradation des terres, en réduisant la perte des sols, en réhabilitant les habitats dégradés et en renforçant la protection des habitats naturels à la biodiversité intacte, dans les bassins versants du lac - bien que ces bassins versants n'aient pas encore été déterminés au Burundi. Les personnes interrogées ont relevé que le dépôt des sols dans le lac Tanganyika est un problème qu'il faut régler en priorité et ce projet aidera à concevoir des stratégies pour inverser la dégradation des terres.
- En tant que priorité secondaire, le projet PADZOC a encouragé une meilleure gestion des paysages de café en cultivant le café à l'ombre, ce qui contribue également à la santé des sols en augmentant leur contenu organique et en améliorant leur rétention. Les méthodes encouragées dans les provinces de Bubanza, Bururi et Muyinga le sont maintenant dans la province de Kayunga avec le projet Restauration et résilience du paysage du Burundi (FEM 10594). Les producteurs de café locaux à Mwakiro, Burunga, Kivyuka et Kayange, avec qui des échanges de vues ont eu lieu, ont tous convenu que l'introduction d'arbres avec des systèmes racinaires plus profonds pour fournir de l'ombre a également contribué à stabiliser les pentes plus raides des plantations de café. De plus, les feuilles qu'ils déposaient se décomposaient pour contribuer à la santé du sol.

	
Canalisation pour la lutte contre les inondations à Bujumbura (FEM 4990)	Semis pour la stabilisation des pentes (FEM 4990)

- **Systèmes d'alerte précoce pour les catastrophes**. Dans le cadre du Projet de gestion communautaire des risques de catastrophe, 30 stations hydrométriques ont été installées dans le bassin versant de Ntahangwa et à Bujumbura grâce aux informations recueillies par l'IGEBU. Dans le cadre du Projet de restauration du paysage de Bujumbura, les capacités du gouvernement seront étendues afin de lui permettre d'utiliser les informations climatiques pour mieux comprendre la santé des écosystèmes et fournir des services aux administrations et aux communautés locales. Lors de l'examen des projets avec les parties prenantes locales, celles-ci se sont félicitées de la mise en place de systèmes d'alerte précoce, mais elles aimeraient mieux comprendre comment en tirer profit et utiliser les informations pour renforcer la résilience des communautés. Le nouveau projet est conçu pour aborder cette question au niveau du bassin versant.

- **Qualité de l'eau :** La qualité de l'eau a été abordée directement par le projet PADZOC par la promotion du traitement de l'eau résultant du processus de lavage du café. Le projet a mis en place des installations de traitement dans six stations de lavage du café pour traiter les polluants biologiques. Dans le processus de lavage, seuls environ 15 % en poids du café brut sont des grains de café, tandis que le reste est de l'écorce. À la fin du projet PADZOC, alors que la demande biologique en oxygène sur 5 jours, la demande chimique en oxygène et les solides dissous totaux ne s'étaient pas sensiblement améliorés depuis le début du projet, on a constaté une amélioration sensible du pH, de l'azote total, du phosphore total, des huiles et des graisses - ces trois dernières améliorations étant conformes aux normes nationales. Il convient de noter que les responsables de l'ODECA ont estimé que les « normes nationales » pour les eaux usées devaient être revues à la lumière du contexte environnemental local et ne devaient pas être simplement importées de l'étranger. Il a également été noté que le prélèvement d'échantillons d'eau dans les bassins d'infiltration est difficile, car il faut prendre l'eau qui émerge après l'infiltration. En conséquence, l'échantillonnage est moins fréquent.

	
Un des trois fossés d'infiltration en ligne pour le traitement de l'eau, station de lavage du café, communauté de Mwakiro.	Réservoirs de traitement des eaux usées à la station de lavage du café à Burunga, Buriburi (FEM 4631)

En outre, dans le cadre du Projet de gestion conjointe du bassin du Nil - Projet de l'aquifère de Kagera (FEM 9912), des puits de surveillance doivent être aménagés et des analyses de la qualité de l'eau seront effectuées ; et les bonnes pratiques en matière de lutte contre la pollution devraient être l'une des priorités du projet du lac Kivu et du BRR.

- **Approvisionnement en eau :** Le projet de gestion conjointe du bassin du Nil favorise spécifiquement la gestion durable de l'eau de l'aquifère de Kagera, ce qui inclut l'approvisionnement en eau des communautés vulnérables, en particulier les Batwa indigènes, i) en aidant à déterminer les rendements durables et les directives de gestion pour les zones sensibles de l'aquifère, et ii) en mettant au point du matériel de sensibilisation au sein des communautés Batwa indigènes. Les parties prenantes interrogées ont noté la nécessité d'élaborer des solutions rentables pour entretenir les robinets communautaires - le matériel éducatif et de sensibilisation sera axé sur l'entretien des robinets communautaires et l'utilisation durable de l'eau. Jusqu'à présent, 10 communautés ont été interrogées au titre de ce projet. Dans le cadre du projet PADZOC, la communauté Batwa de Kiganda a été incitée à quitter le parc national de Bururi et a reçu un robinet central d'alimentation en eau fonctionnant toute l'année, dont la communauté a confirmé qu'il permettait un accès simple et constant à l'eau potable. Le projet de restauration du paysage de Bujumbura, celui du bassin du lac Tanganyika et celui du lac Kivu et BRR cherchent tous à réduire l'érosion et donc l'entrée de sédiments dans le lac Tanganyika, ce qui contribuera potentiellement à limiter le coût du traitement pour l'approvisionnement en eau de la ville de Bujumbura.
- **Préservation de l'écosystème aquatique.** Dans le cadre de la gestion durable de l'aquifère de Kagera, le projet de gestion conjointe du bassin du Nil examine également la connexion des eaux de surface avec les zones humides importantes de la région. Dans le cadre du projet PADZOC, l'écosystème aquatique a bénéficié de la promotion de la gestion des zones protégées du Parc national de Bururi. Une méthode similaire est utilisée dans la province de Kayunga, ainsi que pour accroître la résilience des forêts nationales (et par la suite des rivières qu'elles contiennent) dans le Parc national de Kibira, dans le cadre du Projet de restauration et de résilience du paysage (FEM 10594). Le projet de conservation de la biodiversité, de gestion durable des terres et de renforcement de la sécurité de l'eau dans le bassin du lac Tanganyika favorise également

l'amélioration des services écosystémiques (et donc de la santé) dans les zones centrales de conservation.

c. Collaboration et cohérence entre les projets du FEM et les projets financés par d'autres bailleurs de fonds (cohérence)

Le Burundi est un petit pays et beaucoup de professionnels travaillant dans le secteur de l'eau se connaissent et sont au courant des différents projets en cours et proposés. Par conséquent, il existe un bon niveau de collaboration, de cohérence et d'actions de soutien entre les différents projets. Au nombre des exemples figurent les suivants :

Le Projet de gestion de l'eau du lac Tanganyika (LATAWAMA I) (2019-2022) est un vaste projet financé par l'Union européenne et exécuté par Enabel pour appuyer la surveillance de la qualité de l'eau et la gestion des eaux usées dans les villes côtières. En tant que tel, il met en œuvre une partie des mesures définies par le programme d'action stratégique (PAS) du lac Tanganyika, mis à jour dans le cadre de précédentes interventions du partenariat pour l'exécution du PAS du lac Tanganyika (FEM 1017). De même, le projet plus récent d'étude de cas du bassin du lac Tanganyika alignera les activités pour compléter d'autres initiatives régionales, comme le projet LATAWAMA, entre autres. Les parties prenantes ont également noté que le projet d'étude de cas du bassin du lac Tanganyika devrait aussi collaborer avec le projet d'étude de cas du lac Kivu et du BRR, en particulier pour fournir des données d'expérience acquises dans le bassin du Tanganyika dans la mise en place d'une autorité de gestion à l'échelle du bassin dans ce dernier projet.

Le projet du Lac Kivu et du BRR vise à adopter un programme d'action stratégique basé sur l'Analyse transdiagnostique réalisée par le « Projet d'appui à la gestion intégrée des ressources en eau du Lac Kivu et de la Rivière Rusizi » - un projet de l'UE, exécuté par la GIZ, pour promouvoir la gestion intégrée des ressources en eau dans le bassin transfrontalier.

Au Burundi, le Projet d'intégration des considérations relatives aux eaux souterraines dans la gestion du bassin du Nil (FEM 3321) a utilisé les informations produites par le programme BGR à long terme sur les eaux souterraines au Burundi (2012-2022) qui s'est concentré sur la cartographie et la protection des eaux souterraines. Le projet de gestion conjointe du bassin du Nil s'appuie sur cette base de données et se concentre sur l'aquifère de Kagera.

Le café cultivé à l'ombre et le traitement de l'eau qui ont été favorisés dans le cadre du projet PADZOC ont progressé et ont été reproduits par d'autres bailleurs de fonds, tels que le projet « MARKUP » de l'UE (2018-2022) et sont également reproduits par le Projet de restauration et de résilience du paysage (FEM 10594). D'autres bailleurs de fonds aident également au développement du secteur du café et travaillent avec les communautés locales, comme l'USAID qui a appuyé la promotion des associations de femmes caféicultrices en 2016 et a continué à aider les producteurs de café en s'assurant que les femmes participent aux activités. Lors d'une visite à Kayange et Bobabza, il a été noté qu'environ 30 % des travailleurs qui améliorent la station de lavage du café Musigati étaient des femmes qui ont indiqué que cette méthode était désormais assez courante. Malheureusement, les personnes interrogées n'ont pas étayé par des documents ou mentionné la collaboration entre les projets de café financés par le FEM et le projet MARKUP de l'UE ou les interventions de l'USAID.

d. Assurer la sécurité de l'eau pour les populations vulnérables (efficacité)

- Dans le cadre du projet PADZOC, des incitations ont été offertes à une communauté indigène Batwa près du parc national de Bururi pour qu'elle se réinstalle. Ces mesures ne faisaient pas partie de la conception du projet, mais ont été élaborées au cours de son exécution pour faciliter la réinstallation. Les incitations comprenaient, entre autres, des logements, quelques terres agricoles de subsistance et un approvisionnement en eau. Lors d'une visite à la communauté de Kiganda, dans la province de Bururi, les femmes ont confirmé qu'elles sont heureuses, car elles disposent d'une bonne eau même pendant la saison sèche et que l'emplacement central du robinet communautaire leur fait gagner beaucoup de temps. Il fonctionne toujours, mais il a été partiellement réparé avec une chambre à air de vélo. Il y a une petite fuite et la population est capable de la réparer elle-même. Malheureusement, les maisons fournies par le projet, deux en particulier, ont des murs qui ont été gravement endommagés par les intempéries, car l'endroit est situé sur une crête exposée. Il apparaît que d'autres bâtiments présentant des fissures sont entretenus. Un système similaire d'incitation à la réinstallation des Batwa indigènes de la zone protégée de Kibira est envisagé dans le cadre du Projet de restauration et de résilience du paysage (FEM 10594).

	
Point d'eau, robinet légèrement ouvert, Communauté Batwa Kiganda, Province de Bururi (FEM 4631)	Discussion avec la communauté Batwa Kiganda, Province de Bururi (FEM 4631).
	
Maison en état de délabrement avancé dans la communauté Batwa de Bururi	Tentative de réparation des fissures avant qu'elles ne s'aggravent.

Dans le cadre du projet de gestion conjointe du bassin du Nil, les communautés Batwa ont été spécifiquement ciblées pour être incluses et jusqu'à présent, 11 communautés ont été interrogées au titre d'une enquête socio-économique sur l'aquifère de Kagera. Les communautés pilotes spécifiques qui participeront au projet n'ont pas encore été identifiées.

Le genre. Le projet PADZOC a bénéficié à quelque 17 970 personnes, dont 40 % de femmes. Bien que ce chiffre soit inférieur à l'objectif de 50 % de femmes bénéficiaires, il s'agit tout de même d'une solide avancée. Ferdiane Ndikumana à Kiviyka – Station de lavage de café de Makengo - a noté qu'elle, et d'autres femmes qu'elle connaît, ont bénéficié de l'application des techniques de culture du café à l'ombre, car elles améliorent le rendement de la récolte de café ainsi que la production d'autres cultures, comme les bananes. Dans le projet de gestion communautaire des risques de catastrophe, les entretiens ont indiqué que les femmes participaient aux réunions de prise de décision communautaires ainsi qu'à des associations comme l'Association pour le développement de la Femme (ADF). Dans le projet plus récent de restauration du paysage de Bujumbura, les promoteurs espèrent donner des certificats fonciers à toutes les parcelles qui ont été améliorées tout au long du projet. Le nom sur le certificat foncier serait celui des femmes, et le certificat pourrait éventuellement être utilisé pour un microfinancement.

3. Sécurité de l'eau : réalisations et durabilité

a. Résultats des projets du FEM liés à la sécurité de l'eau (prévus et atteints) (efficacité)

Vue d'ensemble des résultats liés à la sécurité de l'eau des projets du FEM achevés, principalement de l'évaluation finale. Discuter de la manière dont les résultats s'inscrivent dans les quatre dimensions principales et les groupes de résultats de la théorie du changement de l'évaluation de la sécurité de l'eau.

La définition de la sécurité de l'eau du PNUE[37] présente quatre domaines essentiels à prendre en compte lorsqu'on cherche à assurer cette sécurité. Le tableau ci-dessous montre comment les projets examinés correspondent à ces quatre domaines.

Zones de sécurité de l'eau	Résultats et objectifs du projet
L'eau potable et le bien-être humain	Le FEM 4631 a mis en place un système d'eau potable pour la communauté Batwa, qui fonctionne toujours et est efficace. Le FEM 9912 - Gestion de l'aquifère de Kagera - prévoit un certain nombre de projets pilotes pour assurer l'utilisation durable de l'aquifère, y compris pour l'approvisionnement en eau des communautés, car l'aquifère est assez peu profond. Les communautés pilotes n'ont pas encore été choisies, mais 10 communautés ont été interrogées. Le projet concernant les sédiments dans le lac Tanganyika pourrait indirectement améliorer l'approvisionnement en eau de Bujumbura.
Écosystèmes	Le FEM 4631 a amélioré la gestion et réduit les effets sur le parc national de Bururi, et donc sur les rivières et les zones riveraines associées au sein du parc. Le FEM 10594 vise à faire de même dans le parc national de Kibira. Le FEM 10388 vise à améliorer la conservation et les écosystèmes aquatiques dans plusieurs zones à déterminer. Dans l'ensemble, l'écosystème bénéficie de la réduction de la

[37] https://www.unwater.org/publications/what-water-security-infographic

	charge sédimentaire dans de nombreux projets du FEM, et la lutte contre la sédimentation est l'un des principaux problèmes auxquels est confronté le lac Tanganyika et qui est mis en évidence dans la Stratégie et le plan d'action. Le FEM 4631 a permis d'améliorer directement la qualité de l'eau en aval de la station de lavage du café. Le FEM 10566 vise à améliorer la lutte contre la pollution dans la rivière Rusizi et le lac Kivu.
Risques liés à l'eau et changement climatique	Le FEM 4990 a permis de réduire la sédimentation, d'améliorer la stabilité des pentes et de mettre en place des systèmes d'alerte précoce dans les zones autour de Bujumbura. Le FEM 10099 poursuit cette action dans les communautés périphériques d'Isare et de Kanyosha.
Développement et activités économiques	Les FEM 4631, 10599, 4990 et 10099 améliorent tous l'agriculture des communautés locales grâce à une meilleure rétention des sols. Le FEM 10388 améliore la pêche en réduisant la sédimentation dans certaines zones du lac Tanganyika (priorité secondaire).

En plus des quatre domaines essentiels, l'évaluation de la sécurité de l'eau a permis de déterminer six groupes de résultats essentiels pour la sécurité de l'eau qui pourraient être abordés par les projets du FEM :

Une participation et une sensibilisation accrues des parties prenantes, notamment au sein des communautés locales, des femmes, des jeunes et du secteur privé.

La majorité des projets examinés ont réussi à associer ou prévoient d'associer les communautés locales au renforcement de la compréhension et de la prise de conscience des problèmes. Le projet PADZOC a permis de renforcer les capacités et la formation au niveau communautaire et d'associer les coopératives de café à la conception et la modernisation de stations de lavage du café. Cette approche est en cours d'extension dans le cadre du projet de restauration et de résilience du paysage du Burundi (FEM 10594). Ce projet fait participer les communautés à un stade précoce (réunion des parties prenantes tenue en novembre 2022) et s'appuie sur le modèle d'intervention de son prédécesseur, le projet de gestion communautaire des risques de catastrophe. Le projet de gestion conjointe de l'aquifère de Kagera (FEM 9921) a mené une enquête socio-économique et mobilisé 11 communautés indigènes Batwa à ce jour. D'autres projets en sont aux premiers stades de leur élaboration et n'ont pas encore concrètement mobilisé les populations locales.

Aucun des projets examinés n'avait d'activités spécifiques axées sur les jeunes, et les femmes sont incluses essentiellement par la promotion de l'égalité des sexes dans la mobilisation des communautés. Le projet de restauration et de résilience du paysage (FEM 10594) cible spécifiquement les femmes pour l'acquisition de titres fonciers dans les zones qui seront revalorisées.

Connaissance et communication solides, concernant les ressources en eau, les utilisations, les effets climatiques et les indicateurs d'alerte précoce ; valeur de l'eau.

La connaissance des ressources en eau est fortement soutenue par plusieurs des projets examinés, qui traitent essentiellement de la gestion de l'eau. Par exemple, le projet de gestion conjointe du bassin du Nil qui met au point une modélisation des eaux souterraines de l'aquifère sur la base de données partagées entre le Burundi, le Rwanda, l'Ouganda et la Tanzanie ; le projet du lac Kivu et du BRR vise à élaborer un programme de surveillance communautaire et à améliorer les laboratoires pour

la surveillance de la qualité de l'eau ; le projet du bassin du lac Tanganyika prévoit de mettre en place une plateforme de connaissances - bien que pour la cogestion de la pêche et non spécifiquement pour la gestion des ressources en eau. Le projet PADZOC a amélioré la science du café cultivé à l'ombre grâce au travail de l'ISEBU - mais pas nécessairement en ce qui concerne les questions d'eau.

Accès constant et suffisant au financement, y compris l'accès au financement du secteur privé, aux obligations vertes, aux fonds environnementaux, etc.

Le projet PADZOC a favorisé différentes approches en matière de culture du café et de traitement de l'eau des stations de lavage du café dans le but de renforcer la qualité et la réputation du café du Burundi, d'obtenir une certification environnementale et de revendiquer un prix plus élevé sur le marché. Cela permettrait à son tour de financer la reproduction d'activités bénéfiques pour l'environnement, notamment l'eau et l'écosystème aquatique. Comme indiqué précédemment, des projets ultérieurs ont également fait progresser cette approche. Malheureusement, les prix mondiaux du café ont connu des fluctuations importantes au cours de la dernière décennie (de 2,80 dollars en 2011 à 0,93 dollar en 2019), ce qui rend difficile l'application d'incitations économiques aux travaux d'infrastructure. Des méthodes telles que celles proposées dans le cadre du projet de restauration et de résilience du paysage (FEM 10594), où les terres restaurées auraient des femmes comme titulaires de titres de propriété leur permettant d'accéder à des prêts pour le microfinancement, pourraient avoir des effets considérables sur le maintien des objectifs du projet à moyen terme.

Dans le cadre du projet de gestion conjointe du bassin du Nil, l'enquête socio-économique menée a permis de déterminer plusieurs modes de paiement communautaire pour la création de robinets d'eau communautaires, y compris la présence d'un opérateur de maintenance local pour assurer une utilisation équitable, le tout payé par le biais d'un système géré localement pour facturer des taux nominaux pour l'eau au robinet.

Systèmes de gouvernance solides ; prise de décision, transparence, politiques et réglementations appropriées, et accords, droits de l'homme, accès.

Le projet du lac Kivu et du BRR contribue à soutenir l'autorité ABAKIR ; le bassin du lac Tanganyika soutient l'autorité du lac Tanganyika ; et le projet de gestion conjointe du bassin du Nil soutient la gouvernance transfrontalière de l'aquifère de Kagera.

Gestion adaptative active ; (apprentissage, planification et mise en œuvre - et réapprentissage)

Aucun des projets examinés ne mentionne spécifiquement la gestion adaptative comme un thème. Cependant, le projet PADZOC a pu mettre en avant une approche qui a été adoptée par les projets suivants. Les entretiens ont révélé qu'en termes de plantes compagnes pour le café cultivé à l'ombre, l'apprentissage se poursuit. Par exemple, l'ODECA étudie l'impact relatif du café planté à côté de plantes aux racines plus profondes (comme le papayer ou les bois durs) par rapport à celles aux racines moins profondes (comme les courges et les haricots). D'autres projets intègrent dans leur conception des « leçons apprises », soit d'autres projets dans la conception du projet, soit pour échanger des données et des informations avec eux.

Optimisation de la nature physique et de la capacité des systèmes d'environnement et d'eau, y compris les infrastructures vertes et grises.

Le projet PADZOC a encouragé le traitement de l'eau des effluents des stations de lavage du café et a construit des installations dans six endroits. Les projets axés sur la stabilisation des pentes par la plantation d'arbres ou l'aménagement de fossés ont également des effets localisés sur la dynamique hydrologique du bassin versant et renforcent la résilience aux fortes pluies et aux inondations.

Examen des répercussions

Les parcs nationaux situés à proximité des zones de projet sont relativement petits et leurs environnements aquatiques sont fortement affectés par les activités agricoles à l'extérieur de leurs limites, comme le parc national de Rusizi à l'embouchure de la rivière Rusizi. Les projets visant à maîtriser la sédimentation par la stabilisation des pentes sont susceptibles d'avoir des impacts durables, car les communautés y voient des avantages directs pour leur propre sécurité et l'amélioration de leurs moyens de subsistance. Cependant, l'échelle des zones nécessitant une stabilisation des pentes et le nombre de kilomètres de cours d'eau à réhabiliter sont très importants. Les activités de stabilisation des pentes auront des répercussions dans une zone localisée, mais il est peu probable qu'elles aient des répercussions importantes sur la charge sédimentaire du lac Tanganyika, à moins que des activités de stabilisation ne soient menées à l'échelle du bassin.

La méthode visant à assurer le traitement de l'eau des stations de lavage du café dans le cadre du PADZOC devait être poursuivie avec le Projet d'appui à la compétitivité du secteur du café de la Banque mondiale ; cependant, ce projet a été clôturé début 2020. Pour autant, le traitement des eaux usées des stations de lavage du café est encouragé et représente une condition à remplir pour obtenir un certificat de l'Office pour le développement du café (ODECA), et est soutenu par d'autres bailleurs de fonds, par exemple dans le cadre du projet « MARKUP » de l'UE qui a débuté en 2018, ainsi que dans la province de Kayunga avec le projet de restauration et de résilience du paysage du Burundi (FEM 10594).

b. Relation entre les résultats et les effets positifs pour l'environnement mondial, les avantages annexes et les conséquences involontaires (efficacité)

Moyens de subsistance. L'amélioration de la stabilité des pentes et la lutte contre l'érosion dans le cadre des projets de gestion communautaire des risques de catastrophe et de restauration du paysage de Bujumbura, ainsi que l'amélioration de la santé du sol et de la rétention de l'humidité du sol dans le cadre du projet PADZOC et du projet de résilience du paysage (FEM 10594) ont pour avantage d'améliorer la production agricole et la qualité des produits et de renforcer les moyens de subsistance des membres de la communauté - comme le confirment les producteurs de café locaux. Les installations de traitement de l'eau pour les stations de lavage du café ont permis d'obtenir la certification de commerce équitable pour deux des stations, ce qui permet au café d'obtenir un prix plus élevé.

Le projet PADZOC a eu des effets positifs liés à l'amélioration des eaux usées des stations de lavage du café, ainsi qu'au développement des capacités en termes de sensibilisation et d'intérêt de la communauté. En outre, au niveau du paysage, le projet a limité la dégradation des sols en améliorant la rétention et la santé des sols grâce à la production de café cultivé à l'ombre et à la culture de plantes compagnes. Un avantage annexe a été la mise en place d'un système d'approvisionnement en eau et la fourniture de terres agricoles de subsistance pour la communauté indigène Batwa à Kiganda, Bururi.

Le projet d'intégration des considérations relatives aux eaux souterraines dans le bassin du Nil n'a pas eu d'activités spécifiques au Burundi, bien que des sessions de formation aient été organisées et suivies par

le personnel de l'IGEBU ; malheureusement, le matériel et les outils de formation n'étaient pas disponibles en français, ce qui a limité leur applicabilité au Burundi. Les entretiens avec les promoteurs de projet et les parties prenantes ont confirmé que ce problème est en train d'être résolu dans le cadre du projet de gestion conjointe du bassin du Nil.

c. Durabilité des résultats en matière de sécurité de l'eau dans les projets achevés (durabilité)

Le projet PADZOC a été achevé en 2019. L'Office pour le développement du café au Burundi (ODECA)[38] a été créé en 2020 pour superviser la production et la transformation du café ainsi que la promotion des ventes de café au niveau international. Le café représente plus de 75 % des recettes d'exportation et constitue un élément très important de l'économie du Burundi. L'ODECA est également responsable de la délivrance des permis et a adopté une politique visant à installer un système de traitement des eaux dans les stations de lavage du café. Par conséquent, il délivre des certifications environnementales et est chargé de vérifier le traitement des eaux usées dans les stations de lavage. Ces stations sont censées disposer d'installations de traitement des eaux pour recevoir une certification environnementale leur permettant de fonctionner. Environ 70 % des 350 stations de lavage du café du Burundi sont privées ou gérées par des coopératives. Les stations visitées étaient soit certifiées, soit en train d'obtenir une certification, comme la station de Musigati. Il a été noté que si la plupart des stations continuaient à entretenir les fosses d'infiltration et à utiliser des additifs de traitement, comme la craie, au moins une station visitée ne le faisait pas, affirmant qu'il était trop coûteux d'ajouter de la craie chaque année sans en retirer d'avantages apparents. En outre, aucune des personnes interrogées ne savait si l'ODECA avait effectué un suivi pour vérifier l'efficacité des méthodes de traitement. D'autres initiatives, comme le projet « MARKUP » de l'UE, encouragent également le traitement des eaux dans la station de lavage. Un point qui a été noté au cours de l'évaluation nationale est le fait que, bien que l'ODECA relève du ministère de l'Eau, de l'Agriculture et de l'Élevage, il est conçu pour promouvoir le secteur du café (et pourrait donc avoir un conflit d'intérêts en étant également le régulateur du secteur). L'analyse de l'eau provenant des stations de lavage pourrait donc relever de la Direction des ressources en eau et de l'Office burundais pour la protection de l'environnement (OBPE), qui est légalement responsable de l'analyse de la qualité de l'eau provenant des effluents, et non de l'ODECA.

Il semble que la qualité des effluents des stations de lavage de café se soit améliorée depuis la fin du projet, ce qui a été illustré par les premières analyses effectuées au cours du projet et appuyé par des témoignages anecdotiques émanant des communautés, malgré l'absence d'analyse de l'eau. Il semble que la plupart des coopératives de producteurs de café soient disposées à continuer à maintenir et à améliorer la qualité des effluents provenant des stations de lavage du café et qu'il y ait une compréhension commune de ses avantages pour l'environnement en aval. Cette prise de conscience et cette volonté, en particulier face à l'amélioration des prix du café grâce aux certifications internationales qui exigent de meilleures pratiques en matière de stations de lavage du café, laissent entrevoir une tendance positive et fournissent l'incitation fiscale nécessaire pour maintenir la durabilité.

[38] Office pour le développement du café du Burundi

	
Fosses d'infiltration de 2 ans pour le traitement de l'eau dans une station privée de lavage du café à Bururi. L'opérateur a confirmé que le propriétaire creuse et nettoie chaque saison et ajoute du charbon et de la craie.	Fosses de traitement inachevées dans la station de lavage du café, Station de café de Makengo, province de Bubanza. La première fosse de traitement est manquante - elle n'a jamais été construite en raison de la clôture du projet de compétitivité du secteur du café

Le projet d'intégration des considérations relatives aux eaux souterraines a contribué à sensibiliser aux problèmes des eaux souterraines transfrontalières dans le bassin du Nil, et en particulier dans l'aquifère de Kagera qui est partagé entre la Tanzanie, l'Ouganda et le Burundi. En supposant que le projet de gestion conjointe du bassin du Nil réalise une analyse transdiagnostique et un programme d'action stratégique pour l'aquifère de Kagera, il est possible d'améliorer la gestion de l'eau de l'aquifère et, si les avantages sont obtenus au niveau de la communauté, il est plus probable que les « bonnes pratiques » soient maintenues.

4. Conclusions générales

La sécurité de l'eau est prise en compte par les interventions du FEM au Burundi, avec des résultats apparemment positifs, même si ce n'est pas nécessairement l'objectif spécifique de tous les projets examinés. Les projets portant sur la stabilisation des pentes dans la région de Bujumbura contribuent à réduire les risques liés aux aléas climatiques tels que les glissements de terrain dans une zone localisée, et réduisent également la charge sédimentaire dans le lac Tanganyika, ce qui devrait améliorer l'approvisionnement en eau de la principale ville du Burundi. Cependant, les répercussions réelles sur la charge sédimentaire dans le lac Tanganyika n'ont pas été évaluées et elles sont probablement de faible ampleur compte tenu de l'étendue et de l'intensité de l'agriculture dans les bassins versants de Ntahangwa et des environs. Néanmoins, les projets qui atteignent leurs objectifs d'amélioration de la stabilité des pentes et de rétention des sols sur les sites du projet, réduisent – dans une certaine mesure- la charge sédimentaire dans le lac Tanganyika.

Les projets associés au traitement des effluents des stations de lavage de café ont progressé du point de vue de la construction d'infrastructures. L'entretien complet et l'exploitation des systèmes semblent généralement se poursuivre, bien que dans au moins un cas, l'ajout de chaux réduisant le pH ait cessé en raison des coûts. Sur le terrain, les changements dans la façon dont les effluents sont traités sont mis en évidence par le nombre de stations de lavage de café qui ne faisaient pas partie du projet PADZOC,

mais qui ont adopté des installations de traitement ou sont sur le point de le faire. Par conséquent, même si l'eau des effluents n'atteint pas les normes nationales pour tous les paramètres, elle est sans aucun doute améliorée par rapport aux pratiques utilisées avant 2014. En outre, ils ont réussi à sensibiliser le public au niveau national, mais surtout au niveau local, à la nécessité de faire des efforts pour traiter les effluents. La mesure dans laquelle l'eau s'est améliorée relève de l'anecdote, car aucun échantillonnage n'a été effectué pour déterminer les niveaux de pollution dans les effluents.

Les projets ont fait preuve de sensibilité à l'égard des communautés vulnérables et marginalisées, en particulier le peuple indigène Batwa. Dans le cas du projet PADZOC, une communauté a été dotée d'une source d'eau potable durable, et dans le cas du projet de gestion conjointe du bassin du Nil, la collaboration avec 11 communautés de la région de l'aquifère de Kagera a été entreprise jusqu'à présent.

Les parties prenantes interrogées ont confirmé qu'il existe un bon niveau de coordination ou de compatibilité avec les projets du FEM et les activités d'autres bailleurs de fonds, par exemple avec le BGR en termes de projets sur les eaux souterraines ; le projet de surveillance de la qualité de l'eau de l'EU-LATAWAMA avec le projet sur le lac Tanganyika et le lac Kivu - BRR. Toutefois, le projet de résilience du paysage (FEM 10594) devra peut-être déployer davantage d'efforts pour établir des liens avec d'autres initiatives de bailleurs de fonds, du moins dans le secteur de la production de café du projet.

En ce qui concerne l'implication des parties prenantes au niveau local, les projets des zones focales des eaux internationales n'associent pas les parties prenantes locales aux discussions lors de la conception du projet, il ne leur est fait appel que lorsque le projet a été lancé et que des enquêtes sont menées ou que des zones pilotes sont choisies. Dans les projets au niveau national traitant de la stabilité des pentes, ceux de gestion communautaire des risques de catastrophe et de restauration du paysage de Bujumbura ont impliqué les communautés locales dès le début du projet, y compris lors de sa conception. Les parties prenantes locales interrogées dans le cadre du projet PADZOC se sont montrées très satisfaites du projet et de leur expérience, notamment en ce qui concerne la formation et le renforcement des capacités, et celles qui n'ont pas bénéficié d'avantages matériels, comme les communautés voisines, sont enthousiastes à l'idée de participer à d'autres projets similaires. En particulier, comme le café ne rapporte pas autant que les gens l'espéraient, les membres des communautés locales interrogés ont indiqué qu'ils souhaitaient adopter une méthode d'interculture leur permettant de pratiquer d'autres cultures à côté du café.

Dans l'ensemble, le personnel national interrogé a jugé positivement les projets financés par le FEM, tout en suggérant de simplifier la procédure d'accès à ses ressources, et dans le cas du lac Tanganyika, le délai entre les projets relais est long - 6 ans se sont écoulés entre le projet d'intervention en partenariat (FEM 1017) qui s'est achevé en 2015 et le nouveau projet du bassin du lac Tanganyika qui est toujours en phase de préparation. De tels écarts de temps sapent la dynamique des efforts - heureusement, l'Autorité du lac Tanganyika a pu susciter l'intérêt d'autres bailleurs de fonds, comme le projet de surveillance LATAWAMA de l'UE. Bien que le projet d'intégration des considérations relatives aux eaux souterraines du bassin du Nil n'ait pas mené d'activités au Burundi, et que le matériel de formation n'ait pas été disponible en français, les personnes interrogées ont noté qu'il y avait un avantage à établir des relations avec d'autres organismes des eaux souterraines dans le bassin du Nil. De plus, le projet plus récent de gestion conjointe du bassin du Nil a déjà commencé à mettre au point une forme d'analyse transdiagnostique concernant l'aquifère de Kagera et donne lieu à une coopération plus étroite avec les

organismes voisins au Rwanda, en Tanzanie et en Ouganda. Le personnel de l'organisme national s'est également montré positif à l'égard des travaux menés sur la stabilisation des pentes dans les zones urbaines et périurbaines autour de Bujumbura, relevant que la prise en compte des contraintes liées au changement climatique et associées à l'érosion et aux glissements de terrain constituait une priorité de premier ordre.

Technical Document 8: Dinaric-Karst Aquifer System Case Study Report

Global Environment Facility Independent Evaluation Office

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Cover photo shows the Cemi-Cijevna river outside of Tuzi, Montenegro.

1. Introduction

a. Description of the GEF IEO water security evaluation

Freshwater resources are critical to both humans and ecosystems and the threats to these resources are of great importance to GEF and the wider international development community. Water security has increasingly been used by the global water community to frame the issues relating to freshwater resources. United Nations Environment Programme (2013)[39] defines water security as "the capacity of a population to safeguard sustainable access for sustaining livelihoods, human well-being and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability."

Given the importance and cross-cutting nature of water security and the growing recognition of the issue in the GEF strategies and projects, the GEF IEO is undertaking a comprehensive, multi-focal area evaluation of the topic. The Evaluation of GEF's strategy and portfolio in water security will take a look at the broader "footprint" of the GEF portfolio in terms of water security, in terms of impacts and sustainability. The evaluation began in October 2021 and is scheduled to be completed during 2023.

As part of the evaluation, several case studies were chosen to understand how GEF projects and programs have impacted water security at the country and the basin level. Case studies were designed to address several evaluation topics, including:

- **Relevance** of GEF projects to the water security needs, policies and strategies of beneficiaries and key stakeholders in the countries where they work, including national and local government, communities, vulnerable populations, civil society, the private sector, NGOs and others.
- **Coherence** of GEF's projects with similar donor-funded and government initiatives in the areas where they work.
- **Effectiveness** of GEF projects in achieving improvements in water security, through main project outcomes or co-benefits and compliance with water related safeguards.
- **Effectiveness** of GEF projects in considering the specific water security of vulnerable populations especially women.
- **Sustainability** of the outcomes of completed GEF projects.

The criteria for selecting the case studies included: 1) presence of completed and ongoing GEF projects with relation to water security themes, 2) presence of transboundary watersheds or aquifers, 3) geographical diversity among the chosen case studies, 4) focal area[40] and trust fund[41] diversity among the case studies, 5) diversity in GEF Agencies among the case studies and 6) overlap with previous and other ongoing GEF IEO evaluations.

[39] United Nations Environment Programme (2013) What is water security? UN Water, Water Cooperation 2013.
[40] GEF focal areas include: Biodiversity, Chemicals and Waste, Climate Change, International Waters and Land Degradation.
[41] GEF manages three trust funds: the GEF Trust Fund (which consists of the focal areas mentioned above) and two funds focused on climate change adaptation: the Least Developed Countries Fund and the Special Climate Change Fund.

One of the chosen case studies was the Dinaric-Karst Aquifer System (DIKTAS) case study, which includes GEF projects related to management of transboundary groundwater resources within the DIKTAS area in the countries of Albania, Bosnia and Herzegovina (BiH) and Montenegro. This report summarizes the findings of the DIKTAS case study.

b. Description of GEF projects in the case study

The DIKTAS case study included three projects which are listed in Table 5. All three projects had a focus on managing transboundary groundwater resources, were funded through the International Waters focal area and included all three case study countries. GEF ID 3690 (known as the DIKTAS I project) also included Croatia, which was a GEF-eligible country at the time of implementation. GEF ID 9687 is a child project of the MedProgramme, a regional program implemented in the three case studies along with Algeria, Egypt, Lebanon, Libya, Morocco and Tunisia. The case study focused only on aspects of this project that dealt with coastal aquifer management.

c. Table 15. Overview of DIKTAS case study projects.

GEF ID	Project title	Lead Agency	Executing Agency	GEF financing (USD millions)	Co-financing (USD millions)	Period of implementation
3690	Protection and Sustainable Use of the Dinaric Karst Aquifer System	UNDP	UNESCO-IHP	2.16	3.40	2010-2015
9687	Mediterranean Coastal Zones Climate Resilience Water Security and Habitat Protection*	UNEP	UNESCO-IHP	7.00	143.27	2021-present
9919	Implementation of the SAP of the Dinaric Karst Aquifer System: Improving Groundwater Governance and Sustainability of Related Ecosystems	UNDP	UNESCO-IHP	5.15	15.05	Not yet started[+]

*GEF ID 9687 is a child project of the MedProgramme (GEF ID 9607).
[+]Project is GEF CEO endorsed but implementation has not yet begun.
IHP = International Hydrological Programme

d. Case study methodology

The DIKTAS case study was carried out between May – December 2022 culminating with the case study visit between October 3-14, 2022. The case study began with a review of all GEF project documents, including CEO Endorsement Request documents, project implementation reports, mid-term reviews (MTRs), terminal evaluations (TEs) and any other reports or data available. Key stakeholders were

identified via project documents and by contacting GEF Agency representatives from the evaluation's reference group.

An initial scoping trip was completed on June 5-7, 2022 to BiH to meet with major stakeholders to better understand the major themes of the three projects, the environmental issues dealing with groundwater management and identify important places and stakeholders to visit during the longer case study visit in October. After the scoping mission, several virtual interviews were carried out with national level stakeholders, GEF Agencies and former case study project staff. These interviews were evaluative and logistical in nature to gather information and plan the October visit.

The October case study visit involved traveling from Tirana, Albania to Sarajevo, BiH with stops in Shkoder, Albania, Ulcinj, Podgorica and Niksic, Montenegro and Trebinje and Mostar, BiH. Stakeholders met included national and local government, public water and hydropower utilities, NGOs, private companies, GEF project staff and former project staff and academia. Due to the focus on governance, policy and assessments of the DIKTAS I project (the only completed project) and that neither the MedProgramme project nor GEF ID 9919 (known as the DIKTAS II project) had done much implementation at the time of the case study, no project site verifications were carried out during the visit, although several key transboundary locations were visited including the Cemi/Cijevna and Buna/Bojana rivers on the border of Albania and Montenegro and Bileća Lake on the border of Montenegro and BiH.

Including the pre-visit virtual interviews, a total of over 57 stakeholders were consulted throughout the case study. Geospatial data from the DIKTAS I project was accessed and analyzed for geographical context.

2. Meeting stakeholder water security needs

a. Water security stakeholder priorities in the DIKTAS region

Key stakeholders expressed multiple priorities dealing with water security and freshwater management. Karst geology, which is dominant in the DIKTAS region, has unique characteristics such as highly interconnected surface and groundwater, with high infiltration rates and sinking rivers. Given this unique connection, many issues noted by stakeholders appeared to be surface water focused but had connection to groundwater management which was the focus of the case study. The major issues raised by stakeholders were:

- **Groundwater monitoring (all stakeholders groups)**. Technical stakeholders noted the lack of sufficient temporal and spatial resolution in existing groundwater monitoring, lack of availability and transparency of existing monitoring and inconsistent monitoring indicators and techniques across countries. Most monitoring done in the region is outdated (especially detrimental in the Karst region where groundwater flows can change drastically over time). Although the DIKTAS I project collated and synthesized the existing data, there is now a need for more harmonized (across countries) data collection to inform decision making and improve transboundary conflict resolution. At the same time, official monitoring agencies do not have enough budget to create and maintain dense networks.
- **Cross-country collaboration and communication on water management (all stakeholder groups)**. Many stakeholders, including local stakeholders in transboundary regions, expressed

the desire for improved communication between countries including data sharing. This was especially apparent for areas of disagreement over water resources impacts, including Lake Bileca (BiH and Montenegro), the Cemi/Cijevna river and surrounding aquifer (Albania and Montenegro) and the Buna/Bojana river/coastal watershed (Albania and Montenegro). This communication could be in the form of established transboundary forums or other established, long-term mechanisms.

- **On the ground activities (all stakeholder groups)**. Most stakeholders expressed the desire for more concrete, actionable project activities that leave a specific, physical outcome rather than reports, assessments or studies. DIKTAS I was considered to have left valuable reports for many stakeholders, but they wanted future projects to do more on the ground actions, such as providing monitoring equipment/computer software, monitoring field campaigns, performing community-level pilot activities, creating "shovel-ready" project designs.
- **Definition of sanitary zones in transboundary areas (national government and river basin authorities)**. This priority was raised more commonly in BiH (mostly in the Adriatic Sea coastal watersheds) where there are many surface-groundwater interconnections with Croatia, in which water that infiltrates into soil in once country is connected with springs or rivers in the other. This means that pollution or waste from one country can contaminate water sources in another, meaning defining transboundary "sanitary" zones that should be protected from agreed upon contaminating activities is a high priority for these countries.
- **Compliance with European Union Water Framework Directive (EU WFD; national government)**. All countries were in the process of trying to modify their existing water policy to comply with the EU WFD which has certain requirements for gaining succession to the EU.
- **Biodiversity protection for aquatic and riparian ecosystems (NGOs, academia, local groups)**. Several biodiversity issues were raised including protection of the Hutovo Blato wetlands in BiH which have seen decreased water flow, potentially due to diversion of water by hydropower facilities or increased groundwater abstraction upstream[42] and endangered species such as the European eel in the Drin River basin and the Buna/Bojana river along the coastal Albania/Montenegro border, endemic fish species in the Trebišnjica river in BiH and an endangered carnivorous plant in the Cemi/Cijevna riparian corridor. The issue of the ecological impact of hydropower, an intrenched and powerful stakeholder in the region, was raised in several forums. Authorities tended to see water through the lens of hydropower and water quantity while biodiversity of riparian and aquatic ecosystems as a separate issue.
- **Sewage treatment (local government and groups)**. Stakeholders in multiple countries noted many large population centers do not have adequate sewage treatment although there were several other donors that were investing in increasing the sewage capacity. Rural transboundary areas also do not have proper sewage treatment, but this wasn't raised as a major issue given low population density in these regions. This was mostly considered a domestic issue except for coastal communities near international borders such as in Ulcinj, Montenegro.
- **Impact of climate change and population growth on water supply (national and local government)**. The region historically has had plentiful water supply but utilities and monitoring entities have seen supplies drop during longer drought periods recently and flagged this as an

[42] Spahic M, Temimovic E and Jahic H (2013) Human impact on hydrographic processes in aquatic complex of Nature Park Hutovo Blato. Mittersill: 5th Symposium for Research in Protected Areas, pp. 731-736.

issue that could get worse with more intense climate change. Flooding has also been an issue from time to time. Stakeholders in tourist areas noted that seasonal surges in population often occur in the drier summer months which is straining and will continue to strain water supply to an unprecedented degree.

- **Education and awareness raising (NGOs and former project staff)**. Local NGOs noted the need for improved environmental education on water use and pollution and waste management. Those involved in the DIKTAS I project noted the utility of the Karst school and conferences that built capacity and improved collaboration among experts in different countries and wished to see it continued. Some stakeholders expressed a sense that the general public doesn't properly value groundwater nor understand the complexities of Karst hydrogeology.
- **Protected area management (national and local government)**. Many protected areas in the case study countries surround rivers and key water bodies but lack clear management plans to balance protection and tourism and are influenced by water resources decisions made outside the protected areas (as discussed in the biodiversity priority earlier). Governments especially need support in creating management plans that are inclusive of regional (and sometimes transboundary) water resource management. In some cases, one side of a transnational boundary was officially protected and the other was not (for example, the Montenegrin side of Cemi/Cijevna river is protected but Albanian side is not and the opposite is true for Buna/Bojana river), making management more difficult.

b. Relevance of GEF projects to stakeholder needs and priorities in the DIKTAS region

Outside the national government, most stakeholders reported having little involvement in the design phases of the DIKTAS II and MedProgramme child projects. The design phases for both projects followed a methodology where the initial project concepts were created by UNESCO International Hydrological Programme (IHP) as the executing agency with support from the implementing agencies followed by having several international stakeholder consultations in which one or two national government members or GEF Focal Points for each country attended (which now serve as the country focal points for the projects) where project activities were proposed and reviewed. Once the Project Identification Forms (PIFs) were created, they were then circulated to the project country focal points for review and any suggested changes. Generally, it was found that the country focal points tried to engage other national government ministries to review the PIFs and project design documents but local stakeholders were not engaged at this phase. However, further local stakeholder consultation was planned for the early stages of implementation. Local stakeholders in areas where the two projects planned to focus generally knew very little about the projects. For the DIKTAS II project, many national government stakeholders reported having been involved in stakeholder consultations during the design phase but they occurred several years ago (2019) and remembered little of the content of the proposed project activities. For the MedProgramme child project, the project country focal points in the national government were very knowledgeable on the project, likely because it is currently under implementation and fresh in their minds. Some GEF focal points noted that they wished to be more involved with project implementation rather than only in project design.

However, when comparing the proposed project activities for the MedProgramme and DIKTAS II projects, the proposed activities do align well with stated stakeholder priorities. **Groundwater monitoring** is a key aspect of both projects. The MedProgramme project's work on groundwater in the

region includes the design and testing of a "modern, multi-purpose monitoring network" for the Buna/Bojana delta coastal aquifer on the Albania/Montenegro border. Stakeholders noted this activity as useful to establish a better understanding of the state of the aquifer. In DIKTAS II, pilot monitoring networks are proposed to be established in two locations: the Cemi/Cijevna river aquifer between Albania and Montenegro and the Cetina aquifer on the BiH and Croatia border. Most stakeholders at both the national and local levels agreed that these activities were important and thought the proposed locations were well chosen, although they wished budget allowed for pilots in more locations (at least one pilot location in each country was desired).

Transboundary cooperation and collaboration was and is a key component of the DIKTAS I and II projects. DIKTAS II, picking up from where DIKTAS I left off, proposes to establish a Consultation and Information Exchange body (CIE) to bring together representatives from each country to discuss issues related to groundwater management. Establishing the CIE was an uncompleted goal of DIKTAS I and is now included in the design of DIKTAS II. The DIKTAS I terminal evaluation noted the lack of the CIE creation could detrimentally impact sustainability of transboundary collaboration in the absence of a follow-on project. The CIE as proposed in DIKTAS II would be transnational with representatives from all four countries (three case study countries plus Croatia), however, it was noted that most groundwater related issues tended to be bilateral in nature.

Establishing, improving or collaborating with a multilateral transboundary commission to discuss and manage the transboundary water body or basin of interest is an integral component of almost all GEF IW projects—indeed, several transboundary basin commissions, some supported by GEF projects, exist or are planned in the region including the Sava River Commission and for the Drin and Drina River basins. However, stakeholders were mixed in their assessment of the possibility of establishing a similar commission for DIKTAS. Many had the opinion that a transboundary commission involving the three case study countries, Croatia and possibly other countries within DIKTAS would be the best scenario as it would allow for transboundary collaboration and learning. However, operationally, most noted that groundwater issues tend to be bilateral rather than multilateral, and thus issues are solved at the bilateral level (the DIKTAS is not actually one uniformly connected aquifer, but contains a set of smaller aquifers, some of which are along country boundaries). Establishing multilateral commissions tends to be difficult as well as it involves political buy-in on sensitive issues and must find funding beyond GEF support for sustainability. Sustainability could be further impacted for groundwater systems such as DIKTAS if focus is on certain bilateral aquifers that don't involve all parties. This is inherently different from river basins, which are singular and involve all countries.

The DIKTAS I project did not have **on the ground** "concrete activities. Instead, it focused on elaborating the TDA and SAP documents along with capacity and relationship building. Stakeholders noted some frustration in this, but also saw the value of the TDA as a foundational document that carried out valuable baseline data collection and summary. They hold hope that the DIKTAS II and MedProgramme projects will include more pilot activities. Indeed, according to project design documents, the DIKTAS II project includes plans to set up pilot monitoring systems in two transboundary areas—an activity that was highly regarded by most stakeholders. The MedProgramme is focusing on one particular local coastal aquifer, although it will also focus on information gathering rather than pilot activities.

Definition of **sanitary zones** and **compliance with the EU WFD** are both key components of the DIKTAS II project design. Outcome 2 of the project includes creation of a "DIKTAS Rulebook" with guidelines on

delineation of sanitary protection zones and activities to harmonize permissible activities in different zones across the countries. The project also aims to help countries incorporate adherence of the EU WFD into their legal frameworks, policies and plans for water resource management.

Aquatic or riparian **biodiversity** and **protected area management** is given minor consideration in the case study projects' groundwater related work. The TDA created by DIKTAS I does characterize protected areas and groundwater dependent ecosystems, but biodiversity protection is not a priority of the SAP. The MedProgramme project includes an assessment of the Buna/Bojana coastal aquifer, including the "assessment and diagnosis of coastal ecosystems" related to the aquifer, so some biodiversity could be considered, but is not mentioned as a focus of these assessments. In DIKTAS II, one activity will be to create national/binational action programs which should address establishment of protected areas for karstic related biodiversity, among other goals. However, GEF has invested in other projects that prioritized riparian and aquatic biodiversity in the region, including a project on conservation of Karst peatlands (GEF ID 2723), management of protected areas (GEF ID 3688, 6990, 9289, 10344, 10839), ecosystem management of key transboundary lakes (Lake Skadar-Shkoder GEF ID 2133, Lake Ohrid GEF ID 113, Lake Prespa GEF ID 1537) among others.

Sewage treatment is also not a priority for the case study projects' groundwater activities (beyond the sanitary zone protection work), largely because it is viewed as a surface water issue and often more of a domestic issue rather than transboundary. Other donors were noted to be investing heavily in wastewater treatment plants in all the case study countries. Additionally, the coastal zone management activities of the MedProgramme deal more with wastewater treatment even though the groundwater activities do not.

The case study projects tangentially deal with impacts of climate change and population growth on **water supply**, mostly by improving monitoring and assessment which should better understand how groundwater supply in priority transboundary aquifers has changed in the recent past. However, there are not planned activities to deal directly with upgrading water supply systems.

Education and awareness raising are key components of the case study projects. As mentioned, the DIKTAS I project included the Karst school and several international conferences to raise awareness and capacity on karst hydrology. The MedProgramme project plans for designing training modules on groundwater resources management and gender equality in water stewardship, publicize information gathered on submarine groundwater discharges and promote national dialogues on coastal aquifer topics. The DIKTAS II project plans for training courses on hydrological diplomacy, conjunctive surface and groundwater management, gender analysis and mainstreaming, land use policy and practice in karst terrains, enforcement of sanity zones and other topics along with a study tour for water administrators and decision makers. It will also carry out awareness raising events and dissemination of results, largely through the IW Learn platform and IW global conferences.

c. Collaboration and coherence between case study projects and other water security related initiatives

The DIKTAS I project terminal evaluation states that the project established partnerships with several other GEF projects in the region including a project on the Neretva and Trebisnjica basins management (GEF ID 2132), the MedPartnership (GEF ID 2600; predecessor to the MedProgramme), a project on transboundary cooperation in the Extended Drin River Basin (GEF ID 4483) and the Drina River Basin

(GEF IDs 5556 and 5723) and a World Bank project on protection of the Klokot Spring.[43] However, the details of the partnerships were not mentioned. The project also interfaced with many academic institutions and NGOs through the stakeholder engagement and awareness raising activities.

The Klokot spring project was mentioned by BiH stakeholders as an important example of a bilateral effort with Croatia to delineate sanitary protection zones and define common regulations that could influence the methodology that will be outlined in the DIKTAS II project. Stakeholders also mentioned that the MedPartnership created a management plan for the Buna-Bojana river[44] and that the MedProgramme should be careful not to replicate this plan, considering that the MedProgramme proposed to create a coastal aquifer management plan for the same area. The MedProgramme project does note this previous management plan and says the coastal aquifer plan will be "prepared in line with this wider management plan."

Many donors are active in water resources management issues in the three case study countries with projects that could be considered for collaboration by the MedProgramme and DIKTAS II projects. Stakeholders mentioned: the MAVA Foundation works on wetland preservation the Hutovo Blato reserve, the Sava River Commission conducts monitoring in its watershed which overlaps with DIKTAS, the Austrian Development Agency is supporting Albania is creating river basin plans, the International Union for the Conservation of Nature works on biodiversity in Lake Ohrid and Shkodra, Swedish International Development Cooperation Agency and the Japan International Cooperation Agency fund wastewater treatment in Albania and the World Bank, the French Development Agency and KfW have financed water supply infrastructure, the German Agency for International Cooperation (GIZ) funds groundwater monitoring in Albania and all countries receive European Union Instrument for Pre-accession Assistance (IPA) to align with the WFD and transboundary water resource management. IPA funds go towards a wide range of topics including transboundary watershed management in the Sava river, integrated regional waste management systems, sustainable transport waterway networks and flood protection.

GEF also has several other IW projects in the DIKTAS area. The Drin River basin first phase was completed and the design of the second phase is ongoing (GEF ID 10881) along with a new project for the Sava and Drina Rivers (GEF ID 10553). National government and Drin River project staff stakeholders noted the overlap in geographical area between these rivers and the DIKTAS area, highlighting that collaboration between the projects would be essential to avoid duplication (Figure 11). Some had the opinion that the Sava and Drin River commissions could be utilized to discuss groundwater issues related to DIKTAS, thus removing the onerous task from DIKTAS to set up a completely independent commission to discuss groundwater issues, especially considering the high connectivity of surface and groundwater in karst regions. The Sava River already has an established commission and the Drin projects plan to set up a commission there. It was noted that stakeholders had much more knowledge of the GEF Drin projects than DIKTAS, likely because the first phase was completed more recently and there is good momentum for the second phase to begin soon. Meanwhile, at least eight years have passed since the end of DIKTAS I and DIKTAS II has yet to begin.

[43] World Bank project P158313 'Development of a Study on the Establishment of the Klokot (Bihac) Spring Cross-Border Sanitary Protection Zones'.
[44] MedProgramme (2015) Integrated Resources Management Plan for Buna/Bojana Area.

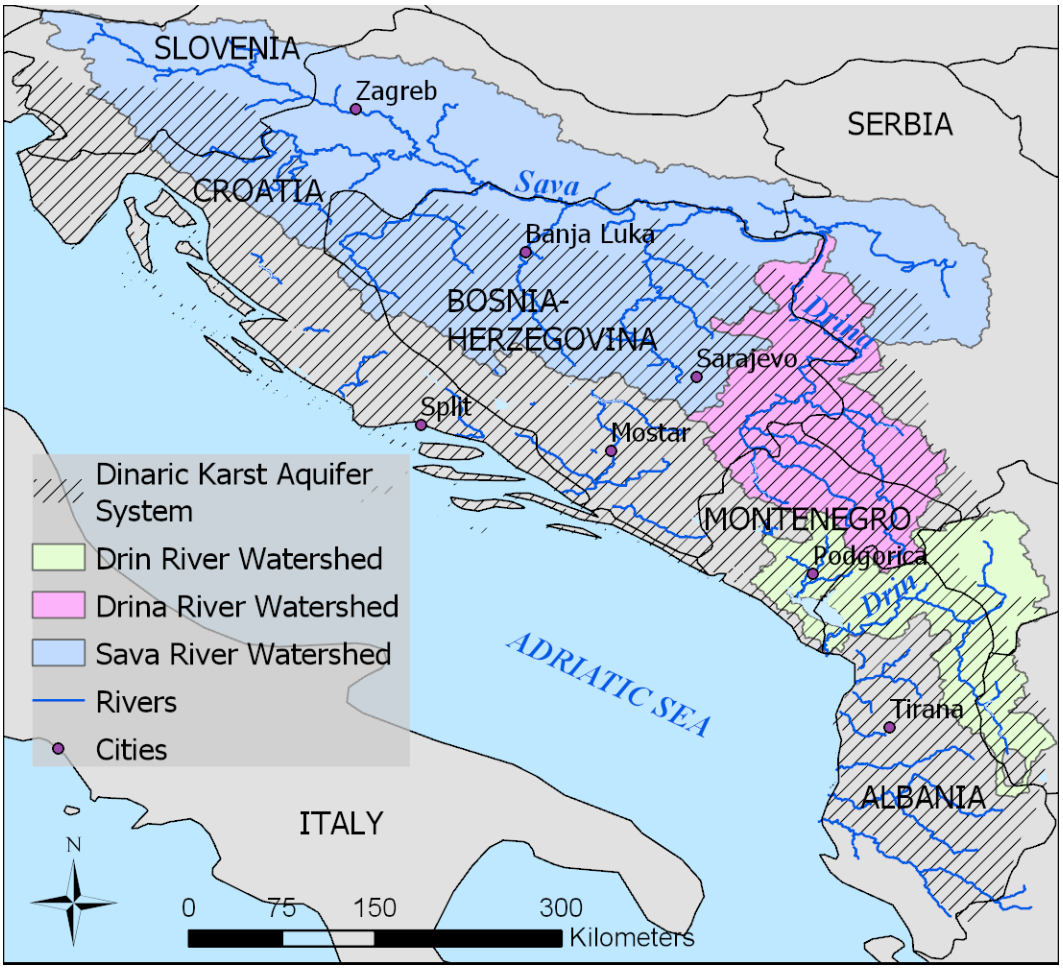

Figure 11. Overlap of DIKTAS with selected major transboundary watersheds. Source: Vedran Furtula

The DIKTAS II design documents list other related GEF projects including those for the Drin and Drina Rivers and the MedProgramme along with GIZ and World Bank projects but doesn't detail any specific cooperation plans. The MedProgramme project design document doesn't discuss such cooperation either. UNESCO notes they do plan to pursue collaboration between DIKTAS II and the MedProgramme but haven't discussed in detail as DIKTAS II has not yet begun. These two projects have a significant opportunity to learn from previous projects such as using the experience of the World Bank Klokot Spring project as a pilot for sanitary zone management and also to collaborate with both other ongoing/upcoming projects. This includes the GEF Drin River program on joint monitoring and better understanding surface-groundwater interactions, EU IPA funds which thematically overlap on transboundary water management and preparing the countries for the WFD and also with investments into wastewater infrastructure at the domestic level, which could be viewed as carrying out SAP activities over the long-term.

d. Addressing gender and water security of vulnerable populations

Gender and vulnerable populations were not major themes in the DIKTAS I project. The terminal evaluation pointed out that a gender strategy and mainstreaming plan were never created for the

project, despite this being a recommendation in the mid-term review for the project. Gender is not a theme mentioned in the TDA or SAP documents either.

The more recent projects have more focus on gender, especially the MedProgramme project which included in its design documents a gender assessment and action plan. The assessment notes that employment rates for women and some vulnerable populations, especially Roma, are lower than average and there is a wage gap between men and women in the region. This puts women and Roma populations in lower economic positions which lower their resilience to water-related shocks like floods. The action plan notes several ways in which gender will be included in the project, including improving inclusion in decision making bodies through increasing gender parity in water management units and other key entities, creating gender responsive water policy that increases women's access to profitable water-based livelihoods and creating training modules that discuss gender mainstreaming and monitoring. However, there is some lack of clarity about how the gender aspects of the project will be budgeted by the project and concern that the gender plan maybe too ambitious for the project budget.

The DIKTAS II project design documents did not include a gender analysis or action plan but had plans to create an analysis and mainstreaming strategy during implementation. The gender approach will have two main activity lines: mainstreaming gender participation in project management bodies and stakeholder engagement activities and integrating gender perspective into water policy.

Other consulted stakeholders in the region did not have much expertise in dealing with gender or vulnerable populations' unique water security issues. However, some national government stakeholders noted that some of the leading experts in water management in the region are women, so there is a degree of gender balance in decision making positions. Regarding vulnerable groups, some noted that Roma often live in marginalized, flood-prone riparian areas making them more at risk. Other groups mentioned were migrants and internally displaced people.

3. Water security achievements and sustainability

a. Water security related outcomes of case study projects

The DIKTAS I project, as a "foundational" IW project, focused on creation of the TDA and SAP documents and establishing relationships between water management entities and individuals in the project countries. Thus, the activities and achievement involved improving knowledge and communication, stakeholder engagement and awareness building, enhancing transboundary governance systems. These activities did not directly improve water security of local populations as they didn't involve any local interventions. However, they did contribute to setting a knowledge and governance foundation for improving water security in the future.

The newer projects, the MedProgramme project and DIKTAS II have outcomes that are similarly focused on stakeholder engagement, knowledge and communication and governance systems. DIKTAS II has a broad set of goals, including: to reestablish multi-disciplinary thematic expert groups, draft an agreement to establish the CIE, strengthen bilateral agreements and bodies, create groundwater governance diagnostics, harmonize groundwater policy across countries, create DIKTAS-centric training courses, design a DIKTAS-wide monitoring network (along with two full scale demonstration networks), improve data sharing, created action programs for transboundary aquifers, created a DIKTAS rulebook for sanitary zone protection and perform general awareness raising. The MedProgramme focuses on

similar themes, aiming to: create detailed assessments of the Buna-Bojana aquifer, national dialogues to identify management solutions, national assessments of submarine groundwater discharges, create a coastal aquifer management plan and facilitate broader adoption of approaches promoted by the project. Neither project includes specific actions to improve water security and only the pilot monitoring systems planned by DIKTAS II were considered "on the ground" or "concrete" actions by most stakeholders. Nonetheless, given the paucity of data in the region and relatively few avenues for transboundary collaboration, the activities proposed were generally thought of as valuable and needed by stakeholders.

As detailed in the project's terminal evaluation, the DIKTAS I project had mixed success in achieving its original objectives (Table 16). The TDA was completed with some delay and the project established multilateral coordination at the technical level. DIKTAS I project staff were very positive about the relationships they developed through the project and said working relationships were very good. The project also achieved a lot of awareness raising and capacity building through the Karst Summer School and "Karst Without Boundaries" conference while also taking part in IW international conferences. The DIKTAS project website hosted an interactive spatial platform to explore some of the data that the project collected. The collection of data for the TDA represented the first collection of all existing monitoring data across the countries and helped formulate international mapping specifications that could be utilized across borders.

Table 16. Summary of DIKTAS I project achievements vs. original intended outcomes.

DIKTAS I project intended outcome	Actual Outputs (at project completion)
1.1 A complete science based Transboundary Diagnostic Analysis (TDA) approved by the National Inter-ministerial Committees (NICs)	**Achieved**: TDA was written and adopted by the Project Steering Committee in June 2014.
1.2 Baseline conditions identified, and environmental status indicators agreed upon and adopted by the multi-country consultative body (CIE)	**Partially achieved**: Project working groups collected already existing data, collated, systemized and mapped it, representing the first thorough regional groundwater analysis that covers the four countries. A proposal for environmental status indicators was made and discussed thoroughly, but never adopted.
2.1 CIE established and operational	**Not achieved**: A CIE was not created during the project. It was agreed that the exact role of the CIE would be specified at the beginning of the SAP implementation phase (DIKTAS II).
2.2 Environmental quality targets defined and adopted by the CIE	**Not achieved**: CIE was not established and no evidence that targets were not agreed upon was found.
2.3 Common monitoring program for harmonization of quality targets established	**Not achieved**: No monitoring program was established—this is a planned focus for DIKTAS II.
2.4 Mechanisms for coordination and exchanges with other relevant projects and initiatives, established and operational	**Achieved**: Several multilateral working groups on hydrogeology, environment and socio-economics, policy, legal and institutional framework and stakeholder participation were established for the project.

3.1 Ad hoc inter-ministerial committees (NICs) focused on harmonization of the existing frameworks and on priority reforms, established in each Project country	**Achieved**: NICs were established in the Project countries but members were vulnerable to rearrangements or personnel changes in governments, even by project end.
3.2 Strategic Action Program (SAP) for the DIKTAS and National Implementation Plans elaborated and adopted by the four countries at a high ministerial level	**Partially achieved**: An extension was granted for the preparation of a shorter SAP document which was drafted but not adopted by the countries by project end.
3.3 Partnership conference aimed at consolidating international support for the implementation of the SAP is held with broad participation of the donor community	**Achieved**: The DIKTAS conference "Karst without Boundaries" was organized and held in in Trebinje and Dubrovnik in June 2014. The conference brought together 155 international karst scientists, engineers and participants.
4.1 Implementation of selected media events to highlight the project progress and achievements	**Achieved**: A brochure was prepared summarizing TDA findings for a broad public. The Atlas of DIKTAS Maps was prepared and a publication and maps were made available via the online DIKTAS portal. Project newsletter issued twice a year and distributed to a broad audience. DIKTAS was represented in numerous meetings and conferences within and beyond the region.
4.2 Implementation of targeted capacity building programs to encourage replication of new practices, behaviors and techniques	**Achieved**: Project team participated in many training sessions in Horizon 2020 Capacity Building/Mediterranean Environment Program, training workshop in Split, Croatia Mar 2012, DIKTAS GIS expert in IW LEARN ICT Workshop on Spatial Data Management in Mar 2014. Karst Summer School held back-to-back with DIKTAS Conference in June 2014 in cooperation with University of Belgrade. A study tour to Edwards Aquifer Authority in Texas, USA was done in Dec 2014. Activity "Karst Waters" was initiated to increase awareness among school children but not carried out.
4.3 Demonstrated active participation to IW:LEARN activities	**Achieved**: Project website following IW:LEARN standards was established and regularly updated. The project participated in GEF IW Conferences (Oct 2011, Nov 2013). The 2011 conference was hosted by the project in Dubrovnik. DIKTAS website established online mapping visualization tool.

However, the project's objectives in many cases were overly ambitious. The TDA took longer than expected to elaborate leaving little time to write the SAP document, which ended up being written in a condensed version with a project extension—but was not approved by the country governments by project end. Equally, it was not able to create the CIE, which hampered its ability to achieve its goals of establishing agreed upon environmental status indicators and a harmonized monitoring.

b. Relationship of results to global environmental benefits, co-benefits and unintended consequences

Although DIKTAS I was approved during the GEF-4 replenishment phase, most of its activities are still relevant to the GEF-7 IW global environmental benefit (GEB) core indicator, "number of shared water ecosystems (fresh or marine) under new or improved cooperative management." By creating the TDA and the SAP, the project did lay a foundation for improved management of the DIKTAS. Prior to the project, most data on the groundwater system existed in disperse locations and wasn't shared widely. Although data sharing remains a problem, the data presented in the TDA is a valuable resource for multilateral efforts to manage the DIKTAS in the future. However, it was clear to all stakeholders that much more needed to be done to achieve true "cooperative management" of the DIKTAS, given the SAP had not been approved and the CIE not established at project completion. Equally, it was clear that much additional monitoring data needed to be generated and transnational cooperation improved. Many stakeholders noted the high degree of momentum that existed at the end of DIKTAS I for the second phase project to continue towards cooperative management.

Beyond the main project outcomes, stakeholders involved in DIKTAS I mentioned one additional benefit, which was the personal relationships they built with other technical level staff in the other countries which was unprecedented. The personal working relationships, despite language differences was described as very good and helped create lasting connections. This didn't lead to improved transboundary cooperation or decision making necessarily, as the relationships were at the technical level, but could be useful in future scenarios during DIKTAS II. However, it was noted that due to changes in government staff, retirements and the long period between the projects, much of the momentum built by these relationships has diminished.

All three projects are aimed at reducing transboundary conflicts (a co-benefit stemming from improved transboundary relations) related to water management, although none of the disagreements related to transboundary water management among the case study countries has resulted in outright conflict (nor have they been completely resolved). The main areas of disagreement pointed to by stakeholders are:

- Hydropower construction in the Albanian upper watershed of the Cemi-Cijevna river which might be impacting water availability downstream in Montenegro (through water diversions).
- Use of electricity from Lake Bileca by BiH and Croatia with limited benefits received by Montenegro while part of the watershed for the lake is in Montenegro.
- Contamination of sanitary zones in BiH and Croatia which then causes contamination in downstream springs or rivers in the other country.
- Contamination and erosion along the Buna-Bojana river through riverside household waste and hydropower construction.

Bilateral commissions to discuss these issues exist between Albania and Montenegro and BiH and Croatia, although no commission exists between BiH and Montenegro. Although these issues, the first three of which were identified by the DIKTAS I project, have not yet been solved, there seem to be ongoing discussions. Many stakeholders mentioned that the case study projects have and will continue to help facilitate discussion on these issues as they represent good motives for collaboration and data collection. Many stakeholder noted the importance of third-party or multilateral data collection in order to provide unbiased data that all countries can use to understand actual impacts of actions taken.

Indeed, much of the disagreement was over facts--For example, there was considerable disagreement about whether or not hydropower construction in Albania in the upper Cemi-Cijevna watershed was actually reducing river flow and groundwater availability downstream in Montenegro. Improved monitoring by a source trusted by all stakeholders could help settle such questions and disagreements over facts. DIKTAS II is planning a pilot monitoring system in that region, which stakeholders agreed would be of great use.

No stakeholders noted any unintended negative consequences of DIKTAS I or any of the case study projects.

c. Sustainability of DIKTAS I water security outcomes

The sustainability of the DITKAS I outcomes was mixed, with many outcomes sustained, few improved and some worsened (Table 17). Sustainability was best for the SAP outcome, given that the SAP document created at the end of the project was adopted by the four countries after project completion in 2017. Evidence points to this being a result of sustained effort by UNESCO, largely because SAP adoption was a prerequisite for further GEF funding in the form of DIKTAS II.

Table 17. Post-completion sustainability of DIKTAS I project outcomes, according to evidence gathered by the case study.

DIKTAS I intended outcome and status at project completion	Status of outcome at time of case study	Direction of change since project completion
1.1 TDA completion: **Achieved**	Stakeholders mention that the TDA has been useful in a few cases, such as providing background for related strategic documents. It was a steppingstone for completion of the SAP and getting funding for DIKTAS II project.	**Sustained**
1.2 Baseline conditions: **Partially achieved**	Baseline data collected by the project continues to be used by some stakeholders as little additional data collection has been collected and centralized since the end of the project. The GIS data is no longer accessible via the project website but some of the data is accessible via the Drin river project website. Multiple countries reported still using the hydrogeological mapping scheme agreed upon in the project—how hydrogeological combinations are referred to on maps. Montenegro used groundwater vulnerability maps from the project for implementation of another European Union funded project.	**Sustained**
2.1 Creation and operation of CIE: **Not achieved**	There is still no CIE exclusive to DIKTAS. Other formal commissions exist or are in the process of being created in the region focusing on surface water such as the Sava, Drin and Drina	Not achieved at project end.

	rivers. There are also bilateral commissions to discuss water related issues between certain countries (Croatia-BiH and Albania-Montenegro) that predate the project.	
2.2 Environmental quality targets defined and adopted: **Not achieved**	There are still no common environmental quality targets for groundwater across the DIKTAS countries.	Not achieved at project end.
2.3 Common monitoring program: **Not achieved**	There is still no common set of indicators or monitoring program among the three countries. Some stakeholders credited the project with encouraging entities to begin groundwater monitoring although no clear attributable cases.	Not achieved at project end.
2.4 Mechanisms for coordination and exchange: **Achieved**	Some stakeholders report being able to sustain communications between countries at a personal level but there is no formal mechanism for discussing groundwater issues. In general, stakeholders report a decline in cross-country communications on groundwater issues since the end of the project. Once specific people change positions in government, connections worsen.	**Worsened**
3.1 Inter-ministerial committees: **Achieved**	There was little evidence found of active inter-ministerial committees to discuss groundwater issues, although Albania now has a water management authority and there are general inter-ministerial committees that could discuss water issues that arise. However, government reorganizations and personnel changes have made committees difficult to maintain.	**Worsened**
3.2 SAP elaborated and adopted: **Partially achieved**	The SAP in its abbreviated form was adopted by the governments in 2017 due to the continued support by UNESCO after the end of the project. This was a necessary step to request funding for the DIKTAS II project.	**Improved**
3.3 Partnership conference: **Achieved**	The DIKTAS conference and the Karst Academy, although remembered fondly, have not been replicated since the end of the project. It is not clear how the knowledge gained in the conference and the academy have continued to influence the individuals that participated.	**Worsened** / Unable to assess
4.1 Implementation of media events: **Achieved**	As mentioned for previous outcomes, the maps produced have been influential in certain situations in the three case study countries for other projects and reports. However, the online mapping tool from the project website is no longer functioning (although the reports of the project are still obtainable from the website).	**Sustained**

	Results from the DIKTAS project have been presented at other international conferences since the project close.	
4.2 Capacity building: **Achieved**	The academy, as mentioned previously, has not been continued. Influence on the participants of the other capacity building events could not be assessed.	Unable to assess
4.3 Participation in IW LEARN: **Achieved**	The project website is still functioning but the GIS online map is no longer functioning. The project still has an online presence on the IW LEARN website as well.	**Worsened**

Several outcomes were sustained, mostly related to the data gathered for the TDA and baseline conditions some of which appears to be available and used by national technical authorities. Several monitoring agencies noted the utility of the transboundary mapping methodology adopted by DIKTAS and other projects (especially EU initiatives for WFD alignment) since DIKTAS I have utilized the spatial data, including vulnerability maps. Others implied that DIKTAS helped stakeholders consider the importance of groundwater monitoring, influencing decisions to include such monitoring as part of projects (such as the Drin River project). Unfortunately, the geospatial database on the DIKTAS website is no longer functional, but reportedly some of the data is available on the Drin River watershed project website. Technical staff continue to be involved in international conferences to discuss DIKTAS project outcomes, although there is no evidence that the DIKTAS organized Karst school or conferences have continued after the project.

Most of the outcomes that have not been sustainable were due to a lack of funding to create multilateral collaboration (with the exception of the Klokot Spring World Bank project, which some stakeholder mentioned was similar in theme to DIKTAS) and along with frequent government turnover, leading to poor institutional memory. Stakeholders again and again blamed this government turnover for hindering sustained working relationships and knowledge of DIKTAS I products along with difficulty in maintaining the NICs (although Albania now has a distinct water management authority which improves cross-ministerial relations on water). Additionally, there was widespread frustration with the long gap between the first and second phases. It seems that most stakeholders were relying on the DIKTAS II project to provide sustainability and continued momentum for improving cooperative management of DIKTAS, as there was a clear intention that a second phase was forthcoming at the latter stages of the first project. This created expectation may have limited the ambition of national governments to search for other means of sustainability. Even the terminal evaluation noted that sustainability of the project largely depended on if the follow up project was realized.

The DIKTAS II project suffered several delays in its design phase including: the delay in getting the SAP adopted by the country governments, a change in GEF reporting software led to delays in submission of design documents by UNDP to the GEF, a UNDP auditing event led to a revision of UNDP procedures which caused delay and the COVID pandemic occurred at the latter stages.

4. Overall findings

- **Case study project activities mostly matched major stakeholder priorities dealing with transboundary groundwater management**. The focus on improving groundwater monitoring included in both the DIKTAS II and MedProgramme child projects was considered very pertinent along with activities to foment transboundary communication and collaboration and harmonize sanitary protection zone regulations and delineation. The pilot monitoring systems planned in the DIKTAS II project were especially appreciated as they represent the first move in DIKTAS projects towards local, "concrete" activities, which are highly sought after by stakeholders, rather than reports, assessments and data gathering.
- **The TDA dataset gathered by DIKTAS I has been useful for technical authorities, but the delay in the DIKTAS II project has had a detrimental impact on sustainability of transboundary collaboration**. The transboundary mapping methodology created by the DIKTAS I project along with vulnerability maps continue to be useful to other projects and geological survey agencies of the case study countries. Additionally, adoption of the SAP was achieved after project completion, paving the way for the design of the DIKTAS II project. However, over eight years have passed without the beginning of DIKTAS II, meaning much momentum toward transboundary collaboration, monitoring and stakeholder engagement has been muted or lost.
- **Many donors are active in the case study countries, opening up significant opportunities for collaboration for the case study countries**. The GEF itself has several IW initiatives in the Balkans, including in watersheds that overlap the DIKTAS area. Other donors are doing complementary domestic projects to improve water security and water resource management through wastewater management and water supply investments, which could be paired with GEF investments as co-financing. Although the design documents of the DIKTAS II and MedProgramme projects did not go into details on any planned coordination with other projects, there are many opportunities and possibilities them to coordinate to avoid overlap and enhance outcomes.
- **Water authorities in the region tend to prioritize water quantity and hydropower potential while riparian and aquatic ecosystem protection is deemphasized**. Hydropower is a powerful, critical and persistent stakeholder in the region that leads discussion on water management issues both domestically and internationally. This continues to be true with recent energy security concerns. However, local stakeholders especially worry about the connections between hydropower and riparian and aquatic ecosystem health. An opportunity for GEF projects could be integrating biodiversity themes with water management topics, given the important overlap between the two environmental topics and the common priority for local stakeholders.
- **Case study project design tended to be top down with limited involvement of local stakeholders**. The design phases of the two more recent projects in the case study followed a formula of the implementing and executing agencies conceiving of the project concept and designing the project with periodic consultations with 1-2 national focal points per country. Local stakeholders were generally not engaged in the design phases of the projects and did not have knowledge of the projects prior to implementation. However, local stakeholders mostly welcomed the activities that the projects planned and hoped to be engaged. Both projects did plan to broaden stakeholder engagement once implementation began.

- **Gender considerations of water security play a more prominent role in the newer case study projects, while other vulnerable populations are not a focus**. The DIKTAS I project included very little consideration of gender considerations as they relate to water management and water security in the case study countries, as neither the TDA nor the SAP address the topic. However, the newer projects, especially the MedProgramme, are addressing the topic in more detail through planned activities to integrate gender considerations into water policy and improve women's representation in water management decision making bodies and lucrative roles water dependent livelihoods. Water security of vulnerable populations in the region, such as Roma communities, is not a major consideration of any of the projects.
- **Case study project activities focused on improving knowledge, governance systems and stakeholder awareness**. As with many IW projects worldwide, the case study projects focused their activities especially on improving the knowledge base on groundwater resources in the transboundary regions of the case study countries. This was especially true for DIKTAS I given it was the first IW project for the aquifer system and focused on creating the TDA. Other major activity themes were related to improving coordination between governments and improving policy along with raising awareness of karst geology and creating management plans in the case of the MedProgramme child project. Topics such as improving access to finance, improving infrastructure or adaptive management were less common.
- **Transboundary groundwater issues in DIKTAS tend to be bilateral in nature rather than transnational.** DIKTAS is a system of distinct aquifers which in many cases have not been proven to have any hydrological connections between them. This is in contrast to most IW projects which deal marine areas or freshwater basins (or contiguous aquifers) in which actions in one country can affect multiple other countries. Therefore, a different approach could be feasible when thinking about how to manage DIKTAS aquifers, given that issues tend to be more local and bilateral, focusing on particular aquifers within DIKTAS that might not involve all DIKTAS countries. This may make establishing a multilateral commission more onerous and less critical, while strengthening bilateral relations more important.

Technical Document 9: Morocco-Tunisia Case Study Report

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Cover photos shows soil bunds to increase infiltration in the tree fields of Rif watersheds in Morocco.

List of Acronyms

AFD	French Development Agency
CP	Child Project
CRTEAN	Centre Régional de Télédétection des États d'Afrique du Nord
CRTS	Centre Royal de Télédétection Spatiale
EIB	European Investment Bank
EIE	Environmental Impact Assessment
SEA	Strategic Environmental Assessment
GCF	Green Climate Fund
GEF	Global Environment Facility
GGGI	Global Green Growth Institute
IWRM	Integrated Water Resources Management
ICZM	Integrated Coastal Zone Management
GWP-Med	Global Water Partnership Mediterranean
INM	National Institute of Meteorology
MedProgramme	Mediterranean Sea Programme
ONAS	National Sanitation Office
NGO	Non-Governmental Organization
OREDD	Regional Observatories of the Environment and Sustainable Development
OTEDD	Tunisian Observatory of the Environment and Sustainable Development
PAP/RAC	Priority Actions Programme Regional Activity Centre
ReGoKo	Governance and Knowledge Generation programme
SRL	Schéma Régional du Littoral
Sustainable Med	Mediterranean Sustainable Development Program
UNESCO – PHI	UNESCO Intergovernmental Hydrological Programme

1. Introduction

a. Brief description of overall evaluation

Freshwater is an essential element for the survival of human society as well as terrestrial ecosystems. Water security has increasingly been used by the global water community to frame the issues relating to freshwater resources. United Nations Environment Programme (2013) defines water security as "the capacity of a population to safeguard sustainable access for sustaining livelihoods, human well-being and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability". In the GEF, water security is woven into several focal areas, from transboundary water resource management in international waters to protecting against drought in land degradation and limiting water pollution in chemicals and waste. Given the importance and cross-cutting nature of water security and the growing recognition of the issue in the GEF strategies and projects, the GEF IEO is undertaking a comprehensive, multi-focal area evaluation of the topic. The Evaluation of GEF's strategy and portfolio in water security will assess the GEF's strategy and interventions that address water security across all its focal areas including its relevance to country and beneficiary needs, effectiveness in achieving global environmental benefits and water security co-benefits, and the sustainability of such outcomes after project completion. The evaluation began in October 2021 and is scheduled to be completed during 2023.

As part of the evaluation, several case studies were chosen to understand how GEF projects and programs have impacted water security at the country and the basin level. Case studies were designed to address several evaluation topics, including:

- **Relevance** of GEF projects to the water security needs, policies and strategies of beneficiaries and key stakeholders in the countries where they work, including national and local government, communities, vulnerable populations, civil society, the private sector, NGOs and others.
- **Coherence** of GEF's projects with similar donor-funded and government initiatives in the areas where they work.
- **Effectiveness** of GEF projects in achieving improvements in water security, through main project outcomes or co-benefits and compliance with water related safeguards.
- **Effectiveness** of GEF projects in considering the specific water security of vulnerable populations especially women.
- **Sustainability** of the outcomes of completed GEF projects.

The criteria for selecting the case studies included: 1) presence of completed and ongoing GEF projects with relation to water security themes, 2) presence of transboundary watersheds or aquifers, 3) geographical diversity among the chosen case studies, 4) focal area[45] and trust fund[46] diversity among the case studies, 5) diversity in GEF Agencies among the case studies and 6) overlap with previous and other ongoing GEF IEO evaluations.

[45] GEF focal areas include: Biodiversity, Chemicals and Waste, Climate Change, International Waters and Land Degradation.

[46] GEF manages three trust funds: the GEF Trust Fund (which consists of the focal areas mentioned above) and two funds focused on climate change adaptation: the Least Developed Countries Fund and the Special Climate Change Fund.

One of the chosen case studies was the Morocco-Tunisia case study, which includes completed and ongoing regional GEF projects involving different countries from the Mediterranean region (Albania, Algeria, Bosnia and Herzegovina Egypt, Jordan Lebanon, Libya, Montenegro Morocco and Tunisia). This report summarizes the findings of the Morocco-Tunisia case study.

b. Description of GEF projects in the Morocco-Tunisia case study

The Morocco-Tunisia case study included five projects, two completed and three ongoing[47]. The two completed projects were funded through the International Waters focal area and were both components of the umbrella program "Mediterranean Sustainable Development Program" (Sustainable Med). The three ongoing projects are child projects of MedProgramme, a regional program implemented in Morocco and Tunisia along with Albania, Algeria, Bosnia and Herzegovina, Egypt, Lebanon, Libya and Montenegro. Besides regional activities, some of the child projects included national activities in Morocco and Tunisia. Table 1 provides details on the evaluated projects.

Table 18. Overview of the Morocco – Tunisia case study projects.

GEF ID	Project title	Implementing Agency	Executing Agency*	GEF financing (USD millions)	Co-financing (USD millions)	Period of implementation	Country with national activities
4001	Governance and Knowledge Generation (ReGoKo)	World Bank	Blue Plan	2.57	4.4	2012-2015	Morocco & Tunisia
3978	Regional Coordination on Improved Water Resources Management and Capacity Building Programme	World Bank	CRTS (Morocco) CRTEAN (Tunisia)	4.48	13.9	2011-2015	Morocco & Tunisia
9717 (CP1.2)	Mediterranean Pollution Hot Spots Investment Project	UNEP	EIB	5.0	733.5	2020-present	Tunisia
9687 (CP2.1)	Mediterranean Coastal Zones Climate Resilience Water Security and Habitat Protection	UNEP	PAP/RAC , Blue Plan, GWP-Med, UNESCO-IHP	7.0	143.3	2020 - present	Morocco & Tunisia
9685 (CP2.2)	Mediterranean Coastal Zones: Managing the Water-Energy-Food and Ecosystems Nexus (WEFE Nexus)	UNEP	GWP-Med	3.5	11.3	2020 - present	Morocco

* CRTS : Centre Royal de Télédétection Spatiale
CRTEAN : Centre Régional de Télédétection des Etats d'Afrique du Nord

[47] Initially, the GEF ID 9691 project (Financing Advanced Environmental Technologies in the Mediterranean Sea Region for Water Systems and Clean Coasts - EnviTeCC) was included in the list. However, after examining the CEO Endorsement Request document and having interviews respectively with the representatives of the GEF unit in Tunisia and representatives of the implementing agency, the European Bank for Reconstruction and Development – EBRD (Ms. Claudia Neuschulz and Ms. Hande Yukseler), it was confirmed that the project doesn't address water security, and hence was excluded from the evaluation.

EIB : European Investment Bank
PAP/RAC Priority Actions Programme Regional Activity Centre
UNESCO – IHP : UNESCO Intergovernmental Hydrological Programme
GWP-Med : Global Water Partnership Mediterranean

c. Case study methodology

The Morocco-Tunisia case study was carried out between September 2022 and February 2023. As a starting point, the GEF project documents were reviewed, these included the CEO Endorsement Request documents, project implementation reports, mid-term reviews (MTRs), terminal evaluations (TEs) and any other reports or data available. The documents review allowed the identification of the specific outputs and outcomes related to water security that will be discussed in the evaluation. Furthermore, key stakeholders were identified and then confirmed with the GEF Unit representatives in the two countries. Considering the presence of the evaluator in Tunisia, it was convenient to conduct first the interviews with the Tunisian stakeholders and then conduct a field trip to Morocco. The field trip took place from the 12th to 20th December 2022. It started with interviews with the representatives of the central departments, and continued with the trip to the three cities of Tangiers, Tetouan and Al Hoceima to meet with the local stakeholders, including local authorities, NGOs and universities.

Due to several years passing since the end of the completed projects, stakeholders involved in the completed projects were in some cases difficult to reach for interviews. For instance, some of the staff from the regional observatories of environment in Tangiers – Morocco who were involved in the project "Governance and Knowledge Generation (ReGoKo)" (GEF ID 4001) were retired and others were promoted to international positions. The difficulty was in particular acute for the project "Regional Coordination on Improved Water Resources Management and Capacity Building Programme" (GEF ID 3978; henceforth referred to as the 'SustainableMED Regional Coordination project'). Indeed, the executing agency "Centre Royal de Télédétection Spatiale (CRTS)" in Morocco could not be reached for interview despite several attempts. In Tunisia, despite the initial agreement with the executing agency "Centre Régional de Télédétection des Etats d'Afrique du Nord (CRTEAN)" to call for a meeting with key partners to the project, the meeting didn't take place without being informed about the reasons. Nevertheless, some bilateral interviews with partners were carried out. Because of these difficulties in reaching stakeholders, project will be evaluated only for the activities implemented in Tunisia.

In total, 45 stakeholders were interviewed: 2 from implementing agencies, 12 from executing agencies, 16 from central departments and 15 local stakeholders.

2. Meeting stakeholder water security needs

a. National and local level priorities in case study region (relevance)

Morocco and Tunisia were experiencing a drought during the evaluation which was on the minds of stakeholders when expressing their national priorities related to water security. Similar challenges caused by this drought were raised in both countries. However, depending on the legal obligations of each of the countries, the priority actions were in some cases different while raising the need for inter-regional learning and experience exchange. The major priorities expressed by stakeholders were:

- **Water scarcity management (all stakeholders)**: satisfying water needs was the top priority for all stakeholders. From the perspective of water managers, this relates to the preparation of national and river basin water strategies and plans. At local level, granting of water withdrawal permits and the allocation of water resources between different users, particularly during the dry periods, is the main challenge for local water managers. From the perspective of spatial planners, agriculture departments representatives and local authorities, it is important not to hinder the economic development because of water shortages. Finally, representatives of environment departments and NGOs want to ensure that ecosystems preservation is not left behind during the crisis.
- **Assessing climate change impacts and managing risks (national and local government and river basin authority)**. The countries are going through unprecedent long droughts and the situation is expected to get worse due to climate change. The rain regime has also changed and floods risks are increasing. The challenges imposed by climate change are multifaceted. Downscaling of global models would help assessing possible climate change scenarios at country level and their impacts on freshwater resources. The development of appropriate monitoring and modelling tools would support drought and floods risks management. Using remote sensing and GIS techniques would support water management decisions.
- **Water monitoring as part of the environment monitoring (environmental observatories):** in alignment with their mandates, the environmental observatories supported by the case study projects stressed the need for supporting their institutional, legal and organizational frameworks as well as enhancing their technical capacities, including through the establishment of shared data platforms. Furthermore, improving the services of the observatories requires a better understanding of the expectations of water stakeholders.
- **Enforcement of legal obligations (all stakeholders in Morocco):** In Morocco, the Coastal Law N°81-12 made it compulsory the development of regional coastal management plans (Schéma Régional du Littoral – SRL) for all coastal areas. Until now, only one Integrated Coastal Zone Management Plan (ICZM) was developed for the Rabat-Salé region with the support of the World Bank. The region Tangiers-Tetouan-Al Hoceima that covers the largest part of the Mediterranean coast is expected to be the second region to have its ICZM plan. However, the water law N° 36-15 introduces the obligation of developing an aquifer management plan called 'aquifer contract' (contrat de nappe) for each aquifer. Enforcement of this law links directly to the priority described in the below point.
- **Coastal groundwater management (national and local government and river basin authorities)**: Marine intrusion in coastal aquifers due to the combined effect of over-exploitation and seal-level rise and the risk of irreversible salinization of groundwater resources are serious threats for both countries. Improving the understanding of the hydrogeological characteristics of the coastal aquifers is obviously required. However, all water stakeholders noted that this won't be enough to address the large users' needs for water. They rather request the development of groundwater coastal plans through participatory processes. These coastal aquifer plans should include realistic options and implementable solutions that can work during the crisis periods of drought.
- **Preparing bankable projects and leveraging funds for wastewater treatment (national government in Tunisia)**. Tunisian National Sanitation Office (ONAS) expressed the need for support to accelerate access to funds for the upgrade and creation of new wastewater treatment plants through the preparation project proposals that meet international standards and attract

donors. Furthermore, the interest in including innovative technologies for climate change mitigation (reduction of greenhouse gas emissions) and adaptation (renewable energy, reuse of treated water, etc.) was expressed.

- **On the ground activities (all stakeholder groups)**. The stakeholders' fatigue from participatory processes towards the development of strategies/plans or studies, the resulting low ownership of the outcomes of these processes, and the very often limited implementation of these strategies/plans were raised during many of the interviews. At the same time, stakeholders do recognize the need for strategies/ plans and studies. They expressed the willingness to combine these soft activities with hard activities that leave physical investments on the ground. This would help to increase the interest and engagement of the stakeholders in the projects. Hard activities could also serve demonstration pilots for innovative solutions to be replicated. Among the potential examples mentioned monitoring networks, industrial water depollution technologies, renewable energy for water management, demonstration for climate adaptation solutions, etc.

b. Perceptions of GEF meeting water security needs (relevance)

For the ongoing projects, stakeholder involvement in the design phase of GEF projects was limited to representatives from national government. Indeed, the initial concept of the MedProgramme and its child projects was suggested by the implementing agencies. The initial concept benefited also from the fact that many of the implementing agencies were also involved in the previous GEF MedPartnership program (GEF ID 2600) and were aware of the situation in the countries and what follow-up actions were necessary for the newer program. The initial concept was then discussed in regional consultation workshops with the participation of GEF Focal Points and through bilateral consultations with the UNEP-MAP Regional Activity Centers focal points. Countries were invited to indicate which activities they were interested in. This is when the country focal points consulted internally with other ministries at national level for the selection of the activities and the implementation sites. However, beyond the selection of activities and implementation sites, it doesn't seem that the national stakeholders were involved further in the review of the project proposals. Furthermore, local stakeholders were involved only after the projects had started and they knew very little about the project activities and structure. The only exception is the regional department of environment for Tangiers-Tetouan-Al Hoceima that has been designated as the focal point for the Medprogramme Child Projects CP2.1 and CP2.2, and hence was more informed about the project activities and involved in their implementation planning.

Nevertheless, all stakeholders valued the flexibility offered by GEF projects during the inception phase to readjust the activities, also considering the time between the design and the start of the projects. Generally, stakeholders felt that completed and planned activities do align well with stated stakeholder priorities.

The completed SustainableMED Regional Coordination project' aimed to support **water management under climate change conditions** through multiple aspects and in collaboration with several national partners. The project supported the Tunisian National Institute of Meteorology (INM) to produce the first results of climate projection downscaling and equipped it with the necessary IT tools (servers, etc.). The two extreme events of floods and droughts were both addressed by the project. Real time flood models were tested in the main river of Medjerda and indicators for drought monitoring were developed. Finally, remote sensing techniques were developed to evaluate water needs in agriculture depending on the type and growth of crops. The purpose was to assist water allocation decisions.

The **enhancement/restructuring of the Environmental Observatories** was on the agenda in both countries. The ReGoKo project provided a timely expertise to support this endeavor. In Morocco, the focus was on revising the legal framework to evolve from Environmental Impact Assessment (EIA) to Strategic Environmental Assessment (SEA) and enhance the capacities of regional observatories to support and contribute to the application of SEAs. In Tunisia, the focus was on learning from Morocco's experience in establishing regional observatories and drafting the Decree for the institutionalization of the national observatory of environment.

Elaboration of coastal aquifers management plans is a key component of the MedProgramme Water Security project (GEF ID 9687). In the framework of the previous MedPartnership work, a methodology for vulnerability assessment of coastal aquifers was developed. It was strongly expressed by national and local stakeholders that studies should not be the goal per se, but a means to support the dialogue with the stakeholders and agree on realistic solutions to address **water scarcity** and the degradation risks of the coastal aquifers. This is even more valid for the case of Morocco where the preparation of aquifer contracts (equivalent to a management plan) is a **legal obligation.** Two aquifer management plans are planned to be developed in the case study countries by the the MedProgramme Water Security project: the first is for the Ras Jbel aquifer in the north-east of Tunisia, and the second for the Ghiss-Nekor aquifer in the north-east of Morocco.

Another legal obligation concerns the development of ICZM Plans. The Moroccan government established an inter-ministerial committee composed by 65 members and chaired by a governor (known as a Wali) to lead the preparation of the ICZM of Tangiers-Tetouan-Al Hoceima region. The MedProgramme Water Security project and the MedProgramme WEFE Nexus project (GEF ID 9685) use this committee for their consultation and stakeholders engagement process. Through the consultation workshops conducted until now, stakeholders indicated the connection between spatial planning and natural resources management. Two major risks related to water resources were highlighted: **water scarcity and water pollution**. While the MedProgramme Water Security project plans to focus on the spatial planning of the coastal area, the MedProgramme WEFE Nexus project plans to undertake an in depth analysis of the interlinkages/trade-offs between the different sectors strategies and feed in the planning process with strategic recommendations and possible WEFE nexus solutions.

Increasing the rate of water treatment and improving the quality of treated water is a high priority in Tunisia. Treated water reuse is included in water and climate strategies as one of the key solutions for water scarcity and climate adaptation. However, the low quality of treated water is very often indicated as the major bottleneck for the development of treated water reuse. The MedProgramme Pollution Hotspots project (GEF ID 9717) plan to support the National Sanitation Office in Tunisia in developing technical and financial studies for the upgrading and creation of wastewater treatment plants in the coastal areas. This would help leveraging investment for the construction of these plants.

On the **ground activities** are absent in the evaluated projects. Only the MedProgramme WEFE Nexus project is planning to implement pilot WEFE nexus solutions for demonstration purposes. The planned demo projects include technical and managerial solutions that have been already applied in the Mediterranean or at experimental/research stage and considered promising for their novelty and feasibility potential, such as solutions looking into the maximization of agricultural production with the minimization of water use including through use of renewable energy, artificial intelligence software systems that allow predicting the water flow and availability and real-time application of multi-spectrum

cameras on vehicles that apply fertilizers and pesticides to adjust their use to minimize the effects to environment and the cost to the farmers, hence positively contributing to food security. However, it is still unclear what is the timeline for their selection and implementation.

c. Collaboration and coherence between GEF projects and other donor-funded projects

The two completed projects are part of the umbrella project "Mediterranean Environmental Sustainable Development Program - Sustainable MED" that comprises eight other projects. The design documents stated complementarity between the ten Sustainable MED projects as well as the alignment with other regional initiatives (the EC Horizon 2020 initiative, the Mediterranean Technical Assistance Program (METAP), the EC-funded LIFE third countries and SMAP programs, etc.). However, the terminal evaluation report doesn't refer to any collaboration with any initiative. Stakeholders also didn't recall any synergy that was promoted during the project implementation. However, they highlighted how the results of the projects were useful for follow-up activities by the government. This will be discussed further below.

The MedProgramme projects have just started, and possible synergies with other ongoing initiatives have not yet been identified. The most tangible example of synergies that was mentioned is for the management plan of Ghiss-Nekor coastal aquifer in Morocco under the MedProgramme Water Security project. The Ministry of Water with the support of the French Development Agency (AFD) is conducting a study on the hydrogeological characterization of the aquifer and assessment of recharge potential of Ghiss-Nekor aquifer. The Ministry requested UNESCO-IHP to revise the ToRs for the assessment of the aquifer vulnerability and to exclude the hydrogeological characterization of the aquifer to avoid duplication between the MedProgramme Water Security project and the AFD funded project. Instead, the MedProgramme Water Security project shall use the results of the AFD study and invest further on the participatory process for the preparation of the coastal aquifer management plan (aquifer contract). However, UNESCO-IHP didn't include this request in the ToRs for the contract to carry out the aquifer vulnerability assessment but promised to adjust the project activities at later implementation stages.

The Global Green Growth Institute (GGGI) is currently implementing a readiness project funded by the Green Climate Fund (GCF) aiming to enhance access to climate finance in Kingdom of Morocco's regions. One of the regions concerned by the project is Tangiers-Tetouan-Al Hoceima region (TTA). A scoping mission has been recently conducted for the identification of project ideas to be developed into concept notes and submitted to GCF. Ideally, project ideas promoted for GCF funding shall contribute to the coastal and WEFE nexus plans implementation (coastal and WEFE nexus plans to be developed in the framework of the MedProgramme for Tangiers-Tetouan-Al Hoceima). However, this will depend on the timeline of each of the projects. Most probably, the coastal and WEFE nexus plan will be ready after the completion of the GGGI project.

MedProgramme is using the ambitious integrated programming intervening across many focal areas with the involvement of multiple executing and implementing agencies. It tackles multiple pressures and bring multiple solutions from different perspectives. This offers the unique opportunity for impact amplification through synergy between the different child projects of MedProgramme. For the Water Security and WEFE Nexus projects which are intervening in the same region of Tangiers-Tetouan-Al Hoceima, this synergy is inevitable. Indeed, the two child projects are collaborating with the same stakeholders and both aim for sustainable development planning: the Water Security project from a spatial perspective based on integrated coastal zone management approach and the WEFE Nexus project from a sectoral

perspective using a WEFE nexus approach. The synergy is already taking place. Consultation meetings were organized jointly by the child projects and joint planning for activities is agreed upon.

Generally, stakeholders highlighted that synchronization is only possible through national budget under which co-funding can be controlled and adjusted by the government to secure complementarity with GEF projects once launched. While synchronization between GEF project and other external development aid is not obvious. Indeed, during negotiations with donors, the government is not certain neither of the acceptance of projects nor the start date. Whereas once launched, each project has its own logfarme and its own implementation planning. It becomes difficult afterwards to change them to ensure synergies and co-financing with GEF projects. As a result, the government efforts focus on avoiding redundancy and converging donors' interventions when they take place towards its priorities and objectives to increase the impact of projects.

d. Addressing gender and water security of vulnerable populations

The completed projects didn't address gender and vulnerable populations issues. During the second restructuring of the ReGoKo project, a gender indicator was introduced and was limited to the number of female participants to the workshops. The terminal evaluation report indicated that this target was achieved.

The MedProgramme has more focus on gender. A gender mainstreaming strategy was prepared for the entire program. It comprises three lines of action: (i) address gender-blind hurdles with gender-differentiated consequences; (ii) mitigate gender specific barriers and discriminatory norms; and (iii) scale up gender-sensitive policies and deliver gender-responsive outcomes. Based on this strategy, tailored gender assessments and action plans were developed for each child project.

For the Pollution Hotspot project, the ToRs drafted for the preparatory studies for the upgrading and/or extension of waste-water treatment plants included the intervention of a gender/social development consultant in charge of generating relevant and reliable information and data regarding gender-specific and social factor-specific exposure risks, access issues and service delivery conditions in plants sites-specific contexts as well as developing guidelines for actions to undertake during the construction of the plants.

For the Water Security project, in synergy with another child project of MedProgramme (the SCCF Child project[48]), a gender sensitive climate risk assessment is under development using the coastal climate risk index that was complexified by adding aspects related to gender. This assessment would complement the socio-economic analysis addressing questions related to equitable society, literacy rate, youth empowerment, unemployment, etc. Vulnerable groups mainstreaming is also planned. For example, immigrants are identified as minority vulnerable group that may not know the history of coastal risks in the area, may not be represented in formal fora and may not have timely access to information shared by local authorities. These gender and socio-economic assessments should inform the ICZM plan of Tangiers-Tetouan-Al Hoceima. At the same time, implementing agencies and the Moroccan government are working on ensuring gender balance in the consultation workshops, as much as possible.

[48] The Child project funded through the GEF Special Climate Change Fund (GEF ID 9670): *"Enhancing regional climate change adaptation in the Mediterranean Marine and Coastal Areas".*

For the specific activity related to the development of coastal aquifers plan in Ras Jbel and Ghiss Nekor, the UNESCO World Water Assessment Programme (WWAP) methodology and tools gender disaggregated data in the water sector collection and analysis are planned to be adopted. The stakeholder engagement consultants will be requested to use these tools and collect data for the two pilot aquifers.

For the WEFE Nexus project, the gender sensitive climate risk assessment indicated above is planned to be used also to inform the WEFE Nexus assessment and dialogue. The consultation process is expected to reach out and have interviews with women organizations and civil society at large to collect their perspective and have a more inclusive WEFE nexus assessment. Also, the project envisages to organize trainings to raise awareness of stakeholders how policies effectiveness can be enhanced if open to inclusive consultation.

3. Water security achievements and sustainability

a. Water security related outcomes of GEF projects

Based on the terminal evaluation reports and the results of the interviews, ReGoKo project achieved its initial goals to a large extent, while the completed SustainableMED Regional Coordination project had mixed results[49] (Table 2). The initial design of ReGoKo had the advantage of defining at the design stage only the components of the project while the activities were detailed during the inception phase. ReGoKo activities focused on the enhancement of national and regional environmental observatories. In Morocco, the Environmental Impact Assessment (EIA) law was revised and the law for Strategic Environmental Assessment (SEAs) was drafted. This new legal framework is expected to enhance water resources preservation from overexploitation and pollution. The staff of the regional observatories of Tangiers-Tetouan-Al Hoceima and Beni Mellal were trained on the application of SEAs. In Tunisia, an assessment of the organization, the operating procedures, and the performance of the environmental observatory (OTEDD) was conducted. A draft decree for the enhancement of OTEDD was developed. The draft decree includes the creation of regional observatories inspired from the Moroccan experience. The monitoring system includes water related indicators. The testing of these indicators at regional scale in collaboration with regional stakeholders led to the addition of two indicators: i) quality of groundwater (salinity and nitrates), and ii) the mobilization rate of brackish water for desalination.

The initial design of the Regional Coordination project included a number of outputs that didn't clearly align with the outcomes. Similarly to ReGoKo project, the project document didn't detailed the planned activities. These were defined during the inception phase. The achieved outputs listed in the terminal evaluation report show significant variations from the initial ones. The achieved activities tackled water related hazards and climate change. These included climate change downscaling, testing real-time flood forecast model for the Medjerda river, development of drought indicators monitoring, and use of remote sensing techniques for the evaluation of the evapotranspiration and mapping of irrigated areas.

The land surface model and land data assimilation system (LDAS) developed by a US university and that was foreseen to be used in the SustainableMED Regional Coordination project was not made available at the start of the project. Hence, the project teams were obliged to look for other tools which caused delays which affected the outcomes of the project. Also, the floods model 'CREST' selected initially was not

[49] As indicated above, the evaluation of the SustainableMED Regional Coordination project concerned only the activities implemented in Tunisia.

appropriate to the Tunisian context and the available data. The project team tested another flood model that is suitable for the Tunisian conditions, but the project timeline didn't allow to undertake all planned activities (flood mapping and use of the model to manage floods in the Medjerda river).

The table below lists the achievement of the two completed projects compared to the initial outcomes indicated in the project documents.

Table 19. Summary of completed ReGoKo and SustainableMED Regional Coordination project project achievements vs. original intended outcomes.

Intended outputs	Actual Outputs (at project completion)
ReGoKo Project	
Component I: 1) Strengthened environmental management systems through support of national commissions for sustainable development and reviews of legal and regulatory frameworks. Water is one of the priority sectors.	**Achieved**: the activities included: - Analysis and suggestion of improvements of the operating procedures of the Moroccan Regional Observatories of the Environment and Sustainable Development (OREDD), - Development of and government capacity building for an action plan for revision of EIA Law with the proposal to include SEA in Morocco, - Catalyzing the development of an information exchange platform . - Knowledge exchange between Morocco and Tunisia with regard to environmental observation and information systems through the assessment of observatories, - Analysis of the operating procedures of OTEDD and development of a road map to establish regional observatories similar to those in Morocco, - Draft decree aiming at institutionalizing OTEDD in Tunisia.
Component II: 1) Knowledge generation and sharing, training and technical assistance	**Achieved**: - Development of a guidebook on ESA translated into Arabic, English, and French. - Regional trainings on SEA/EIA and Cost Assessment of Environmental Degradation - The development of an environmental thematic map for Tunisia.
Component II: 2) Identification of investment opportunities for priority environmental actions	**Not achieved**: No activities related to identification of investments was conducted. In the terminal evaluation report, the outcome was modified and indicated: "dissemination activities for beneficiaries for knowledge products produced & establishment for the project website
SustainableMED Regional Coordination project	
Component 1 – (i) Institutions and reforms introduced for basin scale Integrated Water Resources Management (IWRM) and increased water use efficiency	**Partially achieved**: - the purchase, installation and implementation of 2 Water Information System Platform (WISP) tools and related ancillary equipment. The first is for climate change downscaling. The second platform is for irrigation mapping but was not developed. - Establishing reliable models for flood forecasting of Medjerda and setting-up methodologies of flood mapping based on remote
Component 1 - (ii) Real time quantification of critical water	

Intended outputs	Actual Outputs (at project completion)
parameters to inform infrastructure decisions and reform policies	sensing techniques. After calibrating and testing the floods model selected "CREST" developed jointly by the University of Oklahoma and NASA SERVIR, it was concluded that it was not adequate as it requires hydrometric and rainfall data, map data, plus 12 parameters (initial conditions, physical parameters, conceptual parameters) that are not all available, The activity was limited to testing two other models developed by a Tunisian University. There was no application to the Medjerda floods management,Development of drought monitoring indicators, - Estimation of evapotranspiration using remote sensing techniques - Development of irrigation maps using remote sensing techniques in three governorates of Tunisia - No work on the estimation of groundwater withdrawals in Kebili aquifers (South of Tunisia), - No decisions were taken to support flood management for Medjerda river.
Component 1 - (iii) Political and legal commitments made to utilize IWRM policies towards sustainable water use	
Component 1 - (iv) Improved national coordination between remote sensing centers and local Ministries of water, agriculture and environment	
Component 2 - (i) Increased awareness and capacity on quantitative remote sensing for improved agricultural and water resources management	**Achieved:** - Local workshops to share results of evapotranspiration and irrigation needs estimation with stakeholders, - Various international and regional technical training workshops and conferences were conducted, One PhD student received a scholarship to contribute to the on real-time flood modelling of Medjerda river and defended her PhD in 2017 after the project completion,
Component 2 - (ii) Increased capacity to collect and utilize remote sensing data collected	
Component 2 - (iii) funding fellowships to study remote sensing for environmental and water resources management	
Component 3 - (i) Regional quantification of impacts of climate change on water resources across MENA	**Partially achieved**: - Developed an online portal to share regional results (http//www.rciwrm-awc.org), - Regional report recommending a regional methodology for drought indicators monitoring based on analysis drought indicators at national scale, and assess the possibility of using it to build a regional system - No quantification of climate change impact at regional level conducted, - No activities related to transboundary water management conducted
Component 3 - (ii) Establishment of standardized definitions, methodologies and processes for measurement of and communication on regional water issues	
Component 3 - (iii)Enhanced communication and knowledge sharing across recipient countries on transboundary water resources management issues	

The ongoing MedProgramme activities have several outcomes that are directly related to water security. The Pollution Hotspots project outputs include technical and financial studies for nine coastal wastewater treatment plant upgrades and four rehabilitations of transfer systems. Depending on budget availability[50], wastewater management Master Plans for a number of governorates aim to upgrade WWTPs by 2045. Water Security project is expected to lead to the development of the coastal plan for the region of Tangiers-Tetouan-Al Hoceima. The coastal plan is planned to follow the comprehensive and operational methodology of the Integrative Methodological Framework (IMF) that combines ICZM, IWRM and Coastal Aquifer and Groundwater Management approaches. This project is expected also to deliver two coastal aquifer management plans, the first in Ras Jbel in Tunisia, and the second in Ghiss-Nekkor in Morocco. National dialogues on conjunctive surface and groundwater management solutions in coastal areas are planned for Morocco and Tunisia. Finally, the WEFE Nexus project is expected to produce a WEFE Nexus Strategy or Action Plan (henceforth referred to as Nexus Plan) for Tangiers-Tetouan-Al Hoceima region as well as implement pilot WEFE Nexus solutions on the ground. The WEFE Nexus Plan should indicate the action to be taken to implement the solutions identified through the Nexus assessments and dialogues and assist in and guide the incorporation of the Nexus approach in policy formulation and decision making for natural resources management. The Nexus Plan is planned to be incorporated into the coastal plan to be prepared under the Water Security project.

b. Relationship of results to GEBs, co-benefits and unintended consequences

The case study projects contribute to the global environmental benefit (GEB) core indicator, "number of shared water ecosystems (fresh or marine) under new or improved cooperative management." Indeed, the activities addressed two priorities identified by the TDA for the Mediterranean Sea (completed under previous GEF projects): i) Reduction of Land-Based Pollution in Priority Coastal Hotspots and measuring progress to impacts; and ii) Enhancing Sustainability and Climate Resilience in the Coastal Zone.

The Pollution Hotspots project tackles pollution reduction directly through investment in treatment infrastructure. While the Water Security project and the WEFE Nexus project adopt the source to sea approach to support sustainable planning in the coastal areas of the Mediterranean. ReGoKo project aimed to enhance the mechanisms for the monitoring of environment status in the Mediterranean countries. The regionality of the projects was highlighted by all stakeholders as a major asset. The exchange of knowledge and experience had a very positive impact. ReGoKo project is a concrete example on how the Moroccan experience with the regional environmental observatories inspired the outputs of the project in Tunisia by recommending the creation of regional observatories. In addition, personal relations were developed and continue beyond the project completion.

No stakeholders noted any unintended negative consequences of the completed projects.

c. Sustainability of water security outcomes in completed projects (sustainability)

The projects outcomes were to a large extent sustained or improved, while few has worsened. The table below provides a detailed analysis of the sustainability of the project outputs.

[50] Due to the inflation worldwide and in Tunisia, the cost of the studies is expected to be higher than the initial estimations included in the project document.

Table 20. Post-completion sustainability of the projects outcomes, according to evidence gathered by the case study.

Intended outputs and status at project completion	Status of outputs at time of case study	Direction of change since project completion
ReGoKo Project		
Improvement of operating procedures of OREDDs suggested (Morocco)	The organization of OREDDs changed since 2015. Not clear however to what extent this new organization took into consideration the results of ReGoKo.	**Unable to assess**
Information exchange platform developed& established (Morocco)	The platform was not developed in the framework of ReGoKo. However, the regional information systems SIREDD (Systèmes d'Information Régionaux de l'Environnement et du Développement Durable) were developed after the completion of the project and are currently operational.	**Improved**
Draft EIA Law revised with the inclusion SEA (Morocco)	The law for SEAs is now in place. Enforcement Decrees to operationalize are yet to be approved.	**Improved**
Ministerial staff trained on EIA public consultation, SEA and EIA information system (Morocco)	The interviewees reported that useful training workshops took place. The training material developed by ReGoKo was used to replicate the trainings in the other regions of the country.	**Improved**
Regional knowledge exchange on environmental observation and information systems (Morocco & Tunisia)	Interviewees from both countries indicated that they benefited strongly from the regional exchange of experience between Tunisia and Morocco. Tunisia was inspired by the Moroccan experience of regional observatories/ Furthermore, the field trip organized to the observatory of Poitou-Charentes in France was indicated as a very useful to learn best practices from other countries.	**Sustained**
Operating procedures of OTEDD analyzed & managerial measures identified (Tunisia)	The institutionalization of OTEDD didn't happen due to the political context giving low priority to environmental issues and the decision by the successive governments to limit recruitments. However, the study results are still used until now for advocacy purposes for the institutionalization of OTEDD under different options.	**Sustained**
Draft decree aiming at institutionalizing OTEDD in Tunisia	The draft Decree was prepared but didn't go through approval and didn't enter into force. However, it is still on the table of negotiation with the government.	**Sustained**
Guidebook on ESA prepared and translated into Arabic, English, and French (Morocco).	The guidebook shared with the different regional observatories. However, it was not possible to check if this guidebook is still used by the staff.	**Sustained / Unable to assess**
Environmental map developed (Tunisia)	Which institution will host and manage the environmental map remained an unresolved question. Due to the lack of legal status and resources (server), OTEDD was not ready to ensure this role. The map was transferred to the	**Worsened**

Intended outputs and status at project completion	Status of outputs at time of case study	Direction of change since project completion
	Department of Informatics. However, due the lack of human resources, the map was not updated and is not functioning.	
Project website established	The website had lasted at least 3 years after the end of the project. Currently it is no longer functional (http://REGOKO.planbleu.org/en)	**Worsened**
SustainableMED Regional Coordination project		
Two Water Information System Platform (WISP) tools developed and related equipment the purchased, installed and implemented	• The platform developed for climate change downscaling and related equipment installed at the National Institute of Meteorology are still functional until today. •	**Sustained**
Flood forecasting of Medjerda and methodologies of flood mapping based on remote sensing techniques using free radar and optical images set up.	The activity was limited to testing floods models and no methodology was set-up for flood mapping. Furthermore, no follow-up was made on this activity and until today, there is no real time floods model used for the management of the Medjerada floods.	**Not achieved at the project end**
Drought monitoring indicators developed	The drought indicators were developed through the collaboration between Nebraska University and a Tunisian research center. The activity introduced the approach in Tunisia and allowed networking. Another project funded by the USAID with the involvement of the water resources department and Nebraska University extended the work and developed drought composite index. Furthermore, a National Drought Management Plan was developed by the Water Resources Department with the support of UNCCD.	**Improved**
Estimation of evapotranspiration using remote sensing techniques	Purchase of flux station to calculate evapotranspiration. The equipment is installed at the National Research Institute of Rural Engineering. The equipment continues to be used for education and research purposes.	**Sustained**
Better irrigation planning	Development and application of the methodology for the evaluation of irrigated areas for each crop type in three regional governments of Tunisia with the lead of the Remote Sensing Centre and the involvement of the Ministry and local departments of agriculture. The methodology and the projects results were used as a background to define the activities of the FAO regional programme on water scarcity. Also, the expertise developed was used for the development of agriculture maps in 2022 that aim to assist decision making for water allocation.	**Improved**

Intended outputs and status at project completion	Status of outputs at time of case study	Direction of change since project completion
Estimation of groundwater withdrawals	The leader of this component left the water resources department, and no interview was conducted for this component.	Unable to assess
Water related decisions	Due to the above-mentioned challenges that faced flood modelling, no water decisions for the Floodplain Management Plan was reached.	**Not achieved**
Capacity building	Several trainings workshops were organized for each of the project components. The impact of these activities and their sustainability couldn't be assessed.	Unable to assess
Academic study	One student started her PhD on real-time floods modelling in the framework of the project and continued working on it after the project completion until she defended it in 2017. Master internships supported by the project.	**Improved**
Regional reports	The terminal evaluation reports indicate only one report output discussing the national outcomes of the application of drought monitoring at national level. The study recommends building a regional system for drought monitoring. No follow-up made.	**Worsened**
Online portal of the project	Portal developed and still functional (http//www.rciwrm-awc.org)	**Sustained**

The alignment of the project activities with the country priorities explains to a large extent the sustainability or the improvement of the projects outcomes. Indeed, many project activities were maintained within the countries, even though, some time passed until additional funds were mobilized. This is the case of the development of composite indicators for drought monitoring that were recently developed through USAID fund, while fundraising is still ongoing for the development of a drought early warning system. In some cases, the improvement of the outcomes could've been accelerated if the projects had longer duration or a second phase. This is the case of the enforcement of the draft law for the institutionalization of OTEDD that would've required additional funds to conduct advocacy activities.

The sustainability of platforms developed is very often challenged by the availability of human and capacity resources within the countries. This was the case for the environmental map in Tunisia that is not functional.

The flood mapping is among the activities that were not completed because the selected model was not appropriate for the Tunisian context. Testing more than one model at the beginning of the project and selecting the suitable one could've allowed the project to reach its objectives.

It is often the case that the projects' national leaders leave their positions for careers promotion or retirement. Hence, the expertise and knowledge developed by the projects is lost. Stakeholders recommended to enlarge the projects vis-à-vis to a core group rather to one leader, as well as increase

the number of participants to trainings to form a critical mass within the organization that can lead to change and increase the chances for the expertise developed to remain within the institutions.

4. Overall findings

- **Project activities mostly support country priorities:** Morocco and Tunisia share common water challenges that dictate similar priorities, though depending on the existing national institutional and legal framework and governance system, required actions may differ. GEF projects succeeded to fit adequately into national dynamics and efforts to address these challenges and suggested comprehensive approaches for this purpose. The ongoing Water Security and WEFE Nexus MedProgramme projects tackle the mainstreaming of water resources sustainability in spatial and sectoral planning processes in Morocco in alignment with the national legal obligations. In Tunisia, the MedProgramme Water Security project contributes to bridging the financial gap in the water sector through the preparation of feasibility studies and bankable projects to improve the sanitation service.

- **Water security thematic outcomes are targeted to different degrees:** Stakeholder awareness, improving knowledge, governance systems and adaptive management are the outcomes that are strongly addressed by the projects. Activities focused on improving knowledge on water resources under climate change conditions and in coastal aquifers, as well as on developing appropriate tools to manage climate risks. Even though all projects included training and capacity building activities, stakeholders recommended to further enhance these activities and include systematically an overarching component on capacity building in order to reach larger number of actors. Projects activities also supported the enhancement and the enforcement of legal frameworks related to water resources planning and monitoring. Activities implementation is generally based on participatory approach. However, access to finance and optimizing physical water systems are less developed. They are respectively limited to the preparation of sanitation bankable projects and the implementation of WEFE Nexus demo solutions.

- **More inclusive approach for ongoing projects design and implementation:** The completed projects didn't include gender consideration in their design. ReGoKo dealt with the issue in a basic accounting manner of percentage of women among the participants in the events. More focus on inclusive processes, gender and vulnerable groups mainstreaming is put in the recent MedProgramme. Gender assessment and action plans were already developed during the design phase for each of the projects. During implementation, the activities' ToRs require systematic consideration of a gender dimension in the deliverables requested. However, the identification and mainstreaming of vulnerable groups is referred to only in a limited way.

- **Enhancing water governance systems requires time and continuity:** For both of the completed case study projects, delays during implementation meant that additional activities identified during the project could not be carried out in the limited time period of the project. Once the draft law for the institutionalization of OTEDD in Tunisia was completed during the ReGoKo project, additional advocacy activities could've supported its adoption, but did not take place. Also, once the methodology for the mapping of irrigated areas and the estimation of irrigation needs using remote sensing techniques was developed under the SustainableMED regional Coordination project, additional activities for the institutionalization of the procedures and the enhancement of the teams' capacities at national and local level could've improved the project sustainability.

- **Very limited knowledge by the water stakeholders of the GEF opportunities to support water security:** The initial designs of the ongoing case study projects were suggested by the implementing agencies. The involvement of national water stakeholders during the design phase was limited to the selection of activities they were interested in and to the identification of sites where activities can be implemented. Local stakeholders were not involved at all at this stage. During implementation, apart from the projects' focal points, other stakeholders don't have a complete picture of all activities. Furthermore, they don't have a clear understanding of GEF objectives, focal areas, and operating modalities. Stakeholders confirmed that projects activities match their priorities well, but they highlighted the missed opportunities to benefit more from GEF funding to reply to the high needs of the countries to achieve water security , among others funds mobilization including through climate funds. They expressed their wish to be more informed about GEF strategy and funding priorities related to water security.

- **Integrated programming combining several focal areas promotes synergies:** Stakeholders indicated the difficulty to synchronize donors funding. What is more accessible is building-up on activities already implemented and avoiding overlapping and maximizing complementarities when activities are run in parallel. However, synergies between MedProgramme Child Projects are being achieved and appreciated by the stakeholders.

Technical Document 10: Rapport sur l’étude de cas Maroc-Tunisie

Bureau indépendant d'évaluation du Fonds pour l'environnement mondial

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Pour finir, nous tenons à remercier les parties prenantes qui ont accepté de répondre aux questions dans le cadre des entretiens et de partager généreusement les informations et connaissances disponibles concernant les projets. On trouvera en annexe la liste des parties prenantes.

Les photos de couverture montrent des murets destinés à permettre une meilleure infiltration dans les champs plantés d'arbres situés dans les bassins hydrologiques du Rif au Maroc.

Liste des abréviations

AFD	Agence Française de Développement
CP	Child Project
CRTEAN	Centre Régional de Télédétection des États d'Afrique du Nord
CRTS	Centre Royal de Télédétection Spatiale
EIB	Banque Européenne d'Investissement
EIE	Etude d'Impact sur l'Environnement
ESE	Evaluation Stratégique Environnementale
FVC	Fonds Vert pour le Climat
GEF	Fonds pour l'Environnement Mondial / Global Environment Facility
GGGI	Institut mondial de la croissance verte
GIRE	Gestion Intégrée des Ressources en Eau
GIZC	Gestion Intégrée des Zones Côtières
GWP-Med	Partenariat Mondial pour l'eau - Méditerranée
INM	Institut National de la Météorologie
MedProgramme	Programme pour la Mer Méditerranée
ONAS	Office National de l'Assainissement
ONG	Organisation Non Gouvernementale
OREDD	Observatoire Régional de l'Environnement et du Développement Durable
OTEDD	Observatoire Tunisien de l'Environnement et du Développement Durable
PAP/RAC	Programme d'Actions Prioritaires Centre d'Activité Régional
ReGoKo	Programme Gouvernance et Développement des Connaissances
SRL	Schéma Régional du Littoral
Sustainable Med	Programme de Développement Durable de la Méditerranée
UNESCO – PHI	Programme Hydrologique Intergouvernemental de l'UNESCO

1. Introduction

a. Description succincte de l'évaluation globale

L'eau douce est un élément indispensable pour la survie de la société humaine et les écosystèmes terrestres. La sécurité de l'eau est de plus en plus utilisée par les responsables des ressources en eau dans le monde pour donner un aperçu global des questions relatives aux ressources en eau douce. Le Programme des Nations Unies pour l'environnement (2013) définit la sécurité de l'eau comme « la capacité d'une population à maintenir un accès durable à des quantités adéquates d'eau d'une qualité acceptable permettant de garantir les moyens de subsistance, le bien-être humain et le développement socioéconomique, de se protéger contre la pollution de l'eau et les catastrophes naturelles liées à l'eau, et de préserver les écosystèmes dans un climat de paix et de stabilité politique. » La sécurité de l'eau est au cœur de plusieurs domaines d'intervention du GEF, qu'il s'agisse de la gestion des ressources en eau transfrontières dans les eaux internationales, de la protection contre la sécheresse et de la dégradation des sols ou de la limitation de la pollution de l'eau due aux produits chimiques et aux déchets. Compte tenu de l'importance et du caractère transversal de la sécurité de l'eau, ainsi que de la prise de conscience croissante de la question dans les stratégies et projets du GEF, le Bureau indépendant d'évaluation du GEF a décidé de procéder à une évaluation globale de cette question dans les différents domaines d'intervention. Le document intitulé Evaluation of GEF's strategy and portfolio in water security (Évaluation de la stratégie et du portefeuille du GEF dans le domaine de la sécurité de l'eau) évaluera la stratégie et les interventions du GEF dans l'ensemble des domaines d'intervention du Fonds, notamment leur pertinence par rapport aux besoins des pays et des bénéficiaires, leurs effets positifs sur l'environnement de la planète et leurs retombées positives pour ce qui est de la sécurité de l'eau et la pérennité de ces résultats une fois les projets terminés. L'évaluation a commencé en octobre 2021 et devrait prendre fin en 2023.

Dans le cadre de l'évaluation, plusieurs études de cas ont été retenues afin de comprendre l'incidence des projets et programmes du GEF sur la sécurité de l'eau au niveau des pays et des bassins. Les études de cas avaient pour objet d'aborder plusieurs thèmes d'évaluation, dont les suivants :

- La **pertinence** des projets du GEF par rapport aux besoins, aux politiques et aux stratégies des bénéficiaires et des principales parties prenantes (autorités nationales et locales, collectivités, populations vulnérables, société civile, secteur privé, ONG, etc.) dans le domaine de la sécurité de l'eau dans les pays où ils sont mis en œuvre.
- La **cohérence** des projets du GEF avec des initiatives similaires financées par des bailleurs de fonds et des gouvernements dans les domaines où ils sont mis en œuvre.
- Les **effets positifs** des projets du GEF sur l'amélioration de la sécurité de l'eau grâce aux principaux résultats ou aux principales retombées positives des projets et au respect des mesures de sauvegarde liées à l'eau.
- L'**efficacité** des projets du GEF dans la prise en considération de la question de la sécurité de l'eau des populations vulnérables, et plus particulièrement des femmes.
- Le **caractère durable** des résultats des projets exécutés par le GEF.

Les critères de sélection des études de cas étaient les suivants : 1) la présence de projets du GEF, clôturés ou en cours, ayant pour thème la sécurité de l'eau ; 2) la présence de bassins hydrographiques ou de nappes phréatiques transfrontaliers ; 3) la diversité géographique parmi les études de cas choisies ; 4) la diversité des domaines d'intervention[51] et des fonds d'affectation[52] parmi les études de cas ; 5) la diversité des agences d'exécution du GEF parmi les études de cas ; et 6) le chevauchement avec des évaluations antérieures et d'autres évaluations menées actuellement par le Bureau indépendant d'évaluation du GEF.

L'une des études de cas retenues était l'étude de cas Maroc-Tunisie, qui regroupe des projets régionaux du GEF, clôturés ou en cours, auxquels ont participé différents pays de la région de la Méditerranée (Albanie, Algérie, Bosnie-Herzégovine, Égypte, Jordanie, Liban, Libye, Maroc, Monténégro et Tunisie). On trouvera dans **le présent rapport un résumé des conclusions de l'étude de cas Maroc-Tunisie.**

b. Description des projets du GEF figurant dans l'étude de cas Maroc-Tunisie

L'étude de cas Maroc-Tunisie englobait cinq projets, deux projets clôturés et trois projets en cours[53]. Les deux projets clôturés ont été financés dans le cadre du domaine d'intervention « Eaux internationales » et étaient tous deux des composantes du programme-cadre intitulé : « Programme de développement durable de la Méditerranée » (Sustainable Med). Les trois projets en cours sont des projets rattachés au Programme pour la mer Méditerranée (MedProgramme) qui est un programme régional mis en œuvre au Maroc et en Tunisie ainsi qu'en Algérie, en Bosnie-Herzégovine, en Égypte, au Liban, en Libye et au Monténégro. Outre les activités régionales, certains de ces projets comprenaient des activités nationales au Maroc et en Tunisie. Le tableau 1 présente une description détaillée des projets évalués.

[51] Les domaines d'intervention du GEF sont les suivants : la biodiversité, les produits chimiques et les déchets, les changements climatiques, les eaux internationales et la dégradation des sols.

[52] Le GEF gère trois fonds d'affectation spéciale : la Caisse du GEF (qui comprend les domaines d'intervention mentionnés ci-dessus) et deux fonds axés sur l'adaptation aux changements climatiques : le Fonds pour les pays les moins avancés et le Fonds spécial pour les changements climatiques.

[53] Initialement, le projet ID GEF 9691 Financement des technologies environnementales avancées dans la région de la mer Méditerranée pour les systèmes d'eau et les côtes propres (ENVITECC) figurait dans la liste. Cependant, après examen du document concernant les demandes d'agrément par le directeur général et après les entretiens organisés respectivement avec les représentants du Groupe chargé du GEF en Tunisie et les représentants de l'agence de mise en œuvre, la Banque européenne pour la reconstruction et le développement– BERD (Mme Claudia Neuschulz et Mme Hande Yukseler), il a été confirmé que le projet n'abordait pas la question de la sécurité de l'eau et qu'il a donc été exclu de l'évaluation.

Tableau 21. Vue d'ensemble des projets figurant dans l'étude de cas Maroc-Tunisie.

ID GEF	Intitulé du projet	Agence de mise en œuvre	Agence d'exécution*	Financement du GEF (millions de dollars)	Cofinancement (millions de dollars)	Période de mise en œuvre	Pays où des activités nationales ont été menées
4001	Gouvernance et développement des connaissances (ReGoKo)	Banque mondiale	Plan Bleu	2,57	4,4	2012-2015	Maroc & Tunisie
3978	Coordination régionale pour l'amélioration de la gestion des ressources en eau et Programme de renforcement des capacités	Banque mondiale	CRTS (Maroc) CRTEAN (Tunisie)	4,48	13,9	2011-2015	Maroc & Tunisie
9717 (CP1.2)	Projet d'investissement dans les zones gravement polluées de la Méditerranée	PNUE	BEI	5,0	733,5	2020-à ce jour	Tunisie
9687 (CP2.1)	Zones côtières de la Méditerranée : Sécurité de l'eau, résilience climatique et protection de l'habitat	PNUE	PAP/RAC, Plan Bleu, GWP-Med, UNESCO-IHP	7,0	143,3	2020-à ce jour	Maroc & Tunisie
9685 (CP2.2)	Zones côtières de la Méditerranée : Interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes.	PNUE	GWP-Med	3,5	11,3	2020-à ce jour	Maroc

* CRTS : Centre royal de télédétection spatiale
CRTEAN : Centre régional de télédétection des États d'Afrique du Nord
EIB : Banque européenne d'investissement
PAP/RAC Programme d'actions prioritaires Centre d'activité régional
UNESCO – PHI : Programme hydrologique intergouvernemental de l'UNESCO
GWP-Med : Partenariat mondial pour l'eau-Méditerranée

c. Méthodologie retenue pour l'étude de cas

L'étude de cas Maroc-Tunisie a été réalisée entre septembre 2022 et février 2023. En premier lieu, les descriptifs de projet du GEF ont été passés en revue, notamment les documents concernant les demandes d'agrément par le directeur général, les examens à mi-parcours, les évaluations finales et tout autre rapport ou toutes autres données disponibles. L'examen des documents a permis de recenser les produits et les résultats relatifs à la sécurité de l'eau qui seront analysés dans le cadre de l'évaluation. En outre, les principales parties prenantes ont été identifiées et leur identité a été confirmée aux représentants du Groupe chargé du GEF dans les deux pays. Compte tenu de la présence de l'évaluateur en Tunisie, il a commode de s'entretenir tout d'abord avec les parties prenantes tunisiennes et d'effectuer ensuite une

visite sur le terrain au Maroc. Cette visite a eu lieu du 12 au 20 décembre 2022. Elle a débuté par des entretiens avec les représentants des administrations centrales et s'est poursuivie par la visite des trois villes de Tanger, de Tétouan et d'Al Hoceima qui a permis de rencontrer les parties prenantes locales, y compris les autorités locales, les ONG et les universités.

Plusieurs années s'étant écoulées depuis l'achèvement des projets, il a été parfois difficile de s'entretenir avec les parties prenantes ayant participé à ces projets. Par exemple, certains membres du personnel des observatoires régionaux de l'environnement de Tanger (Maroc) qui avaient pris part au projet « Gouvernance et développement des connaissances (ReGoKo) » (ID GEF ID 4001) étaient partis à la retraite et d'autres avaient été promus et nommés à des postes internationaux. La difficulté était particulièrement grave pour le projet « Coordination régionale pour l'amélioration de la gestion des ressources en eau et Programme de renforcement des capacités) (ID GEF 3978), désormais appelé - « projet de coordination régionale Sustainable Med ». En effet, il n'était pas possible de joindre l'agence d'exécution, le « Centre royal de télédétection spatiale (CRTS) » au Maroc, et ce malgré plusieurs tentatives. En Tunisie, bien que l'accord initial conclu avec l'agence d'exécution, le « Centre régional de télédétection des États d'Afrique du Nord (CRTEAN) » ait prévu la tenue d'une réunion avec des partenaires clefs du projet, cette réunion n'avait pas eu lieu sans que les raisons en aient été communiquées. Néanmoins, certains entretiens bilatéraux avec des partenaires avaient pu être organisés. Compte tenu de la difficulté d'entrer en contact avec les parties prenantes, le projet sera évalué seulement pour les activités mises en œuvre en Tunisie.

Au total, 45 parties prenantes ont été interrogées : 2 issues d'agences de mise en œuvre, 12 issues d'agences d'exécution, 16 issues d'administrations centrales et 15 parties prenantes locales.

2. Répondre aux besoins des parties prenantes en matière de sécurité de l'eau

a. Priorités nationales et locales dans la région faisant l'objet de l'étude de cas (pertinence)

Le Maroc et la Tunisie ont été frappés par la sécheresse pendant l'évaluation. Cette sécheresse monopolisait les esprits des parties prenantes au moment où elles présentaient leurs priorités nationales relatives à la sécurité de l'eau. Des problèmes similaires résultant de cette sécheresse ont été soulevés dans les deux pays. Cela étant, en fonction des obligations juridiques incombant à chacun de ces pays, les mesures à prendre à titre prioritaire étaient dans certains cas différentes, même si la nécessité d'un apprentissage et d'un échange de données d'expérience au niveau intrarégional était soulignée. Les grandes priorités énoncées par les parties prenantes étaient les suivantes :

- **La gestion de la pénurie d'eau (toutes les parties prenantes)** : la satisfaction des besoins en eau était la priorité absolue pour toutes les parties prenantes. Dans l'optique des gestionnaires des services d'approvisionnement en eau, il s'agit d'élaborer des stratégies et des plans nationaux pour les bassins hydrographiques. À l'échelon local, l'octroi de permis de prélèvement d'eau et la répartition des ressources en eau entre les différents utilisateurs, en particulier pendant les périodes sèches, constituent la principale difficulté pour les gestionnaires des services d'approvisionnement en eau à l'échelon local. Du point de vue des responsables de l'aménagement du territoire, des représentants des ministères de l'Agriculture et des autorités locales, il importe que les pénuries d'eau n'entravent pas le développement économique. Enfin,

les représentants des ministères de l'Environnement et des ONG veulent s'assurer que la préservation des écosystèmes ne sera pas laissée de côté pendant la crise.

- **L'évaluation des effets des changements climatiques et la gestion des risques (autorités nationales et locales et autorité du bassin hydrographique).** Les pays sont frappés par des sécheresses d'une durée sans précédent et il y a tout lieu de s'attendre à ce que la situation empire en raison des changements climatiques. Le régime des pluies a également changé et les risques d'inondation augmentent. Les problèmes liés aux changements climatiques sont multiples. Le réajustement des modèles mondiaux aidera à évaluer les scénarios possibles de changements climatiques au niveau national et leurs effets sur les ressources en eau douce. La mise au point d'outils de surveillance et de modélisation appropriés contribuera au renforcement de la gestion des risques de sécheresse et d'inondation. L'utilisation des techniques de télédétection et des techniques GIS permettra de prendre des décisions en matière de gestion de l'eau.
- **La surveillance des ressources en eau dans le cadre de la surveillance de l'environnement (observatoires de l'environnement)** : conformément à leur mandat, les observatoires de l'environnement ont souligné la nécessité de soutenir leurs cadres institutionnels, juridiques et organisationnels et de renforcer leurs capacités techniques, notamment par la mise en place de plateformes de données partagées. Par ailleurs, l'amélioration des services fournis par les observatoires passe par une meilleure compréhension des attentes des acteurs de l'eau.
- **L'application des obligations juridiques (toutes les parties prenantes au Maroc)** : au Maroc, la loi n° 81-12 relative au littoral prévoit l'obligation d'élaborer des plans régionaux de gestion du littoral (Schéma régional du littoral – SRL) pour toutes les zones côtières. Jusqu'à présent, seul un plan de gestion intégrée des zones côtières a été élaboré pour la région de Rabat-Salé, avec le soutien de la Banque mondiale. La région de Tanger-Tétouan-Al Hoceima qui couvre la plus grande partie de la côte méditerranéenne devrait selon toute vraisemblance être la deuxième région à se doter d'un plan de gestion intégrée des zones côtières. D'autre part, la loi n° 36-15 relative à l'eau prévoit l'obligation d'établir un plan de gestion des nappes phréatiques appelé contrat de nappe pour chaque nappe phréatique. Il existe un lien direct entre l'application de cette loi et la priorité décrite au point suivant.
- **La gestion des eaux souterraines côtières (autorités nationales et locales et autorités du bassin hydrographique)** : l'intrusion d'eau de mer dans les nappes phréatiques due à l'effet combiné de la surexploitation et de l'élévation du niveau de la mer, ainsi que le risque de salinisation irréversible des ressources en eau souterraine constituent des menaces graves pour les deux pays. Il est bien évidemment nécessaire de mieux comprendre les caractéristiques géologiques des nappes phréatiques côtières. Cependant, tous les acteurs de l'eau ont fait remarquer que cela ne suffira pas à répondre aux besoins en eau des gros usagers de l'eau. Ils demandent plutôt l'élaboration de plans pour les zones côtières souterraines dans le cadre de processus participatifs. Ces plans doivent prévoir des options réalistes et des solutions pouvant être mises en œuvre pendant les périodes de crise due à la sécheresse.
- **L'élaboration de projets aptes à bénéficier d'un financement et la mobilisation de fonds pour le traitement des eaux usées (autorités nationales en Tunisie).** L'Office National de l'Assainissement de la Tunisie (ONAS) a déclaré qu'il avait besoin d'un soutien pour accélérer l'accès aux fonds nécessaires pour la création de stations d'épuration et la mise à niveau des stations existantes dans le cadre de l'élaboration des projets proposés qui répondent aux normes

internationales et attirent les bailleurs de fonds. En outre, cet organisme a émis de souhait d'appliquer les nouvelles technologies pour l'atténuation (réduction des gaz à effet de serre) des changements climatiques et l'adaptation à leurs effets (énergies renouvelables, réutilisation des eaux usées traitées, etc.).

- **Les activités sur le terrain (tous les groupes de parties prenantes)**. La lassitude des parties prenantes à l'égard des processus participatifs dans le but d'élaborer des stratégies, des plans ou des études, le faible degré d'appropriation des résultats de ces processus et la mise en œuvre très souvent limitée de ces stratégies et ces plans ont été évoqués au cours des nombreux entretiens. Dans le même temps, les parties prenantes reconnaissent la nécessité de mettre en place des stratégies et des plans et de réaliser des études. Elles ont exprimé le souhait d'associer ces activités conceptuelles aux activités pratiques qui se traduisent par des investissements physiques sur le terrain, ce qui permettra d'intéresser un plus grand nombre de parties prenantes aux projets et d'accroître leur engagement. Les activités conceptuelles peuvent aussi servir à la reproduction de solutions innovantes à titre pilote ou de démonstration. Citons par exemple les réseaux de surveillance, les techniques de dépollution des eaux industrielles, les énergies renouvelables au service de la gestion des ressources en eau, l'expérimentation de solutions d'adaptation au climat, etc.

b. Façon dont est perçue la réponse du GEF aux besoins en matière de sécurité de l'eau (pertinence)

La participation des parties prenantes à la phase de conception des projets du GEF en cours s'est limitée aux représentants des administrations publiques. En effet, le concept initial du Programme pour la Méditerranée (MedProgramme) et des projets y sont rattachés a été soumis par les agences de mise en œuvre. Ce concept a aussi bénéficié du fait qu'un grand nombre d'agences de mise en œuvre participaient aussi au précédent programme MedPartnership du GEF (ID GEF 2600), étaient au courant de la situation dans les pays et savaient quelles étaient les mesures à prendre pour le nouveau programme. Le concept initial a ensuite été examiné dans des ateliers de consultation régionaux avec la participation des points focaux du GEF et dans le cadre de consultations bilatérales avec les points focaux des Centres d'activité régionaux du Plan d'action pour la Méditerranée du PNUE. Les pays ont été invités à indiquer les activités qui les intéressaient. C'est à ce moment-là que les points focaux nationaux ont tenu des consultations internes avec d'autres ministères au niveau national pour sélectionner les activités et les sites de mise en œuvre. Toutefois, au-delà de la sélection des activités et des sites de mise en œuvre, il ne semble pas que les parties prenantes nationales aient participé plus avant à l'examen des projets proposés. De plus, les parties prenantes locales n'ont joué un rôle qu'après le démarrage des projets et ne savaient que très peu de choses sur les activités et la structure des projets, exception faite du bureau régional du ministère de l'Environnement pour la région de Tanger-Tétouan-Al Hoceima qui avait été désigné comme point focal pour les projets CP2.1 et CP2.2. Celui-ci connaissait donc mieux les activités de projet et avait participé à la planification de la mise en œuvre.

Néanmoins, toutes les parties prenantes ont attaché une grande importance à la flexibilité offerte par les projets du GEF pendant la phase de démarrage pour réajuster les activités, compte tenu également du temps écoulé entre la conception et le démarrage des projets. D'une manière générale, les parties prenantes ont estimé que les activités achevées et les activités planifiées étaient conformes aux priorités énoncées par les parties prenantes.

Le projet de coordination régionale SustainableMed achevé avait pour objet de soutenir la **gestion des ressources en eau dans le contexte des changements climatiques** à travers de multiples aspects et en collaboration avec plusieurs partenaires nationaux. Le projet a aidé l'Institut national de la météorologie de la Tunisie (INM) à produire les premiers résultats du réajustement des projections climatiques et l'a doté des outils informatiques nécessaires (serveurs, etc.). Les deux phénomènes extrêmes que sont les inondations et les sécheresses ont été pris en considération par le projet. Des modèles d'inondation en temps réel ont été testés dans la Medjerda, qui est le principal fleuve, et des indicateurs de surveillance de la sécheresse ont été mis au point. Enfin, des techniques de télédétection ont été mises au point pour évaluer les besoins en eau dans l'agriculture en fonction du type de cultures et de la croissance des cultures. L'objectif était d'aider à prendre des décisions en matière de répartition des ressources en eau.

Le **renforcement/la restructuration des observatoires de l'environnement** était au centre des préoccupations dans les deux pays. Le projet ReGoKo a fourni en temps voulu un appui technique à cette entreprise. Au Maroc, l'accent a été mis sur la révision du cadre juridique, ce qui a permis de privilégier l'évaluation stratégique environnementale (ESE) au détriment de l'Etude d'Impact sur l'Environnement (EIE) et de renforcer les capacités des observatoires régionaux pour encourager l'application des EIE et y contribuer. La Tunisie a mis à profit l'expérience acquise par le Maroc dans la création d'observatoires régionaux et dans la rédaction de décret instituant l'observatoire national de l'environnement.

L'**élaboration de plans de gestion des nappes phréatiques côtières** est un volet essentiel du projet sur la sécurité de l'eau du MedProgramme (GEF ID 9687). Une méthode d'évaluation des nappes souterraines côtières a été mise au point dans le cadre des activités menées précédemment par le MedPartnership. Les parties prenantes nationales et locales ont fortement insisté sur le fait que les études ne devaient pas être un objectif en soi, mais qu'elles devaient être un moyen d'encourager le dialogue avec les parties prenantes et sont parvenues à un accord sur des solutions réalistes visant à lutter contre la **pénurie d'eau** et les risques de dégradation des aquifères côtiers. Cela vaut d'autant plus pour le Maroc ou l'établissement de contrats de nappe (ce qui est équivalent à un plan de gestion) est une **obligation prévue par la loi**. Deux plans de gestion des aquifères seront élaborés dans les pays visés par l'étude de cas par le projet sur la sécurité de l'eau du MedProgramme : le premier concerne la nappe de Ras Jebel dans le nord-est de la Tunisie et le second concerne la nappe de Ghis-Nekor dans le nord-est du Maroc.

Il existe une autre obligation : l'élaboration de plans de gestion intégrée des zones côtières. Le gouvernement marocain a créé un comité interministériel composé de 65 membres et présidé par un gouverneur (dénommé Wali) chargé de l'élaboration du plan de gestion intégrée des zones côtières de la région de Tanger-Tétouan-Al Hoceima. Le projet sur la sécurité de l'eau, et le projet sur les interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes » du MedProgramme (ID GEF 9685) utilisent ce comité pour leur processus de consultation et de participation des parties prenantes. Dans le cadre des ateliers de consultation organisés jusqu'à présent, les parties prenantes ont indiqué qu'il y avait un lien entre l'aménagement du territoire et la gestion des ressources naturelles. Deux risques majeurs liés aux ressources en eau ont été mis en évidence : **la pénurie d'eau et la pollution de l'eau**. Le projet sur la sécurité de l'eau du MedProgramme sera axé sur l'aménagement du territoire de la zone côtière et le projet sur les interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes du MedProgramme entreprendra une analyse détaillée des liens et des interactions entre les stratégies des différents secteurs et alimentera le processus de planification en proposant des recommandations stratégiques et d'éventuelles solutions fondées sur les interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes.

L'**augmentation du taux de traitement de l'eau et l'amélioration de la qualité de l'eau** sont des priorités majeures en Tunisie. La réutilisation des eaux traitées figurant dans les stratégies concernant l'eau et le climat joue un rôle clef dans la lutte contre la pénurie d'eau et l'adaptation au climat. Cependant, la faible qualité de l'eau traitée est souvent considérée comme le principal obstacle au développement de la réutilisation de l'eau traitée. Le projet d'investissement dans les zones gravement polluées de la Méditerranée du MedProgramme (ID GEF 9717) aidera l'Office national de l'assainissement en Tunisie à réaliser des études techniques et financières en vue de la création de stations de traitement des eaux usées et de la mise à niveau des installations existantes dans les zones côtières, ce qui permettra de mobiliser l'investissement pour la construction de ces stations.

Les projets évalués n'ont pas tenu compte des **activités sur le terrain**. Seul le projet sur les interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes » du MedProgramme prévoit de mettre en œuvre à titre pilote des solutions fondées sur ces interactions à des fins de démonstration. Les projets de démonstration prévus comportent des solutions techniques et administratives qui ont été déjà appliquées dans la région de la Méditerranée ou qui sont au stade expérimental ou au stade de la recherche et sont jugées prometteuses pour leur potentiel de nouveauté ou de faisabilité. Ces solutions s'efforcent d'optimiser la production agricole et de réduire au minimum l'utilisation de l'eau grâce aux énergies renouvelables, aux systèmes logiciels faisant appel à l'intelligence artificielle qui permettent de prédire le flux et la disponibilité de l'eau et d'utiliser en temps réel des caméras multispectrales sur des véhicules qui épandent des fertilisants et des pesticides pour adapter leur utilisation et réduire le plus possible les effets sur l'environnement et le coût pour les exploitants agricoles, contribuant ainsi de manière positive à la sécurité alimentaire. Toutefois, il est encore difficile de savoir quand ces solutions seront retenues et mises en œuvre.

c. Collaboration et cohérence entre les projets du GEF et les autres projets financés par des bailleurs de fonds

Les deux projets clôturés font partie du programme-cadre intitulé « Programme de développement durable de la Méditerranée - Sustainable Med » qui regroupe huit autres projets. Les descriptifs de projet mettent en avant la complémentarité entre les dix projets du Programme Sustainable MED ainsi que l'alignement sur d'autres initiatives régionales (l'initiative Horizon 2020 de la CE, le Programme d'assistance technique pour l'environnement méditerranéen (METAP), le programme LIFE Pays tiers et le programme SMAP financés par la CE, etc.). Cependant, il n'est pas fait mention dans le rapport d'évaluation finale d'une quelconque collaboration avec une initiative. Les parties prenantes ne se rappellent pas non plus qu'une quelconque synergie ait été encouragée au cours de la mise en œuvre du projet. Elles ont toutefois mis en évidence l'utilité des résultats des projets pour les activités de suivi menées par le gouvernement. Ce point sera abordé plus loin.

Les projets menés dans le cadre du MedProgramme viennent tout juste de démarrer et il n'a pas encore été possible d'identifier des possibilités de synergies avec d'autres initiatives. L'exemple de synergies le plus concret qui a été mentionné est celui du plan de gestion de la nappe souterraine côtière de Ghiss-Nekor au Maroc dans le cadre du projet sur la sécurité de l'eau du MedProgramme. En effet, le ministère de l'Eau, avec le soutien de l'Agence française de développement (AFD), mène actuellement une étude sur la caractérisation hydrologique de l'aquifère et une évaluation du potentiel de recharge de la nappe souterraine de Ghiss-Nekor. Le ministère a demandé à l'UNESCO-PHI de modifier le mandat d'évaluation de la vulnérabilité de l'aquifère et d'exclure la caractérisation hydrologique de l'aquifère afin d'éviter tout

chevauchement d'activités entre le projet sur la sécurité de l'eau du MedProgramme et le projet financé par l'AFD. À la place, le projet sur la sécurité de l'eau du MedProgramme doit utiliser les résultats de l'étude de l'AFD et investir davantage dans le processus participatif en vue de l'élaboration du plan de gestion de la nappe souterraine côtière (contrat de nappe). Cependant, l'UNESCO-PHI n'a pas inclus cette demande dans le mandat d'évaluation de la vulnérabilité de la nappe souterraine figurant dans le contrat, mais a promis d'adapter les activités faisant partie du projet au cours des étapes ultérieures de mise en œuvre.

L'Institut mondial de la croissance verte (GGGI) met actuellement en œuvre un projet de développement des capacités d'accès direct aux ressources du Fonds Vert pour le Climat (FVC) financé par ce dernier et ayant pour objet d'améliorer l'accès aux financements climatiques dans des régions du Royaume du Maroc. L'une des régions concernées par le projet est la région de Tanger-Tétouan-Al Hoceima. Une mission de cadrage a été menée récemment en vue de trouver des idées de projet qui donneront naissance à des notes d'orientation et seront soumises au FVC. Idéalement, les idées de projet mises en avant aux fins de leur financement par le FVC contribueront à la mise en œuvre des plans côtiers et plans sur les interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes (ces plans doivent être élaborés dans le cadre du MedProgramme pour la région de Tanger-Tétouan-Al Hoceima). Cela dépendra cependant du calendrier fixé pour chacun des projets. Les plans côtiers et le plan sur les interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes seront très probablement prêts après l'achèvement du projet de l'Institut mondial de la croissance verte.

Le MedProgramme a mis en place une programmation intégrée ambitieuse dans de nombreux domaines d'intervention avec la participation d'une multitude d'agences d'exécution et de mise en œuvre. Il fait face à de très nombreuses pressions et propose des solutions sous des angles différents offrant une possibilité exceptionnelle d'amplifier l'effet grâce à la synergie entre les projets rattachés au MedProgramme. En ce qui concerne le projet sur la sécurité de l'eau et le projet sur les interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes qui interviennent dans la même région de Tanger-Tétouan-Al Hoceima, cette synergie est inévitable. En effet, les deux projets collaborent avec les mêmes parties prenantes et ils ont tous deux pour objet la planification du développement durable : le projet sur la sécurité de l'eau sou l'angle géographique reposant sur une approche de la gestion intégrée des zones côtières et le projet sur les interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes sous un angle sectoriel reposant sur une approche des interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes. La synergie existe déjà bel et bien. Des réunions de consultation ont été organisées conjointement par les projets rattachés au MedProgramme et il a été décidé de planifier des activités en commun.

D'une manière générale, les parties prenantes ont fait ressortir que la synchronisation ne peut se faire que dans le cadre du budget national où le cofinancement peut être contrôle et ajusté par le gouvernement pour apporter une complémentarité aux projets GEF une fois lancés. En revanche, la synchronisation entre les projets GEF et d'autres financements extérieurs d'aide au développement n'est pas chose évidente. En effet, quand les négociations sont entamées avec les différents bailleurs de fonds, le gouvernement n'a pas de certitude sur l'acceptation des projets et sur leur date de démarrage. Alors qu'une fois démarrés, les projets disposent chacun de son propre cadre logique et de son propre planning de mise en œuvre et il devient difficile de les modifier pour les mettre en synergie et co-financement avec les projets GEF. C'est ainsi que les efforts du gouvernement visent plutôt à éviter les redondances et à

rapprocher/converger les interventions des bailleurs de fonds vers ses priorités et ses objectifs pour augmenter l'impact des projets.

d. Aborder les questions relatives à l'égalité et à la sécurité de l'eau des populations vulnérables

Les projets clôturés n'ont pas abordé les questions relatives à l'égalité des sexes et aux populations vulnérables. La deuxième restructuration du projet ReGoKo a permis de mettre en place un indicateur de genre qui se limitait au nombre de femmes participant aux ateliers. Le rapport d'évaluation finale indique que cet objectif a été atteint.

Le MedProgramme met davantage l'accent sur la place réservée aux femmes. Une stratégie d'intégration des femmes a été élaborée pour l'intégralité du programme. Elle s'articule autour de trois axes : i) s'attaquer aux obstacles qui ne tiennent pas compte de la dimension de genre avec des conséquences différentes selon le sexe ; ii) atténuer les obstacles auxquels se heurtent les femmes et les normes discriminatoires ; et iii) transposer à une plus grande échelle les politiques axées sur l'égalité des sexes et obtenir des résultats tenant compte des questions de genre. Cette stratégie a permis d'évaluer la place réservée aux femmes et d'élaborer des plans d'action sur mesure pour chaque projet.

S'agissant du projet d'investissement dans les zones gravement polluées de la Méditerranée, les termes de référence des études préparatoires en vue de la mise à niveau ou de l'extension des stations d'épuration des eaux usées prévoyaient l'intervention d'un ou d'une consultant(e) en genre et en développement social chargé(e) de produire des informations et des données pertinentes et fiables sur les risques d'exposition liés à l'appartenance à un sexe donné et aux facteurs sociaux, les problèmes d'accès et les conditions de la fourniture de services dans des contextes propres à chaque station d'épuration, ainsi que d'élaborer des lignes directrices qui devront être mises en œuvre pendant la construction des stations d'épuration.

En ce qui concerne le projet sur la sécurité de l'eau, en synergie avec un autre projet rattaché au MedProgramme (le projet relevant du Fonds spécial[54]), une évaluation des risques climatiques sensible au genre est en cours d'élaboration. Elle s'appuie sur un indice des risques climatiques dans les zones côtières dont la complexité s'est accrue en raison de l'ajout d'aspects relatifs au genre. Cette évaluation complétera l'analyse socioéconomique en abordant les questions relatives à l'équité dans la société, au taux d'alphabétisation, à l'autonomisation des jeunes, au chômage, etc. L'intégration des groupes vulnérables sera également examinée. Par exemple, les immigrés sont considérés comme un groupe minoritaire vulnérable qui ne connaît peut-être pas l'historique des risques côtiers dans la région, n'est peut-être pas représenté dans les instances internationales et n'a peut-être pas accès en temps voulu aux informations communiquées par les autorités locales. Ces évaluations de la place réservée aux femmes et évaluations socioéconomiques serviront de base au plan de gestion intégrée des zones côtières de la région de Tanger-Tétouan-Al Hoceima. Dans le même temps, les agences de mise en œuvre et le gouvernement marocain s'efforcent d'assurer, dans la mesure du possible, un équilibre entre les sexes dans les ateliers de consultation.

[54] Le projet financé par le Fonds spécial pour les changements climatiques du GEF (ID GEF 9670) : *« Renforcement de l'adaptation régionale au changement climatique dans les zones marines et côtières de la Méditerranée ».*

S'agissant plus particulièrement de l'élaboration du plan pour les aquifères côtiers de Ras Jebel et de Ghis Nekor, la méthodologie et les outils du Programme mondial de l'UNESCO pour l'évaluation des ressources en eau (WWAP) pour la collecte et l'analyse de données ventilées par sexe dans le secteur de l'eau seront adoptés. Il sera demandé aux consultants chargés d'encourager la participation des parties prenantes d'utiliser ces outils et de collecter des données pour ces deux aquifères pilotes.

En ce qui concerne le projet sur les interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes, l'évaluation des risques climatiques sensible au genre évoquée plus haut servira également de base à l'évaluation des interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes et au dialogue sur cette question. Le processus de consultation devrait permettre d'établir des contacts et d'organiser des entretiens avec des organisations de femmes et la société civile dans son ensemble afin de connaître leur point de vue et d'évaluer ces interactions dans une optique plus inclusive. En outre, le projet prévoit d'organiser des formations pour faire mieux connaître aux parties prenantes la façon dont il est possible de renforcer l'efficacité des politiques si elles ouvrent la voie à des consultations accessibles à tous.

3. Activités réalisées dans le domaine de la sécurité de l'eau et viabilité à long terme de la sécurité de l'eau

a. Résultats des projets du GEF dans le domaine de la sécurité de l'eau

D'après des rapports d'évaluation finale et les résultats des entretiens, le projet ReGoKo a atteint ses objectifs initiaux pour une large part, tandis que le projet de coordination régionale Sustainable MED, qui est achevé, a obtenu des résultats mitigés[55] (tableau 2). La conception initiale du projet ReGoKo présentait l'avantage de ne définir au stade de la conception que les composantes du projet, alors que les activités étaient détaillées durant la phase de démarrage. Les activités menées dans le cadre du projet ReGoKo étaient axées sur le renforcement des observatoires nationaux et régionaux de l'environnement. Au Maroc, la loi relative à l'évaluation de l'impact sur l'environnement (EIE) a été révisée et la loi relative à l'évaluation stratégique environnementale (ESE) a été élaborée. Ce nouveau cadre juridique devrait permettre de mieux protéger les ressources en eau de la surexploitation et de la pollution. Le personnel des observatoires régionaux de Tanger-Tétouan-Al Hoceima et de Beni Mellal a appris à réaliser des ESE. En Tunisie, une évaluation de l'organisation, des procédures et des résultats de l'Observatoire tunisien de l'environnement et du développement durable (OTEDD) a été menée à bien. Un projet de décret portant renforcement de l'OTEDD a été élaboré. Le projet de décret prévoit la création d'observatoires régionaux inspirés de l'expérience marocaine. Le système de suivi comporte des indicateurs liés à l'eau. L'expérimentation de ces indicateurs à l'échelle régionale en collaboration avec les parties prenantes régionales a permis d'ajouter deux indicateurs : i) la qualité des eaux souterraines (salinité et nitrates) et ii) le taux de mobilisation des eaux saumâtres pour le dessalement.

La conception initiale du projet de coordination régionale comprenait un certain nombre de produits qui n'étaient pas clairement alignés sur les résultats. Comme pour le projet ReGoKo, le descriptif de projet ne présentait pas en détail les activités prévues qui étaient définies durant la phase de démarrage. Les produits obtenus énumérés dans le rapport d'évaluation finale révèlent des écarts importants par rapport aux produits initiaux. Les activités menées à bien avaient pour objet de s'attaquer aux risques liés à l'eau

[55] Ainsi qu'il est dit plus haut, l'évaluation du projet de coordination régionale SustainableMED ne concernait que les activités mises en œuvre en Tunisie.

et de lutter contre les changements climatiques. Il faut notamment pour cela procéder à une réduction d'échelle des modèles des changements climatiques, tester un modèle de prévision des inondations en temps réel pour la Medjerda, la mise en place d'un suivi des indicateurs de sécheresse et l'utilisation de techniques de télédétection pour évaluer l'évapotranspiration et cartographier les zones irriguées.

Le modèle des surfaces continentales et le système d'assimilation des données à la surface des terres émergées mis au point par une université américaine et qui devaient être utilisés dans le cadre du projet de coordination régionale SustainableMED n'ont pas été mis à disposition au début du projet. Les équipes de projet ont donc été obligées de chercher d'autres outils, ce qui a entraîné des retards qui ont eu une incidence sur les résultats du projet. Par ailleurs, le modèle d'inondation « CREST » retenu initialement n'était pas adapté au contexte tunisien et aux données disponibles. L'équipe de projet a testé un autre modèle d'inondation adapté aux conditions tunisiennes, mais le calendrier du projet n'avait pas permis d'entreprendre toutes les activités prévues (cartographie des inondations, et utilisation du modèle de gestion des inondations dans la Medjerda).

Le tableau ci-dessous répertorie les réalisations des deux projets achevés par rapport aux résultats initiaux indiqués dans le descriptif du projet.

Table 22. Résumé des réalisations du projet ReGoKo et du projet de coordination régionale SustainableMED, tous deux clôturés, par rapport aux résultats escomptés à l'origine.

Résultats escomptés	Produits effectivement exécutés (à l'achèvement du projet)
Projet ReGoKo	
Composante I : 1) renforcement des systèmes de gestion de l'environnement grâce au soutien des commissions nationales pour le développement durable et à l'examen des cadres juridiques et réglementaires. L'eau est l'un des secteurs prioritaires.	**Activités achevées** : - Analyse des améliorations apportées aux procédures des observatoires régionaux de l'environnement et du développement durable (OREDD) et suggestion d'améliorations à apporter. - Élaboration d'un plan d'action pour la révision de la loi relative à l'EIE avec la proposition d'inclure l'ESE au Maroc, et renforcement des capacités du gouvernement à cet effet. - Mise en place favorisée d'une plateforme d'échange d'informations. - Échange des connaissances entre le Maroc et la Tunisie concernant l'observation de l'environnement et les systèmes d'information dans le cadre de l'évaluation des observatoires. - Analyse des procédures de l'Observatoire tunisien de l'environnement et du développement durable (OTEED) et élaboration d'une feuille de route visant à créer des observatoires régionaux similaires à ceux du Maroc. - Projet de décret portant institutionnalisation de l'OTEDD en Tunisie.
Composante II : 1) Création et partage de connaissances, formation et assistance technique	**Activités achevées** : - Élaboration d'un guide sur l'ESE traduit en anglais, en arabe et en français. - Formations régionales sur l'ESE et l'EIE et évaluation des coûts de la dégradation de l'environnement.

Résultats escomptés	Produits effectivement exécutés (à l'achèvement du projet)
	- Établissement d'une carte thématique de l'environnement pour la Tunisie.
Composante II : 2) Recensement des possibilités d'investissement dans des actions prioritaires en faveur de l'environnement.	**Activités non achevées** : Rien n'a été fait pour recenser les investissements. Dans le rapport d'évaluation finale, le résultat a été modifié comme suit : « activités de diffusion à l'intention des bénéficiaires des supports de connaissances produits et création du site Web du projet ».
Projet de coordination régionale SustainableMED	
Composante 1 – i) Mise en place d'institutions et de réformes pour la Gestion Intégrée des Ressources en Eau (GIRE) et amélioration de l'utilisation efficace des ressources en eau	**Activités partiellement achevées** : - L'achat, l'installation et la mise en œuvre de deux outils de la plateforme du système d'information sur l'eau (SINEAU) et de l'équipement accessoire connexe. Le premier est destiné à la réduction d'échelle des modèles de changement climatique. Le second est destiné à la cartographie de l'irrigation, mais n'a pas été mis au point. - L'établissement de modèles fiables pour la prévision des inondations à Medjerda et la mise en place de méthodes de cartographie des inondations reposant sur les techniques de télédétection. Après avoir calibré et testé le modèle d'inondation retenu « CREST », mis au point conjointement par l'Université d'Oklahoma et NASA SERVIR, on est parvenu à la conclusion qu'il ne convenait pas, car il nécessitait des données hydrométriques et pluviométriques, des données cartographiques, ainsi que 12 paramètres (conditions initiales, paramètres physiques, paramètres conceptuels) qui n'étaient pas tous disponibles. L'activité s'est limitée à tester deux autres modèles mis au point par une université tunisienne. Ces modèles n'ont pas été appliqués à la gestion des inondations de la Medjerda et à l'élaboration d'indicateurs de la surveillance de la sécheresse. - Estimation de l'évapotranspiration à l'aide de techniques de détection. - Établissement de cartes d'irrigation au moyen de techniques de télédétection dans trois administrations régionales de Tunisie. - Rien n'a été fait pour estimer les prélèvements d'eaux souterraines dans les nappes de Kebilii (sud de la Tunisie). - Aucune décision n'a été prise pour appuyer la gestion des inondations de Medjerda.
Composante 1 - ii) Quantification en temps réel des paramètres critiques de la qualité de l'eau pour aider à prendre des décisions en matière d'infrastructure et contribuer à l'élaboration des politiques de réformes	
Composante 1 - iii) Engagements politiques et juridiques pris pour que les politiques IWRM assurent la viabilité à long terme de l'utilisation de l'eau	
Composante 1 - iv) Amélioration de la coordination nationale entre les centres de télédétection et les ministères locaux de l'Eau, de l'Agriculture et de l'Environnement	
Composante 2 - (i) Sensibilisation et capacité accrues en matière de télédétection quantitative pour l'amélioration de la gestion de l'agriculture et des ressources en eau	**Activités achevées** : - Ateliers locaux destinés à partager les résultants de l'évaporation et de l'estimation des besoins en irrigation avec les parties prenantes. - Divers ateliers de formation technique et différentes conférences internationales et régionales ont été organisés. Une doctorante a reçu une bourse qui lui a permis de contribuer à la modélisation en temps réel des inondations de la Medjerda et a soutenu sa thèse en 2017 après l'achèvement du projet.
Composante 2 - (ii) Capacités accrues de collecte et d'utilisation des données de télédétection recueillies	

Résultats escomptés	Produits effectivement exécutés (à l'achèvement du projet)
Composante 2 - (iii) Bourses de financement pour étudier les techniques de télédétection appliquées à la gestion de l'environnement et des ressources en eau	
Composante 3 - (i) Quantification régionale des effets des changements climatiques sur les ressources en eau dans la région MENA	**Activités partiellement achevées** : - Mise en place d'un portail en ligne destiné à partager les résultats régionaux (http//www.rciwrm-awc.org), - Rapport régional recommandant l'adoption au niveau régional d'une méthode permettant de suivre les indicateurs de sécheresse fondée sur l'analyse des indicateurs de sécheresse à l'échelle nationale et évaluant la possibilité d'employer cette méthode pour mettre en place un système régional. - Pas de quantification de l'effet des changements climatiques au niveau régional. - Rien n'a été fait dans le domaine de la gestion des eaux transfrontières.
Composante 3 - (ii) Mise en place de définitions, de méthodologies et de processus normalisés pour évaluer les problèmes régionaux dans le domaine de l'eau et communiquer sur ce point	
Composante 3 - (iii) Amélioration de la communication et du partage des connaissances entre les pays bénéficiaires sur les questions relatives à la gestion des ressources en eau transfrontières	

Plusieurs résultats des activités du MedProgramme menées actuellement ont un lien direct avec la sécurité de l'eau. Le projet d'investissement dans les zones gravement polluées de la Méditerranée a notamment donné lieu à des études techniques et financières pour la mise à niveau de neuf stations d'épuration côtières et à quatre remises en état des systèmes de transfert. En fonction du budget disponible[56], les plans-cadres d'un certain nombre de gouvernorats pour la gestion des eaux usées ont pour objet de moderniser les stations d'épuration à l'horizon 2045. Le projet sur la sécurité de l'eau devrait ouvrir la voie à l'élaboration du plan côtier pour la région de Tanger-Tétouan-Al Hoceima. Le plan côtier suivra la méthodologie globale et opérationnelle du Cadre méthodologique intégratif (CMI) qui combine les approches de la Gestion Intégrée des Zones Côtières (GIZC), de la Gestion Intégrée des Ressources en Eau (GIRE) et de la gestion des nappes souterraines côtières. Ce projet devrait en outre aboutir à deux plans de gestion des nappes souterraines côtières, le premier à Ras Jebel en Tunisie et le second à Ghis-Nekor au Maroc. Des dialogues sur les solutions de gestion conjointe des eaux de surface et des eaux souterraines dans les zones côtières auront lieu à l'échelon local au Maroc et en Tunisie. Enfin, le projet sur les interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes devrait permettre d'élaborer une stratégie ou un plan d'action sur ces interactions (désormais appelé plan sur les interactions) pour la région de Tanger-Tétouan-Al Hoceima et de mettre en œuvre des solutions pilotes fondées sur ces interactions sur le terrain. Ce plan précisera les mesures à prendre pour mettre en œuvre les solutions trouvées dans le cadre des évaluations et des dialogues. Il facilitera et encadrera l'intégration de l'approche de ces interactions dans l'élaboration de la politique et la prise de décision pour la gestion

[56] Compte tenu de l'inflation dans le monde et en Tunisie, le coût des études devrait être supérieur aux estimations initiales figurant dans le descriptif de projet.

des ressources naturelles. Le plan sera intégré dans le plan côtier qui sera établi dans le cadre du projet sur la sécurité de l'eau.

b. Relation entre les résultats et les avantages pour l'environnement mondial, retombées positives et conséquences imprévues

Les projets visés par l'étude de cas contribuent à l'indicateur de base concernant les avantages pour l'environnement mondial « Nombre d'écosystèmes aquatiques partagés (dulcicoles ou marins) bénéficiant d'un mécanisme de gestion concertée nouveau ou amélioré ». En effet, les activités ont tenu compte des deux priorités recensées par l'état des lieux transnational pour la mer Méditerranée (achevées dans le cadre de projets antérieurs du GEF : i) Réduction de la pollution terrestre, en particulier dans les zones côtières à risque et mesure des progrès par rapport aux impacts ; et Renforcement de la durabilité et de la résilience climatique dans les zones côtières.

Le projet d'investissement dans les zones gravement polluées de la Méditerranée s'attaque directement à la réduction de la pollution en investissant dans des infrastructures de traitement. Le projet sur la sécurité de l'eau et le projet sur les interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes adoptent l'approche de la source à la mer en vue de soutenir la planification durable dans les zones côtières de la Méditerranée. Le projet ReGoKo a pour objet de renforcer les mécanismes de surveillance de l'état de l'environnement dans les pays méditerranéens. Toutes les parties prenantes ont souligné que le caractère régional des projets était un atout majeur. L'échange de connaissances et de données d'expérience a eu un impact très positif. Le projet ReGoKo est un exemple concret de la façon dont l'expérience marocaine des observatoires régionaux a été prise en compte dans les résultats du projet en Tunisie en recommandant la création d'observatoires régionaux. En outre, des relations personnelles ont été nouées et perdurent au-delà de l'achèvement du projet.

Aucune partie prenante n'a indiqué que les projets achevés avaient eu de conséquences négatives imprévues.

c. Pérennité des résultats en matière de sécurité de l'eau dans les projets clôturés (durabilité)

Les résultats des projets ont été dans une large mesure consolidés ou améliorés. Dans un petit nombre de cas, ils ont empiré. On trouvera dans le tableau ci-dessous une analyse détaillée de la pérennisation des produits des projets.

Produits attendus et état d'avancement à l'achèvement du projet	État d'avancement des produits au moment où l'étude de cas a été réalisée	Tendance depuis l'achèvement du projet
Projet ReGoKo		
Suggestion visant à améliorer les procédures de l'OREDD (Maroc)	L'organisation des OREDD a changé depuis 2015. On ne sait cependant pas très bien dans quelle mesure cette nouvelle organisation a tenu compte des résultats du projet ReGoKo.	**Évaluation impossible**

Produits attendus et état d'avancement à l'achèvement du projet	État d'avancement des produits au moment où l'étude de cas a été réalisée	Tendance depuis l'achèvement du projet
Élaboration et mise en place d'une plateforme d'échange d'informations (Maroc)	La plateforme n'a pas été mise au point dans le cadre du projet ReGoKo. Cependant, les systèmes d'information régionaux de l'environnement et du développement durable) ont été mis au point après l'achèvement du projet et sont actuellement opérationnels.	**Amélioration**
Révision du projet de loi relative à l'EIE et inclusion de l'ESE (Maroc)	La loi relative à l'ESE est maintenant en vigueur. Les décrets d'application nécessaire à sa mise en œuvre doivent encore être approuvés.	**Amélioration**
Formation du personnel des cabinets ministériels à la consultation publique sur l'EIE, au système d'information sur l'ESE et l'EIE (Maroc)	Les personnes interrogées ont indiqué que des ateliers de formation utiles avaient eu lieu. Le matériel de formation mis au point par le projet ReGoKo a été utilisé pour reproduire les formations dans les autres régions du pays.	**Amélioration**
Échange de connaissances au niveau régional sur les systèmes d'observation de l'environnement et les systèmes d'information sur l'environnement (Maroc et Tunisie)	Les personnes interrogées dans les deux pays ont indiqué qu'elles avaient largement bénéficié de l'échange de données d'expérience au niveau régional entre la Tunisie et le Maroc. La Tunisie s'est inspirée de l'expérience marocaine des observatoires régionaux. En outre, la visite sur le terrain organisée à l'observatoire du Poitou-Charentes en France a été jugée très utile pour apprendre les meilleures pratiques d'autres pays.	**Consolidation**
Analyse des procédures de l'OTEED et recensement des mesures administratives (Tunisie)	L'OTEDD n'a pas pu être institutionnalisée en raison du contexte politique qui accorde une faible priorité aux questions environnementales et de la décision prise par les gouvernements successifs de limiter les embauches. Cependant, les résultats de l'étude sont toujours utilisés à ce jour à des fins de sensibilisation à l'institutionnalisation de l'OTEDD selon différentes options.	**Consolidation**
Projet de décret portant institutionnalisation de l'OTEDD en Tunisie	Le projet de décret a été établi, mais n'a pas été approuvé et n'est pas entré en vigueur. Toutefois, il fait l'objet de négociations avec le gouvernement.	**Consolidation**
Élaboration et traduction en anglais, en arabe et en français d'un guide sur l'ESE (Maroc).	Le guide a été partagé avec les différents observatoires régionaux. Il n'était cependant pas possible de vérifier si ce guide était toujours utilisé par le personnel.	**Consolidation/Évaluation impossible**
Élaboration d'une carte de l'environnement (Tunisie)	On ne sait toujours pas quelle est l'institution qui hébergera et gérera la carte de l'environnement. Faute de statut juridique et de ressources (server), l'OTEDD n'était pas prêt à assurer ce rôle. La carte a été transférée au service informatique. Cependant,	**Dégradation**

Produits attendus et état d'avancement à l'achèvement du projet	État d'avancement des produits au moment où l'étude de cas a été réalisée	Tendance depuis l'achèvement du projet
	compte tenu du manque de ressources humaines, la carte n'a pas été actualisée et ne fonctionne pas.	
Création d'un site Web pour le projet	Le site Web a continué de fonctionner pendant au moins trois ans après la fin de projet. Il ne fonctionne plus actuellement. (http://REGOKO.planbleu.org/en)	**Dégradation**
Projet de coordination régionale SustainableMED		
Mise au point de deux outils de la plateforme du système d'information sur l'eau (SINEAU) et achat, installation et mise en œuvre de l'équipement connexe	• La plateforme mise au point pour la réduction d'échelle des modèles de changement climatique et l'équipement connexe installés à l'Institut national de météorologie fonctionnent encore aujourd'hui. •	**Consolidation**
Prévision des inondations de la Medjerda et méthodes de cartographie des inondations reposant sur des techniques de télédétection utilisant des images radar et des images optiques	L'activité s'est limitée à tester des modèles d'inondation et aucune méthode n'a été définie pour cartographier les inondations. De plus, aucun suivi n'a été effectué et jusqu'à aujourd'hui, aucun modèle d'inondation en temps réel n'est utilisé pour la gestion des inondations de la Medjerda.	**Non achevé à la fin du projet**
Mise au point d'indicateurs de surveillance de la sécheresse	Les indicateurs de sécheresse ont été mis au point dans le cadre de la collaboration entre l'Université du Nebraska et un centre de recherche tunisien, ce qui a permis d'adopter l'approche en Tunisie et de travailler en réseau. Un autre projet financé par l'USAID avec la participation du ministère des Ressources en eau et l'Université du Nebraska a poursuivi les travaux et élaboré un indice composite de la sécheresse. En outre, un plan national de gestion de la sécheresse a été établi par le ministère des Ressources en eau avec le soutien de la Convention des Nations Unies sur la lutte contre la désertification.	**Amélioration**
Estimation de l'évapotranspiration à l'aide de techniques de télédétection	Achat d'une station de flux pour calculer l'évapotranspiration. L'équipement est installé à l'Institut national de la recherche en génie rural et est toujours utilisé à des fins d'enseignement et de recherche.	**Consolidation**
Amélioration de la planification de l'irrigation	Élaboration et application de la méthode d'évaluation des zones irriguées pour chaque type de culture dans trois gouvernements régionaux de Tunisie sous la direction du Centre de télédétection	**Amélioration**

Produits attendus et état d'avancement à l'achèvement du projet	État d'avancement des produits au moment où l'étude de cas a été réalisée	Tendance depuis l'achèvement du projet
	et avec la participation du ministère de l'Agriculture et de ses antennes locales. La méthode et les résultats des projets ont servi de base pour définir les activités du programme régional de lutte contre la pénurie d'eau de la FAO. En outre, le renforcement des compétences a permis d'élaborer en 2022 des cartes agricoles qui avaient pour but d'aider à prendre des décisions pour la répartition de l'eau.	
Estimation des prélèvements d'eaux souterraines	Le responsable de cette composante ayant quitté le ministère des Ressources en eau, il n'a pas été possible d'organiser un entretien pour cette composante.	Évaluation impossible
Décisions relatives à la gestion de l'eau	Compte tenu des difficultés mentionnées plus haut concernant la modélisation des inondations, aucune décision n'a pu être prise pour le plan de gestion de la plaine inondable.	**Non achevé**
Renforcement des capacités	Plusieurs ateliers de formation ont été organisés pour chacune des composantes du projet. Il n'a pas été possible d'évaluer l'incidence et le caractère durable de ces activités.	Évaluation impossible
Étude scientifique	Une étudiante a commencé son doctorat sur la modélisation des inondations en temps réel dans le cadre du projet et l'a poursuivi après l'achèvement du projet jusqu'à la soutenance de sa thèse en 2017. Stages de Master financés par le projet.	**Amélioration**
Rapports régionaux	Les rapports d'évaluation finale font état des résultats d'un seul rapport examinant les résultats nationaux de l'application de la surveillance de la sécheresse au niveau national. L'étude recommande la mise en place d'un système régional de surveillance de la sécheresse. Aucun suivi n'a été effectué.	**Dégradation**
Portail en ligne du projet	Le portail a été créé et fonctionne toujours (http//www.rciwrm-awc.org).	**Consolidation**

L'alignement des activités de projet sur les priorités des pays explique dans une large mesure la pérennisation ou l'amélioration des résultats du projet. En effet, de nombreuses activités de projet ont été maintenues dans les pays, même s'il s'est écoulé un certain laps de temps avant que des fonds additionnels ne soient mobilisés, comme la mise au point d'indicateurs composites de surveillance de la sécheresse dont l'élaboration récente a été financée par un fonds de l'USAID. La levée de fonds est toujours en cours pour la mise en place d'un système d'alerte précoce de la sécheresse. Dans certains cas,

l'amélioration des résultats aurait pu être accélérée si la durée des projets avait été plus longue ou si les projets avaient comporté une deuxième phase.

La pérennisation des plateformes mises en place est très souvent remise en question par la disponibilité des ressources humaines et des capacités dans les pays. Ce fut le cas pour la carte de l'environnement en Tunisie qui ne fonctionne pas.

La cartographie des inondations fait partie des activités qui n'ont pas été achevées parce que le modèle retenu ne convenait pas pour la Tunisie. Le projet aurait pu atteindre ses objectifs s'il avait été possible de tester plusieurs modèles au début du projet et de sélectionner le projet qui convenait.

Souvent, les chefs de projet au niveau national quittent leurs fonctions en raison d'une promotion ou du départ à la retraite, avec pour conséquence la perte des compétences et des connaissances acquises dans le cadre des projets. Les parties prenantes ont recommandé d'élargir les projets à un groupe restreint, en lieu et place d'un chef de projet, et d'accroître le nombre de participants aux formations afin de créer une masse critique au sein de l'organisation permettant de faire évoluer la situation et d'augmenter les chances de voir les compétences acquisses rester au sein des institutions.

4. Conclusions générales

- **Les activités de projet appuient le plus souvent les priorités des pays :** Le Maroc et la Tunisie ont en commun des problèmes liés à l'eau qui dictent des priorités similaires, bien que les mesures requises puissent être différentes en fonction du cadre institutionnel et juridique et du système de gouvernance du pays. Les projets du GEF ont réussi à s'intégrer de manière satisfaisante dans la dynamique nationale et l'action menée par les pays pour résoudre ces problèmes et ont proposé des approches globales à cet effet. Le projet sur la sécurité de l'eau et le projet sur les interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes du MedProgramme abordent la question de l'intégration de la viabilité à long terme des ressources en eau dans les processus d'aménagement du territoire et de planification sectorielle au Maroc, conformément aux obligations au regard du droit national. En Tunisie, le projet sur la sécurité de l'eau du MedProgramme aide à combler le déficit de financement dans le secteur de l'eau en élaborant des études de faisabilité et des projets aptes à bénéficier d'un financement visant à améliorer les services d'assainissement.

- **Les résultats thématiques des projets sur la sécurité de l'eau sont ciblés à des degrés différents :** la sensibilisation des parties prenantes, l'amélioration des connaissances, les systèmes de gouvernance et la gestion évolutive sont les résultats auxquels les projets s'intéressent tout particulièrement. Les activités ont porté essentiellement sur l'amélioration des connaissances sur les ressources en eau dans le contexte des changements climatiques et les nappes souterraines côtières et sur la mise au point d'outils appropriés de gestion des risques climatiques. Même si tous les projets comportaient des activités de formation et de renforcement des capacités, les parties prenantes ont recommandé d'intensifier ces activités et d'inclure systématiquement une composante sur le renforcement des capacités afin d'atteindre un plus grand nombre d'acteurs. Les activités de projet ont en outre permis d'améliorer et d'appliquer les cadres juridiques relatifs à la planification et la surveillance des ressources en eau. La mise en œuvre des activités repose généralement sur une approche participative. Cependant, l'accès au financement et l'optimisation des réseaux physiques d'approvisionnement en eau sont moins développés. Ils se limitent respectivement à l'élaboration de projets d'assainissement aptes à bénéficier d'un

financement et à la mise en œuvre de solutions de démonstration fondées sur les interactions entre l'eau, l'énergie, l'alimentation et les écosystèmes.

- **Une approche plus inclusive de la conception et la mise en œuvre des projets en cours :** les projets achevés ne prenaient pas en compte les questions de genre dans leur conception. Le projet ReGoKo a remédié au problème en comptabilisant le pourcentage de participantes aux événements. Le récent MedProgramme met davantage l'accent sur les processus inclusifs, la place réservée aux femmes et l'intégration des groupes vulnérables. Une évaluation relative aux questions de genre et des plans d'action avaient déjà été élaborés pendant la phase de conception pour chacun des projets. Au cours de la mise en œuvre, les termes de référence des activités imposent systématiquement la prise en considération des préoccupations des femmes dans les réalisations attendues. Toutefois, il est rarement fait référence au recensement et à l'intégration des groupes vulnérables.

- **L'amélioration des systèmes de gouvernance de l'eau nécessite du temps et de la continuité :** en ce qui concerne les deux projets achevés visés dans l'étude de cas, les retards dans la mise en œuvre n'ont pas permis de mener à bien d'autres activités identifiées au cours du projet dans la durée limitée du projet. Dès lors que le projet de loi portant institutionnalisation de l'OTEDD en Tunisie avait été déposé pendant le projet ReGoKo, d'autres activités de sensibilisation auraient pu encourager l'adoption de ce projet de loi, mais ces activités n'ont jamais vu le jour. De plus, une fois la méthode permettant de cartographier les zones irriguées et d'estimer les besoins en irrigation au moyen des techniques de télédétection avait été mise au point dans le cadre du projet de coordination régionale SustainableMED, d'autres activités destinées à institutionnaliser les procédures et à améliorer les capacités des équipes aux niveaux national et local auraient pu améliorer la viabilité à long terme du projet.

- **Les acteurs de l'eau connaissent mal les possibilités offertes par le GEF à l'appui de la sécurité de l'eau :** la conception initiale des projets en cours visés dans l'étude de cas a été suggérée par les agences de mise en œuvre. La participation des acteurs nationaux de l'eau au cours de la phase de conception s'est limitée à la sélection des activités qui les intéressaient et au recensement des sites où les activités pouvaient être mises en œuvre, mais cela n'a pas été du tout le cas des acteurs locaux. Pendant la mise en œuvre, outre les points focaux pour les projets, les autres parties prenantes n'ont pas un tableau complet de toutes les activités. Par ailleurs, elles ne savent pas précisément quels sont les objectifs du GEF, ses domaines d'intervention et son mode de fonctionnement. Les parties prenantes ont confirmé que les activités de projet correspondaient bien à leurs priorités, mais elles ont mis en évidence les occasions manquées de bénéficier davantage des financements du GEF pour répondre aux besoins importants des pays en matière de sécurité de l'eau, notamment la mobilisation de fonds, y compris par l'intermédiaire des fonds climatiques. Elles ont souhaité obtenir davantage d'informations sur la stratégie et les priorités de financement en matière de sécurité de l'eau.

- **La programmation intégrée combinant plusieurs domaines d'intervention favorise les synergies :** les parties prenantes ont indiqué qu'il était difficile de synchroniser les financements des bailleurs de fonds. Il est plus facile de tirer parti des activités déjà mises en œuvre, à éviter les chevauchements d'activités et à optimiser les complémentarités quand les activités sont menées en parallèle. Cela dit, les synergies entre les projets relevant du MedProgramme sont en train de se concrétiser et les parties prenantes s'en félicitent.

Technical Document 11: Sudan Case Study Report

Global Environment Facility Independent Evaluation Office

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1. Introduction

a. Brief description of overall evaluation

Neither human society nor terrestrial ecosystems can survive without freshwater, the threats to freshwater resources are of great importance to GEF and the wider international development community.

Given the importance and cross-cutting nature of water security and the growing recognition of the issue in the GEF strategies and projects, the GEF IEO is undertaking a comprehensive, multi-focal area evaluation of the topic. The Evaluation of GEF's strategy and portfolio in water security will take a look at the broader "footprint" of the GEF portfolio in terms of water security, in terms of impacts and sustainability. The evaluation began in October 2021 and is scheduled to be completed during 2023.

As part of the evaluation, several case studies were chosen to understand how GEF projects and programs have impacted water security at the country and the basin level. Case studies were designed to address several evaluation topics, including:

- **Relevance** of GEF projects to the water security needs, policies and strategies of beneficiaries and key stakeholders in the countries where they work, including national and local government, communities, vulnerable populations, civil society, the private sector, NGOs and others.
- **Coherence** of GEF's projects with similar donor-funded and government initiatives in the areas where they work.
- **Effectiveness** of GEF projects in achieving improvements in water security, through main project outcomes or co-benefits and compliance with water related safeguards.
- **Effectiveness** of GEF projects in considering the specific water security of vulnerable populations especially women.
- **Sustainability** of the outcomes of completed GEF projects.

The criteria for selection of case study locations were: 1. Number of completed and ongoing GEF projects. 2. Shared watersheds or aquifers. 3. Geographical diversity. 4. Focal area and trust fund diversity. 5. GEF Agency diversity. 6. Overlap with previous and other ongoing GEF IEO evaluations.

One of the chosen case studies was Sudan, which includes several completed and ongoing projects from various GEF focal areas that took place completely or partially in the country. This report summarizes the findings of the Sudan case study.

b. Description of GEF projects in the case study

For the Sudan case study, a total of seven projects were identified and four projects implemented by UNDP were selected for in depth evaluation (considering the operational pause of World Bank activities in Sudan discussed in the Methodology section).

Three of the selected projects are regional with main focus on groundwater; two implemented on the Nile basin countries (Sudan together with: Burundi, Congo, Egypt, Ethiopia, Kenya, Rwanda, South Sudan, Tanzania and Uganda) and one on the Nubian Aquifer (Sudan together with: Egypt, Libya and Chad). The main objectives of these projects were to do legal, policy and institutional reforms, strengthen the knowledge base, and to assess surface water/groundwater conjunctive use. The projects also included implementation of pilot projects in Gedarif and Darfur States.

The fourth project was a national project with focus on building resilience to the adverse impacts of climate change in Sudan, with implementation of pilot projects. The Project design covered five locations representing the dominant agro-ecological zones with visible climate change impacts and the areas the most affected by recurring food insecurity. The five concerned States were Central Equatorial, Gedarif, North Kordofan, River Nile and South Darfur. However, following the secession of the Republic of South Sudan from Sudan, Central Equatorial State no longer lies in Sudan; accordingly, project activities in Central Equatorial State stopped and the funds allocated to Central Equatorial State were reallocated across the four other States.

Table 24. Overview of Sudan case study projects

GEF ID	Project title	Lead Agency	Executing Agency	GEF financing	Co-financing	Period of implement
3321	Mainstreaming Groundwater Considerations into the Integrated Management of the Nile River Basin	UNDP	International Atomic Energy Agency (IAEA)	1,000,000 USD	2,890,00 USD	2009 - 2016
3430	Implementing NAPA Priority Interventions to Build Resilience in the Agriculture and Water Sectors to the Adverse Impacts of Climate Change in Sudan	UNDP	Higher Council for Environment and Natural Resources (HCENR)	3,300,000 USD	3,500,000 USD	2009 - 2015
9912	Enhancing Conjunctive Management of Surface and Groundwater Resources in Selected Transboundary Aquifers: Case Study for Selected Shared Groundwater Bodies in the Nile Basin	UNDP	Nile Basin Initiative (NBI)	5,329,452 USD	25,850,000 USD	2020 - Present
9165	Enabling implementation of the Regional Strategic Action Program (SAP) for the rational and equitable management of the Nubian Sandstone Aquifer System (NSAS)	UNDP	UNESCO-IHP	3,990,000 USD	17,730,000 USD	Not yet started
3398	Eastern Nile Transboundary Watershed Management in Support of ENSAP Implementation	World Bank	National Ministries, Eastern Nile Technical	8,700,000 USD	26,700,000 USD	2009 -2017

			Regional Office (ENTRO)			
9575	Sudan Sustainable Natural Resources Management Project-Additional Financing	World Bank	Ministry of Environment, Natural Resources and Physical Development (MoENRPD)	5,504,586 USD	27,500,000 USD	2018 - Now
10083	Sustainable Natural Resources Management Project -AF	World Bank	Ministry of Agriculture and Natural Resources	17,600,000 USD	17,600,000 USD	2020 - Now

c. Case study methodology

The Sudan case study was carried out between August 2022 – January 2023, it starts with general review of all the project documents (main project documents, CEO endorsement request documents, project implementation reports, mid-term reviews terminal evaluations; TEs, project publications, IW LEARN, and other technical reports and scientific journals). This provided an overview of the main objectives of these projects related to water security and the associated outcomes. Reviewing the documents followed by initial interviews with all the projects coordinators, who provided more information and documents to review.

An initial case study plan was developed based on the above information, which included:

1. List of projects with brief introduction (objectives, site location, components, and outcomes).
2. Detailed time plan for the case study work.
3. Description of the field visits (include villages location, activities, and key contact person).
4. Key stakeholders identified by name and institution, categorized in 12 different stakeholder groups.
5. Water security evaluation interview questions edited based on the context of different projects/ stakeholder and then the questions translated to formal Arabic then to Sudanese local Arabic.

Following the submission of the first evaluation plan, the World Bank – Sudan office informed the GEF IEO of the operational pause of its activities in Sudan; which has led to discussions between GEF IEO and the World Bank representatives in Sudan (online and in person); to identify which activities can be carried out considering the pause (GEF IEO travel must be approved by World Bank country offices).
Finally, the World Bank – Sudan office and GEF IEO agreed to avoid interviews with government stakeholders regarding projects implemented by the World Bank as well as to stop all the planned site visits outside Khartoum (including for UNDP projects). However, the World Bank allowed the consultant to continue evaluation activities for the UNDP projects with the possibility to interview the stakeholders (online for those outside Khartoum, and in person for those in Khartoum).
Despite travel restrictions, efforts have been made to reach community members involved in GEF projects and ensure a diverse mix of voices (including women, youth, and vulnerable groups) via telephone interviews. Additionally, government and other stakeholders were interviewed in-person in Khartoum and via telephone for those outside Khartoum / outside Sudan.

Based on the above information and conditions the methods used for this evaluation included: **Desk Review for documents, meetings with key stakeholders, group discussions, interviews (online, in person and written).**

Total number of stakeholder interviews are 63 (categorized in 12 different groups)

Table 2. Summary of the Stakeholder Groups

No.	Stakeholder Group	Total Number	Female	Male
1	GEF National Focal points[57]	2	1	1
2	Local Project Staff and consultants	11	1	11
3	Implementing agency staff[1]	5	3	2
4	Executing agencies staff	7	0	7
5	Government Officials[1]	8	2	6
6	State government officials	3	1	2
7	Transboundary Organizations	3	1	2
8	Other international organizations	1	0	1
9	Private sector	3	0	3
10	Research and Educational institutes[1]	6	2	4
11	Community Organizations	2	0	2
12	Community Representatives[58]	12	5	7
Total Number		**63**	**16**	**48**

2. Meeting stakeholder water security needs

a. National and local level priorities in case study region (relevance)

The priorities raised by the government are high level priorities (National Level) such as climate change adaptation, sustainable management of transboundary water resources, and capacity building, and low-level priorities (State Level) which differ between government agencies. Priorities are highly dependent on the political will and power of each agency can change with emergencies and sudden events such as floods.

The communities express fewer high-level priorities, as their priorities focus mainly on the basic need of life such as access to water for drinking and agriculture activities, water quality protection, and having solar pumps instead of the diesel pumps (because of the high increase in the diesel prices in the recent years).

The research, and academic institutes as well as private sector had less involvement in GEF water related activities, and they mentioned the data and information sharing mechanism as high priority for them.

[57] Some of the interviews were group discussion with more people engaged.
[58] The community members representing 4 states (8 villages)

Current ongoing conflicts on water resources (internally and externally) were mentioned as important priority for the government and the community (these conflicts are mentioned below).

1) **Reduce the vulnerability of the rural communities to current and future climatic risks (national government):** extreme climatic variability with cyclical episodes of prolonged droughts and extreme floods, coupled with increasingly erratic distribution and intensity of rainfall, has a negative impact on the amount of surface and groundwater available for human and livestock consumption and productive purposes. These climatic phenomena also complicated the design and operation of water supply facilities that contribute to competition and conflict between farmers and pastoralists for scarce water resources. Communities expressed these priorities as well but not in the framing of climate change—they focused on the basic need of access to water.
2) **Peaceful co-existence among all competing water users (national government and community):** Sudan has faced decades of conflicts with impacts on water security that have created massive displacements internally, while conflicts in neighboring countries have resulted also in an influx of refugees. Displacement can be trigged by three levels of conflict: internal (tribal), federal, or regional. Internal conflicts include interethnic clashes over natural resources such as land, water, and crops. Climatic change has also contributed to shifts in nomadic movements, which have exacerbated tensions and conflicts over scarce resources between sedentary farming settlements and pastoralist communities who rely on rivers, seasonal streams (wadis), Haffrs[59] and wells to provide water supply for their livestock.

   At the federal level, Sudan is generally very arid, and large parts of the country are considered drought prone, these climatic conditions have overlapped with conflict and economic and political instability. Darfur, South Kordofan, and Blue Nile states face conflicts relating to natural resources and political tensions.

   The dependency on water originating outside the country is high, and the Sudan National Water Strategy notes that negotiated and agreed upon management of the Grand Ethiopian Renaissance Dam (GERD) on the Nile River at the border of Ethiopia and Sudan will be vital to ensuring that Sudan's water demands are met.[60]
3) **Human Resource Development and Capacity Building (national and local government):** there is shortage of staff with adequate skills, to design, implement, and manage water services in Sudan. The water sector has experienced significant "brain drain," with the loss of numerous qualified technical cadres, political interference and appointments have also contributed to an increase in staff turnover and a lack of institutional memory and capacity to guide the sector. As a result, the water sector today does not have sufficient technical capacity to attend to the increasing challenges ahead, and there is a disproportionate number of administrative staff and limited technical staff at all levels.[4]
4) **Support of water infrastructure with renewable energy sources; specifically using the solar pumps (all stakeholder groups):** Sudan faces severe fuel shortages that have negatively affected many

[59] Haffir is a common water harvesting structure in Sudan, it is a water catchment basin with a circular earthen wall. The Haffir catch the water during the rainy season to have it available for several months during the dry season to supply drinking water and irrigation.

[60] Sudan Water Sector Strategy (2021 - 2031): The Promise of the Ministry of Irrigation and Water Resources to Transform the Livelihoods of the People of Sudan

aspects of life, including provisions for the diesel driven machinery that operate water supply points. Adoption of technologies like solar pumps, mentioned as important priority by all the stakeholder groups, as noted by the following quotes from stakeholders:

"The state now is that we are really in need of solar pumps because of the problem in the diesel", "The diesel problem is the main challenge now which start two years ago", "The water is available but we have problem in the diesel, we prefer the solar pump".

5) **Availability of drinking water (community and the government**): both basic and safely managed water facilities, is high priority for the community and the government.
6) **Water quality protection (community):** in Sudan most of the water supply comes from shallow groundwater sources and unprotected surface water sources that are prone to pollution and contamination by human activities, especially constructed pit latrines and sanitary disposal wells that tap into shallow aquifers. Poor water quality has dire impacts on human and livestock health, leading to a series of chronic diseases, this mentioned a lot by the community in many ways: *"Most of the wells in our area are not drinkable water, water pollution is really problem", "The problem is from refugee camps, they drill sanitation well that reach to groundwater" , "there should be clear law for the refugees, they swim in the drinking water Haffirs out the camp", The pollution of the water is big problem in our state, either in Haffirs where drinking animals and water from the same place, or the pollution of the groundwater"*.
7) **Sustainable Management of the Nubian groundwater aquifer (national government, international agencies):** Nubian Aquifer is the second largest aquifer in the world and it located at one of the arid and semi-arid regions in Sudan so it's very important for water security, this was highlighted by the ex. minister and the government official as they want to make sure that it managed and shared equitably and reasonably.
8) **Involvement of the research institutes (research and academic institutes);** Links between academia, applied research, and operations are limited and are not widely promoted for addressing water security challenges, it is important to circulate the results and benefit from the research institutes in the publication.
9) **The enabling environment for private sector (private sector)**; the enabling environment for private sector participation in the supply chain, the introduction of technology, and innovative contracts for design, build, and operation are limited.
10) Construction of a data sharing platform for water resources (research and academic institutes, private sector, and project staff)
11) Utilize the remaining non-used water from the Nile River that belongs to Sudan according to water treaties with neighboring countries (national government)
12) Better utilization of groundwater for agriculture purposes (national government)
13) Improved irrigation projects in the time and the location required (national government)
14) Improved safety of the Sudanese dams (national government)
15) Identification of the current use and the needs of the countries up to 2050 at the Nile basin level (transboundary organization, NBI priorities)

b. Perceptions of GEF meeting water security needs (relevance)

The NAPA project (GEF ID 3430) addressed the water security priorities for different uses in its project documents and in the implementation such as: water infrastructure rehabilitation and awareness raising on the new techniques to best utilize and manage the water. In certain areas, NAPA project achieved beyond its targets. This mainly because the communities found that the project matched their needs related to food and water.

The NAPA project also addressed continuous issues such **as climate change** as new technologies, practices and approaches were introduced and generally adopted in all the project target villages. In most villages this typically included a complex package of forestry, traditional agricultural crops, new horticultural crops, water management and harvesting, livestock management, sustainable energy, and training.

However, national stakeholders noted that the scale of these challenges can't be addressed fully by only pilot projects. The government noted that despite the fact that the NAPA project activities helped in mitigating the impacts of climate change, the community remained vulnerable to these impacts. Upscaling is very difficult in developing countries like Sudan which is under sanctions by international funders, making it difficult to receive the financing needed for upscaling. Government officials felt that GEF funds are very limited for Sudan and this leads the government to accept funds under any condition, even if projects are not priorities for the government.

National stakeholders noted that GEF could intervene more in areas such as supplementary irrigation and groundwater control structures as the government has many studies already done and is waiting for implementation financing.

The priority to **reduce the vulnerability of the rural communities to climatic risks** is addressed in the NAPA project as explained above; the NAPA project contributed to the implementation of the government priorities related to climate change with focus on supporting the use of **renewable energy** for the water sector**.** However, solar pumps were only installed in some villages and states while other places received diesel pumps. Additionally, in some villages the solar pumps need maintenance and expertise to choose the right type for the specific conditions. Community stakeholders noted their preference for solar pumps:

"The upscaling of this project should be with the use of solar pump because factors like the diesel price encourage that", "The state government wish that the pumps were solar pump instead of diesel because the sustainability in the work and it is environment friendly", "The diesel problem is the main challenge now which start two years ago", "We want to have solar pumps instead of the diesel", " now we face problem because the price become very high for diesel", "The agriculture stopped in the last years because of the diesel problem", "the community looking the option of using electricity for the pump instead of Diesel because it became very expensive", "The women face problem in the diesel for the pumps to irrigate the lands"

Despite that, **availability of drinking water and water quality protection** were mentioned as big priorities for communities. These topics were not covered by the case study projects (only the ongoing Nile Basin groundwater project (GEF ID 9912), mentioned water quality in Gedarif groundwater aquifer as area to be included in their planned study). Most other GEF projects focused on management, policies and

capacity building aspects and only implement pilot projects with focus in agriculture and less focus on intervention to drinking water and water quality.

Peaceful co-existence among all competing water users; conflicts between herders and farmers, as well as refugee and internal displacement have been addressed in the GEF projects, however the problem is very big which need big intervention.

The NAPA project in its baseline situation analysis mentioned that declining rainfall and changing wet seasons lead to direct impacts on conflict and security and introduced new technologies and methods for water management to the community that helped in mitigating the climate risk. The ongoing Nile Basin groundwater project mentioned conflict over the scarce water sources is common in Sudan and Ethiopia—in recent years the population in Sudan increased because of the instability in Ethiopia which brought a lot of refugees causing pressure on the water resources in the region. The project will work closely with the countries on potential climate change scenarios and will work to help countries best adapt to hazards by utilizing limited resources more effectively. The GEF Nubian project (GEF ID 9165) mentioned desertification, political conflicts and uprising as important barriers to the sustainable management of the aquifer system. The Nubian aquifer is mostly in Darfur state where there are a lot of conflict related to water resources. This project will help solving these conflicts and enhance the peace in Darfur State while contributing to reduce the tension between the countries.

Human Resource Development and Capacity Building; GEF focuses heavily on the capacity building for government staff as well as for the community. However, these programs have several limitations such as project materials being lost after the project, the high turnover of government staff, lack of knowledge sharing between people, and low involvement of youth in trainings programs. The NAPA project did a lot of capacity building activities at the village and local levels to incorporate climate change risks into ongoing and future national development planning. The main activities were visits from technical experts to villages. The project has enhanced the resilience of food production systems by raising producers' capacity in the use of technical packages. Both men and women benefited in large numbers. Numerous local community organizations were strengthened and established, and there is evidence that, at the village level, there is increased capacity with regards to both natural resources management and organizational capacity. There were a lot of workshops for capacity building for women in agriculture practices and water harvesting done. However, in some villages communities noted that they couldn't apply what they learn because of lack of equipment as the project brought equipment only for doing capacity building, and later they take the equipment back. On the other hand, the project did good job to train its staff to be experts in the field and until now they are serving in different projects.

All the outcomes of the completed Nile Basin groundwater project (GEF ID 3321) focused on enhancing capacity in national and regional institutions to understand impact of groundwater on the Nile basin. The Ministry of Irrigation and Water Resources benefited very much in the knowledge and capacity building. The project built the capacity of many staff through the trainings outside Sudan on how to take the measurements and do the analyses and it highlight the importance of groundwater data for the Ministry. The staff benefited from the project in learning how to simulate hydrological impacts. This helped them in knowing why the water is increasing in some parts of the Nile (the groundwater is recharging the Nile). Scientific knowledge on the Nile River Basin has increased and groundwater-surface water linkages clearly understood. However, people trained mentioned that despite that they benefited very much from the

training, the Ministry didn't get the license of the water model so they have not used it again after the training. They do however still use the equipment provided by this project in other activities within the groundwater directorate of the Ministry of Irrigation and Water Resources.

One of the objectives of ongoing Nile Basin groundwater project is to strengthen the knowledge base, capacity and cross-border institutional mechanisms for sustainable use and management of groundwater. The project document includes large number of planned trainings and workshops where gender balance considered. The Nubian project also gives special focus to train different stakeholders to ensure environmentally and socially optimal development and protection of NSAS water and land resources and linked ecosystems. It has a lot of planned trainings and workshops at the regional and national levels and all training activities will aim at achieving gender-balanced participation.

Data sharing platform: The case study projects spent and spend a lot of time and budget in collecting data needed for implementing the project so interviewees felt this priority was well addressed.

Utilizing the groundwater for agriculture purposes is national government priority which has been addressed in the NAPA project in terms of implementing small-scale pilot projects providing pumps for the community to use it in abstracting groundwater for agriculture activities. Groundwater resource management and development of groundwater policies and capacity building is also addressed in the ongoing Nile Basin groundwater project and Nubian project.

The results of the completed Nile Basin groundwater project were supposed to be used by the dam implementation unit of the Ministry of Irrigation and Water Resources to help in the **safety of the Sudanese dams (identifying the leakages);** but it was not used according to the national government officials.

Involvement of the research institutes was mentioned as priority by most of the stakeholders. Interviewees from research institutes and private sector companies noted they are not heavily involved in GEF projects. For example, there is overlap in Gedarif state where research institutes conducting similar activities and studies related to groundwater and water harvesting of ongoing Nile Basin groundwater project and NAPA project. Also, there are some private company and research institutes worked in the Nubian aquifer project area.

Sustainable Management of the Nubian groundwater aquifer is a priority addressed in the Nubian aquifer project, but the project is facing some institutional and political challenges which has led to big delay.

Identifying the current use and the needs of the countries up to 2050 at the Nile basin level is one of the priorities of the Nile Basin Initiative. The Initiative is trying to address current needs of the countries through a current Nile Basin groundwater project.

c. Collaboration and coherence between GEF projects and other donor-funded projects (coherence)

Other funding agencies that work on water security aspects in Sudan are: African Development Bank (AfDB), World Bank, GIZ, IGAD, JICA, IFAD, UN agencies as well as some government initiatives from its

allocated sources for the water sector. Most of the stakeholders mentioned that in many cases there was not much collaboration between case study GEF projects and the other funding agencies, as well as between GEF projects in Sudan.

This led to many projects being implemented in the same states and same locality with the same activities. For example, in the Gedarif state, research institutes are conducting similar activities and studies related to groundwater and water harvesting of the ongoing Nile Basin groundwater project and NAPA project. Also, there are some private company and research institutes worked in the Nubian aquifer project area. Another example is that the NAPA project and Watershed Management project (GEF ID 3398) worked in similar village in the river Nile state but did not coordinate on project activities.

The reasons of such project overlapping mentioned by stakeholders (although not specific to any of the case study projects) include: (1) community intervention (certain communities have personal relationships with funding organizations so they can direct more funding to their communities), (2) political interventions and high turnover in the staff which affect the selection of the project sites, (3) lack of surveys for mapping the water needs in Sudan, (4) some states do their own projects in isolation without coordinating with the national government, (5) the government lacks access to the documents of the most projects and (6) the project design teams do not perform proper consultation with stakeholders.

Recently the national government thought on how to integrate all the funding agencies projects to increase the efficiency and to avoid the duplication in the activities. The government now plans to establish a new agency called Aid Cooperation: one of its tasks will be to identify the way that those agencies can work together and in which geographical areas they should work according to the amount of funding.

Below are some examples of efforts done in the case study in term of collaboration with other projects:

The ongoing Nile Basin groundwater project: There are some government initiatives and projects funded by UNICEF in the project area, but their activities are different. However, the case study project team did reach out to them in the date collection phase to be used in the modelling activities. At the regional level, East African Community and NBI have a lot of projects related to water security and the GEF project is aligned with it all. Based on the lessons learned from the previous interventions, the project has put great emphasis on the environmental issues to ensure healthy ecosystems and improving financing opportunities. During the implantation phase the project will co-ordinate with current and planned GEF and non-GEF projects (the exact way of coordination was not mentioned).

Nubian aquifer project: there are many similar completed and ongoing projects in the region implemented by other funding agencies such as: UNDP, IAEA, IFAD, UNESCO- IHP and UNECE. Some examples are: 1) the previous UNDP/GEF project that led to the development of the SADA/SAP (Formulation of an Action Programme for the Integrated Management of the Shared Nubian Aquifer), 2) the IAEA has also undertaken a range of technical cooperation activities within specific countries and the region, including: supporting water resource planning (building capacity in support of regional and sub regional water resources planning, development and management in Africa); and pollution monitoring (Contribution of isotopic and hydro chemical techniques to assess sources of pollution in shallow

groundwater basins - Sudan), 3) there have been several initiatives to improve the understanding of the NSAS through the Center For Environment & Development For The Arab Region & Europe (CEDARE) with International Fund for Agricultural Development (IFAD) resources, assistance from the IAEA and the UNESCO, and most recently from the GEF through UNDP that led to the SADA and the SAP, and 4) UNESCO-IHP and United Nations Economic Commission for Europe (UNECE) are currently undertaking joint activities to promote the Convention on the Protection and Use of Transboundary Water courses and International Lakes (Water Convention), which aims to protect and ensure the quantity, quality, and sustainable use of transboundary water resources by facilitating cooperation. The project documents state that interaction with these initiatives will be explored in the inception phase and joint regional training modules will be carried out making use of findings/recommendations/lessons learnt from previous GEF funded projects.

NAPA project: There a lot of other projects that have come after this project and benefited from it in term of design, lessons learned, dealing with communities, etc. Some of them were based on this project, for example when they design a new GCF project (Building resilience in the face of climate change within traditional rainfed agricultural and pastoral systems in Sudan), they use the same model and the implementation arrangement for this project and they only expand it vertically and horizontally (more states and more activities). Examples of projects that benefitted from the NAPA project include: 1) Enhancing the Resilience of Communities Living in Climate Change Vulnerable Areas of Sudan using Ecosystem Based Approaches to Adaptation Project/ GEF (LDCF)/UNEP 2) a GCF funded project building resilience in the facing of climate change within traditional fed agriculture in Sudan, 3) Climate risk finance for Sustainable and Climate Resilient Rain-fed Farming and Pastoral Systems (CRF), GEF/UNDP project, 4) the NGOs such as Sudanese environmental society benefit from this project, as they took it as good example for their own projects 5) Implementing Priority adaptation measures to build resilience of rainfed farmers and pastoral communities of Sudan especially women headed households to the adverse impacts of climate change project funded by the Foreign Affairs Trade and Development of Canada (DFTAD).

The DFTAD project coordinator mentioned that their project benefited from the project during the preparation of the project document (choosing the activity types and location), and also during the implementation (consulting the communities, addressing their needs, etc.). They also benefited from the ex-project staff (all the staff at the state level have been hired to work in the new project part time to benefit from their experience). UNDP also was very helpful in providing all the necessary documents from the case study project. One of the lessons learned from NAPA project that was used in this project was the importance of supporting the basic needs for the communities (drinking water and sanitation), before jumping to other activities, thus DFTAD project included some activities related to drinking water and sanitation as complementary activity for the women community farms.

Regarding other GEF projects there were no cooperation between GEF projects implemented by different executing agencies such as the watershed project which work in the same village of this project.

The research institutes mentioned that GEF is not known for them—sometimes they are implementing similar activities in one of the sites of this project, but they didn't know there was a GEF project there.

Completed Nile Basin groundwater project: The project is not in the database of the NBI, and they didn't know about it. No data was given to the NBI to integrate it in its models, the water balance model from this project was not integrated in the Nile Basin Decision Support System (DSS) or Eastern Nile Technical Reginal office (ENTRO) water resources planning models.

IAEA benefit a lot from this project in building its new initiative on groundwater for Sahara region.

The research institutes and the private sector mentioned that they are aware about the project, but they didn't know of its results.

d. Addressing water security of vulnerable populations (effectiveness)

Ongoing Nile Basin groundwater project: A gender specialist has been recruited during the project preparation stage phase and gender aspects of the expected results are presented in the gender action plan and in the multiyear workplan. The work plan gives the women good space to work in this project--it is not only something to be written in the project, but to be implemented in reality. For example: the role of women in the pilots will be ascertained through the gender action plan, workshops/trainings participants will be selected maintaining gender balance, the committee will have half of its number women, the state will have legal framework for women participation, the effort of women to bring water will be reduced (the Nubian aquifer extends to a large area of the country, mostly in Darfur state where the women walk for long distance to get water and there are a lot of conflict related to water resources), the data will be gender disaggregated and clearly show how women are involved (or lack of it) in the use, protection and management of groundwater resources.

The social studies done by the national project consultant focused on the vulnerable groups: children, youth, women and unprivileged groups (such as refugees). The public forums and focal group discussions were designed to cater for the different local female groups, youth organizations as well as older men groups and vulnerable groups organizations. The youth will be involved in the project action plan, and they will be consulted on how they want to contribute. The project is looking for integrating the youth through a photo gallery competition and in the first survey, youth organizations were identified and consulted.

Nubian aquifer project: All project activities will follow a gender strategy to be developed in the inception phase. The project will organize training courses on "Water and Gender" in all Nubian Aquifer countries to strengthen local capacities in gender analysis, sex disaggregated data collection to enhance gender equality and women's empowerment as part of SAP implementation. The project will endeavor to ensure that women and men are represented in the project management, governance and activities equally. More significantly, the project will engage in women's groups throughout the region to understand how the work can best assist them with local water management issues in-line with the SAP implementation. Pilot projects and prefeasibility assessments for investments will also address gender issues.

NAPA project: The project has impressively reached many women beneficiaries, in all focus states, including in areas and states where this is known to be very challenging due to cultural and religious beliefs. Notably, the capacity of women in the villages has been enhanced in many areas such as agriculture practices, water harvesting and management, group work in all four states as women in

general were found to be more committed to microfinance, so the project focused microfinance pilot activities (such as building community farms) on them.

The activities benefited the women very much—installing solar pumps saved time for women to do other activities, as the women used to go to fetch water with children. The community farms were mainly established for women in a rotational based so each women had the chance to use the farm in part of the year. The project established women's committees to establish a small fund to do other activities (such as small-scale businesses).

Another vulnerable group that benefited from this project are children (their diet became more diverse) which likely had a positive effect on their education. Herders also benefited from this project through obtaining food and water for their livestock.

Completed Nile Basin groundwater project: No gender or vulnerable groups were addressed in this project; While other stakeholders were involved in the project preparation phase, no stakeholder analysis and stakeholder involvement plan were prepared.

3. Water security achievements and sustainability

a. Water security related outcomes of GEF projects (planned and achieved) (effectiveness)

Project intended outcomes	Actual Outputs (at project completion), source: Terminal evaluation reports)
NAPA project	
Outcome.1: Resilience of food-production systems and food-insecure communities enhanced in the face of climate change.	**Partially achieved:** the project improved the life of many people in diverse socio-economic and ecological conditions. New technologies, practices and approaches were introduced and generally adopted in all the project target villages. This typically included a complex package of forestry, traditional agricultural crops, new horticultural crops, water management and harvesting, livestock management, sustainable energy, and training. Despite having been delivered, the outputs may not have had the intended impact, the beneficiaries faced many technical challenges with some of the new practices and technologies due to the quantity or quality of the technical support provided.
Outcome.2: Institutional and individual capacities to implement climate risk management responses in the agriculture sector strengthened	**Fully achieved:** This outcome was achieved through capacity building activities at the village and local levels to incorporate climate change risks into ongoing and future national development planning. The project supported the same villages under this outcome as under outcome 1. The main activity under this outcome was visits from technical experts to villages. The evidence points to increased capacity with regards to natural resources management and organizational capacity in villages, and all outputs have been delivered.
Outcome.3: A better understanding of lessons learned and emerging best practices,	**Partially achieved:** This outcome was expected to be achieved by synthesizing a systematic understanding of lessons learned and emerging best practices. Two of the outputs for this outcome were partially achieved, and two were not achieved. For example, a draft National Food Security Policy was not

captured and upscaled at the national level	delivered, nor was a system put in place for capturing lessons and disseminating them. Overall, the development objective, appears to have been partially achieved as some measures were implemented and are reducing the food insecurity of farmers and pastoralists. However, in addition to implementing measures supporting climate change adaptation, the project was expected to capture lessons and lead to be scaled up at the national level. This aspect of the outcome has not been achieved.
Completed Nile Basin groundwater project (includes only components implemented in Sudan)	
Outcome 1: Enhanced capacity in national and regional institutions to understand extent and impact of groundwater on selected rivers systems comprising the Nile basin	**Fully achieved; The quality of analytical work as well as of reports, particularly the work on modelling water flows confirmed by isotope hydrology application, is of a high quality. Scientific knowledge on the Nile River Basin has increased, national capacities enhanced. Groundwater-surface water linkages clearly understood.
Outcome 3: Enhanced capacity in national and regional institutions to use water balance models that incorporate physical, chemical and isotope data to estimate annual and monthly water balance information that is essential for sustained management of wetlands and lakes in the Nile basin	**Partially achieved: The modelling work was completed, even if Sudd Swamp analysis based on isotope hydrology was not completed because of security concerns. From the reports it is not clear whether integration of assessment results in the DSS and water models of the NBI has been done. The TE concludes that this activity of the project has not been completed.
Outcome 4: Enhanced capacity on the part of national and regional institutions to integrate groundwater considerations into Nile basin planning and management activities	**Partially achieved: Awareness on the importance of groundwater raised among participants in the project and decision-makers. No evidence that groundwater considerations were mainstreamed into Nile River Basin planning and management.

b. Relationship of results to GEBs, co-benefits and unintended consequences (effectiveness)

NAPA project contributed to the GEF-7 GEBs; "Greenhouse gas emissions mitigated", new technologies, practices and approaches were introduced and generally adopted in all the project target villages. in most villages this typically included sustainable energy (using the gas instead of wood for cooking and solar pumps instead of diesel pumps for irrigation), the project also contributed to Climate change adaptation, as it helped the community members become more resilience to drought through access to groundwater and teach them new techniques for water resources management.

Completed Nile Basin groundwater project did not achieve any GEF global environmental benefits (GEBs) in Sudan. The project was very small to have had impact in water security or GEBs and the results of the project were very limited to small areas. The project was very ambitious for medium size project and the Ministry of Irrigation and Water Resources didn't continue in doing the isotopic analysis for groundwater because the lack of finance. The results are in the Ministry library, but they are not used due to lack of dissemination.

The focus on groundwater issues that the project brought came too early for the Nile Basin Initiative (which was still focused on surface water issues at the time), so the stakeholders did not know much about the project. However, reduced groundwater availability caused by inappropriate management could pose an environmental risk and the project made the Ministry of Irrigation and Water Resources aware of the groundwater resources and the data related to it. The equipment of this project was used later by the directorate of groundwater, Ministry of Irrigation and Water Resources

The focus of the project to strengthen the existing national capacities as well as NBI to mainstream groundwater information into water planning and management was achieved. The big benefit to the Ministry of Irrigation and Water Resources was on knowledge and capacity building. The project built the capacity of many staff, which help them in knowing why the water is increasing in some parts of the Nile. The only limitation was that they didn't apply what they learned because the Ministry doesn't have capacity to carry out the analyses and license for the model.

The project was not integrated in the database of the NBI, and the model was not integrated in the DSS of the NBI, and it is not among the used NBI models.

One unintended result of the project is that it contributed to the safety of the Sudanese dams at the time of implementing, as they knew where the leakages from using the water balance models, but the use of the results haven't continued to be useful after the project.

In general, the projects faced a lot of political challenges. Questions were raised by stakeholders about the interlinkage between the groundwater and the Nile basin and if the wetlands in the south of Sudan as well as the Nubian aquifer in the north are critical for the Nile basin. Stakeholders were very nervous about what results can come out from this project: if they discover more detailed connections between the Sudd basin and the Nile (although hydrological connections between the Sudd wetlands and the Nile have long been established[61]) or that the Nubian aquifer take water from the Nile, that could have significant consequences for transboundary water management. The project was supposed to be part of a group of multipurpose projects implemented by the NBI in the shared aquifer between Sudan and Ethiopia, but this initiative was stopped because of political reasons.

c. Sustainability of water security outcomes in completed projects (sustainability)

Intended outcome and status at project completion	Status of outcome at time of case study	Direction of change

[61] Bastawesy ME, Gabr S, White K (2013) Hydrology and geomorphology of the Upper White Nile lakes and their relevance for water resources management in the Nile basin. *Hydrological Processes*: 27, 196-205.

NAPA project		
Outcome.1: Resilience of food-production systems and food-insecure communities **Partially achieved**	The installed generators are still in use and help the farmers to do supplementary irrigation after the flooding season every year, and when they don't use the generator for pumping water, they took it home and use it for electricity which help a lot to have light for student to study in the evening (indirect impact). The women community farms produced a lot of agriculture products that are used for domestic and animal use, and the remaining they sell in the local market. As a result, the women still make good income from these farms. In Darfur state, the community bring machines every year to maintain the terraces constructed during the project to improve water retention for agriculture purposes. In some villages, the project provided women with land to be irrigated using drip irrigation from water tanks and this still working very well. The women now have their own resources, in other villages the women wanted to have their own farm and own machine to make terraces. The solar pumps installed in 2014, and until now they work very well. The villages which were given diesel pumps instead of solar pumps, had their activities stopped more than 2 years ago because they could not afford to refill the pumps due to an increase in diesel prices. The project made green belt by planting trees, 3km length, but now it faces some problems that the trees need a lot of water (water intensive trees were chosen), and the groundwater well-used for irrigating the belt trees has a technical problem. The project has a problem in the fence built around some farms as it is very weak, the animal enters to the agriculture, this problem starts the more than one year ago. The project performed a study done for a water harvesting dam in the Gedarif state, but the dam was not implemented by the Ministry of Irrigation and Water Resources. Currently the UNESCO center for water harvesting doing an assessment for the proposed dam where they found it not a viable solution and they proposed using techniques related to water harvesting.	**Improved**
Outcome.2: Institutional and individual capacities to implement climate risk management responses in the agriculture sector strengthened, Fully **achieved**	The project trained its staff to be experts in the field and after that they served in similar projects such as climate change project funded by foreign affairs trade and development Canada (DFTAD). The villages committee established started looking for micro- finance institutions and they collaborated with Ministry of Agriculture to support them in their activities such as providing technical advice and informing them when there are some opportunities to fund some microfinance projects. Women and men now working as farmers, before it was not accepted that the women work in the agriculture activities. Now they are helping in the harvesting. The project taught the community new agriculture practices and introduced new crop types,. Now they grow all the year instead of one season. In Gedarif State: a lot activities introduced in capacity building programs for the community (both men and women), were not carried out after the project because of lack of equipment.	**Improved**

Outcome.3: A better understanding of lessons learned and emerging best practices, captured and upscaled at the national level, **Not achieved**	The documentation of the results for this project as well as the project design were very good and was thus used as framework and model for other projects such as climate change project funded by foreign affairs trade and development Canada (DFTAD), and also for the new GCF programs, they use the same model and the implementation arrangement for this project and they only expand it vertically and horizontally (more states and more activities). The farmers adopted the use of the water harvesting techniques (terracing) after the project. The project provides pumps to one of the village committees, where they give it to community members with a monthly installment. This installment was used later to buy new pumps for others, and now everyone has their own pump. Some of the villages continue making gardens inside their properties, which they learned from this project. The project opened the mind of people to propose new projects to be implemented in the region. The private solar pump company benefited very much form the lessons learned from this project in choosing the type of the solar pump used for other projects. The project supported research in water harvesting, agriculture, climate change and the renewable energy use (wind and solar). A number of studies have been done on these topics after the project.	**Improved**
Completed Nile Basin groundwater project		
Outcome 1: Enhanced capacity in national and regional institutions to understand impact of groundwater on selected rivers systems, Fully **achieved**	The Ministry of Irrigation and Water Resources benefited from the knowledge and capacity building. The project built the capacity of many staff as they are now able take the water samples from the Nile and groundwater. The project was not integrated in the database of the NBI, there is no information if the Ministry of Irrigation and Water Resources use the results of the analysis. There are some papers published by scientific research using the data of this project.	**Sustained**
Outcome 2: Enhanced capacity in national and regional institutions to assess the contribution of groundwater in sustaining wetlands in selected areas of the Nile basin, **Partially achieved**	**No information obtained for South Sudan**	**Unable to assess**
Outcome 3: Enhanced capacity in national and regional institutions to use water balance models **Partially achieved**	The staff received a regional training course on the application of an isotope - enabled water balance model in the Nile basin using GIS to simulate the flow with application in some stations in Sudan. They use the isotopic measurements as inputs. People whom they trained mentioned that they benefited very much at the time of the training, but the Ministry of Irrigation and Water Resources didn't get the license of the model so they haven't used it again after the training and the Model was not integrated in the DSS of the NBI and it is not among NBI models.	**Worsened**

Outcome 4: Enhanced capacity on the part of national and regional institutions to integrate groundwater considerations into Nile basin planning and management activities, **Partially achieved**	The Ministry of Irrigation and Water Resources benefited in the knowledge and capacity building. It made the Ministry aware of groundwater resources and the data related to it. They benefited from the project in learning how to simulate hydrological impacts, helping them in knowing why the water is increasing in some parts of the Nile (the groundwater is recharging the Nile), before they only incorporated the rainfall in the modelling without consideration given to the groundwater.	**Sustained**

4. Overall findings

- National and local level priorities in the case study region can be summarized in high level priorities (national level) such as climate change adaptation, sustainable management of transboundary water resources, current ongoing conflict on water resources (internally and externally) and capacity building, and low-level priorities (state level) such as access to drinking water, water quality protection, and having solar pumps instead of the diesel pumps (because of the high increase in the diesel prices in the recent years).

- GEF projects addressed the water security priorities for different uses in project documents and in the implementation such as: water infrastructure rehabilitation and awareness raising on the new techniques to best utilize and manage the water. GEF sometimes achieved results beyond their target such as in NAPA project, where the community appreciated the activities and replicated them (like providing pumps in rotation base, establish more women community farms, selling the agriculture products in the local market, improving the health for children as they have enough healthy food, education improved also as result that children has opportunity to study at night using the electricity pump provided for irrigation) , these occurred mainly because the communities were highly engaged in the projects and it matched their needs.

- Case study projects led to positive impacts in water security mostly those linked to climate change and the food security (support the irrigation activities for example), but GEF can intervene more in areas such as supplementary irrigation and groundwater control structures to have a further impact. The government has many studies already done and waiting for implementation financing.

- Completed case study projects contributed to some of the GEF-7 GEBs, such as “Greenhouse gas emissions mitigated”, where new technologies, practices and approaches were introduced and generally adopted in all the project target villages. In most villages this typically included sustainable energy (using the gas instead of wood for cooking and solar pumps instead of diesel pumps).

- Solar pumps consider as an achievement for NAPA project. The solar pumps installed in 2014 and until now are working very well. The villages which were provided diesel pumps instead of solar pumps saw their activities stopped more than 2 years because of the diesel prices.

- The completed Nile Basin groundwater project and NAPA project did a lot of capacity building programs for the government staff and NAPA project did capacity building for the community members as well (both men and women), but in some cases people couldn't apply what they learn because of lack of equipment, model license and laps for analysis. The ongoing Nile Basin groundwater project and Nubian project have a lot of planned capacity building programs for community and government staff, considering the gender dimension.

- The women community farms and the villages committee were one of the biggest achievements of NAPA project. The community start looking for microfinance institutions after the project, and they collaborated with Ministry of Agriculture to support them in the activities (giving technical advice and informing them when there are some opportunities to fund some micro finance projects).

- GEF projects in Sudan face a lot of political challenges, especially GEF transboundary groundwater ones (Nile basin two projects and the Nubian project). Questions were often raised by stakeholders about the interlinkage between the groundwater and the Nile basin and if the wetlands in the South Sudan as well as the Nubian aquifer in the north are contributing positively or negatively in the Nile basin, as this could have significant consequences for transboundary water management. Political conflicts and uprising are important barriers that lead to the delay in the Nubian project and the ongoing groundwater project in the Nile basin is facing a lot of challenges related to data sharing and conflicts between the countries (Ethiopian refugee in Sudan for example). However, the NAPA national project is also affected by politics; priorities are highly dependent on the political will and power of different governmental agencies, political instability in Darfur state also affects the implementation of the project. Political interference and appointments have also contributed to an increase in staff turnover and a lack of institutional memory and capacity to guide the sector.

- It can be clearly seen that effective in implementing transboundary GEF projects mainly rely on the government executing agencies. This can be seen when we compare the two groundwater projects, Nubian Project and the ongoing groundwater Nile Basin Project. Both of them were planned to start at the same time (2018 and 2019) but Nubian project is not started yet and this mainly due to political disagreements between the different national executing agencies, while Nile basin project start its activities on time since it has one regional executing agency.

- The methodology used for the NAPA project (both the design and the lessons learned) was used as framework and model for other projects such as such as climate change project funded by foreign affairs trade and development Canada (DFTAD), and also for a the new GCF program. These newer projects use the same model and the implementation arrangement while expanding it vertically and horizontally (more states and more activities).

- Most of the stakeholders mentioned that in many cases there was not much collaboration between GEF and the other funding agencies, as well as between GEF projects in Sudan. Recently the government made a plan to establish new entity called Aid Cooperation. One of its tasks to identify

the way that those agencies can work together and in which areas they should work according to the amount of funding.

- The research, and academic institutes as well as private sector involvement in GEF water related activities were weak.

- GEF, partially through the LDCF, addressed climate change but the needs are so large that this issue can't be addressed by only pilot projects without continued upscaling, despite that GEF achieved success in doing pilot projects.

- Despite GEF projects achieved a lot of success, sustainability was difficult to achieve in some cases. For example, using the knowledge gained from some of the capacity building programs proved difficult (as they lack the material, equipment, water model licenses as well as the water laps), also scaling up of the pilot projects was difficult due to lack of financing. The government also did not follow up the projects after the end in many cases. The role of the village development committees was also very important in the sustainability in the case of NAPA project as they followed up the activities after the project finished. However, most of the lessons learned from the terminal evaluations were applied in subsequent projects.