GEF-8 PROJECT IDENTIFICATION FORM (PIF)

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General Project Information

Project Title	
Unlocking the groundwater potential of the Kilimanjaro Water Tower	
Region Regional	GEF Project ID 11547
Country(ies) Regional Kenya Tanzania	Type of Project FSP
GEF Agency(ies): FAO	GEF Agency ID 750589
Executing Partner UNESCO Ministry of Water, Sanitation and Irrigation-Government of Kenya Ministry of Water-Government of Tanzania	Executing Partner Type Others Government Government
GEF Focal Area (s) International Waters	Submission Date 3/20/2024
Project Sector (CCM Only) Mixed & Others	
Taxonomy International Waters, Focal Areas, Freshwater, Transboundary Diagnostic Analysis and Strategic Action Plan Preparation, Strategic Action Plan Implementation, Aquifer, Learning, Climate Change, Climate Change Adaptation, Biodiversity, Biomes, Tropical Rain Forests, Wetlands, Influencing models, Transform policy and regulatory environments, Demonstrate innovative approache, Deploy innovative financial instruments, Convene multi-stakeholder alliances, Strengthen institutional capacity and decision-making, Stakeholders, Local Communities, Communications, Education, Awareness Raising, Behavior change, Strategic Communications, Beneficiaries, Type of Engagement, Indigenous Peoples, Participation, Information Dissemination, Consultation, Private Sector, Individuals/Entrepreneurs, SMEs, Civil Society, Non-Governmental Organization, Academia, Gender Equality, Gender Mainstreaming, Sex-disaggregated indicators, Gender-sensitive indicators, Gender results areas, Knowledge Generation and Exchange, Access to benefits and services, Capacity, Knowledge and Research, Knowledge Generation, Knowledge Exchange, Capacity Development, Course, Workshop, Professional Development, Seminar, Training, Conference, Innovation, Adaptive management, Theory of change	
Type of Trust Fund GET	Project Duration (Months) 60
GEF Project Grant: (a) 7,105,936.00	GEF Project Non-Grant: (b) 0.00
Agency Fee(s) Grant: (c)	Agency Fee(s) Non-Grant (d)

675,064.00	0.00
Total GEF Financing: (a+b+c+d) 7,781,000.00	Total Co-financing 56,500,000.00
PPG Amount: (e) 200,000.00	PPG Agency Fee(s): (f) 19,000.00
PPG total amount: (e+f) 219,000.00	Total GEF Resources: (a+b+c+d+e+f) 8,000,000.00
Project Tags CBIT: No NGI: No SGP: No Innovation: No	

Project Summary

Provide a brief summary description of the project, including: (i) what is the problem and issues to be addressed? (ii) what are the project objectives, and if the project is intended to be transformative, how will this be achieved? iii), how will this be achieved (approach to deliver on objectives), and (iv) what are the GEBs and/or adaptation benefits, and other key expected results. The purpose of the summary is to provide a short, coherent summary for readers. The explanation and justification of the project should be in section B “project description”.(max. 250 words, approximately 1/2 page)

The project is a collaborative effort between Kenya and Tanzania, supported by the GEF and facilitated by FAO and UNESCO. This five-year initiative aims to address critical water security, climate resilience, and ecosystem health challenges in the Mt. Kilimanjaro region. The livelihoods of 2.05 million people around Kilimanjaro depend on the health of the Kilimanjaro Transboundary Aquifer System (KTAS), a complex network of important groundwater reserves shared by Kenya and Tanzania, and its ecosystem services. Currently, the region faces significant challenges, including inadequate understanding of the aquifer’s characteristics, lack of recharge protection, and governance issues.

Mount Kilimanjaro, Africa’s highest mountain and one of the world’s largest central volcanoes, serves as a crucial “water tower” in a densely populated region. It gives rise to two major river basins — the Pangani and Athi River Basins — and the Amboseli Internal Drainage Basin, and originates important groundwater reserves collectively known as the Kilimanjaro Transboundary Aquifer System (KTAS) shared by Kenya and Tanzania. Water recharge mainly happens in Tanzania at elevations between 1,500 and 3,000 meters due to high rainfall and moisture in the cloud forests on Kilimanjaro’s upper slopes. This recharge influences groundwater availability in Kenya, as water moves through complex fault and fracture systems, replenishing interconnected aquifers at various depths. These aquifers extend into the surrounding plains of both countries. Freshwater ecosystems, including Chala and Jipe lakes, rivers, wetlands, springs, and humid areas, rely on the KTAS groundwater, showing the interconnected nature of the region’s water resources.

Currently, groundwater is drawn from shallow, unconfined aquifers, typically less than 30 meters deep, found in the plains around Kilimanjaro. However, groundwater demand is rising due to rapid population growth, agricultural expansion, overuse of surface water, and frequent droughts. Exploring the untapped potential of deeper confined groundwater reservoirs in the Kilimanjaro's volcanic edifice will be vital for its population and its dependent ecosystems. The full analysis of the characteristics and functioning of the KTAS will be a decisive factor enabling policy-making based on scientific evidence, sustainable groundwater governance and its conjunctive management with surface waters. Additionally, the protection and restoration of cloud forests will enhance biodiversity and ecosystem services, contributing to global environmental benefits.

The primary objective of this project is to enhance water security and climate resilience in the Kilimanjaro's region by significantly improve the understanding and management of the KTAS, increase access to sustainable groundwater resources, promote their holistic governance and enhance the capacity of national and local water managers. This involves several key components and activities:

1. **Strengthening Transboundary Cooperation and Aquifer Governance:** Fragmented groundwater governance and policy coherence complicate transboundary coordination and hinder sustainable management of the Kilimanjaro aquifer between Kenya and Tanzania. A Strategic Action Program (SAP) for sustainable groundwater management and governance will be developed, and the foundations for the establishment of a permanent transboundary consultation body will be laid down. A partnership conference will be organized to secure international support, foster collaboration among stakeholders and strengthen countries' commitment to undertake agreed priority reforms and investments. This component will build on existing frameworks such as the Memorandum of Understanding between Kenya and Tanzania for the joint management of Lakes Chala and Jipe, and the Umba River Ecosystem.
2. **Groundwater Assessment:** The major issue towards the sustainable development of the groundwater resources in the project area is due to the lack of a full understanding of the aquifer extent, potentialities, interactions with freshwater ecosystems and surface waters, and lack of a shared vision. Detailed hydrogeological surveys will be conducted to develop a conceptual model of the KTAS. This will help understand the aquifer's structure and dynamics, identify issues of transboundary concern, and propose solutions. The process will be highly participatory, involving local communities, women, and indigenous groups to ensure inclusive and effective outcomes. Key locations for these assessments include the Pangani and the Lower Athi River Basins, and the Amboseli Internal Drainage Basin, which are crucial for understanding the groundwater recharge areas in the cloud forests.
3. **Expanding Groundwater Resources:** The project plans to drill deep exploratory wells to assess new confined aquifers and develop plans for managed aquifer recharge and flood management. Protecting the groundwater recharge areas, particularly the cloud forests of Kilimanjaro, is also a critical aspect. These forests play a crucial role in maintaining the region's water balance, and their preservation is essential for sustainable water management. Specific sites include the plains surrounding the Kilimanjaro volcanic edifice and the Chyulu Hills, which are significant recharge zones. Comprehensive water demand analysis for major sectors, including agriculture and urban centers, will inform regional underground water storage and flood water management plans, including the identification of sites suitable for Managed Aquifer Recharge, among others. This will reduce the water-stresses in the region from increasing water demand in the Kilimanjaro region, especially in the Pangani basin, creates a substantial gap between available supply and consumption needs, threatening long-term sustainability.
4. **Establishing Groundwater Management Tools:** Effective management of these resources will be ensured by designing and implementing groundwater monitoring networks and creating a Groundwater Information Management System. Additionally, the Kilimanjaro Hydro-environmental Observatory will be established as a centralized hub for data and information on the region's water resources. This observatory will integrate data from various sources, including the Mzima Springs, a critical water source for Mombasa, Moshi, and Tanga. Thus, enhancing data collection and monitoring systems to ensure effective tracking of groundwater levels, quality, and usage, facilitating informed decision-making and adaptive management
5. **Stakeholder Engagement and Knowledge Management:** Regular consultations with stakeholders, including the private sector, women's groups and local communities, will ensure that diverse perspectives are considered. High-profile outreach events and participation in IW:LEARN activities will help disseminate knowledge and best practices. The project will leverage the Mombasa Water Fund's experience in engaging local communities, such as the Maasai, in

implementing Nature-Based Solutions (NBS) for watershed conservation. In addition, lessons learned from the engagement and involvement of the indigenous communities in Kenya and Tanzania will greatly inform to the project design.

6. **Monitoring and Evaluation:** Throughout the project, a gender-sensitive M&E system will be implemented, and independent mid-term reviews and terminal evaluations will be conducted to ensure adaptive management and continuous improvement.

The project is expected to contribute to Core Indicator 1 (Terrestrial protected areas created or under improved management), Core Indicator 3 (area of land and ecosystems under restoration), more precisely its sub-indicators 3.2 (area of forest and forest land under restoration), Core Indicator 7 (shared water ecosystems under new or improved cooperative management) and Core Indicator 11 (People benefiting from GEF-financed investments disaggregated by sex (count). A conservative estimate of 40,000 ha of the total cloud forest area has been included for CI 3 (corresponding to about 20% of the total cloud forest area), to be refined during the Project Preparation Grant (PPG). Similarly, for Core Indicator 11 (number of high and low intensity beneficiaries), the estimated value of 100,000, representing the population living in the aquifer region, half of whom are women, will be further refined during the PPG. Co-benefits are expected to be generated by the project, particularly through the activities of components 2 and 3. For example, although the project does not aim to generate “direct” biodiversity benefits, the protection of groundwater recharge areas will generate additional biodiversity benefits in line with Target 3 of the Kunming-Montreal Global Biodiversity Framework “Conserve 30% of Land, Water and Seas”.

Indicative Project Overview

Project Objective

The overall objective of this project is to enhance water security, climate resilience, and ecosystem health in the Mt Kilimanjaro region shared by Kenya and Tanzania through comprehensive groundwater assessment, transboundary cooperation, and sustainable management of the Kilimanjaro Transboundary Aquifer System (KTAS).

Project Components

Component 1: Groundwater assessment: making the invisible visible.

Component Type	Trust Fund
Technical Assistance	GET
GEF Project Financing ($)	Co-financing ($)
1,421,187.00	11,072,250.00

Outcome:

Outcome 1.1: Countries improve their common understanding of the socio-economic impacts related to the potential and current state of the shared groundwater resources of the Kilimanjaro region.

Indicator 1: Assessment of the Hydrogeology of the Kilimanjaro Aquifer System and dependent ecosystems, successfully conducted with the participation of experts from the beneficiary countries.

Indicator 2: Countries agreement on TDA findings and recommendations.

Output:

Output 1.1.1: Assessment, characterization and definition of the conceptual model of the KTAS groundwater resources, and of their dependent ecosystems (e.g.: Lakes Chala and Jipe), based on existing information complemented with modern volcanological, hydrogeological, hydrogeochemical, and geophysical surveys.

Output 1.1.2: Stable Isotopes survey of major springs (e.g.: Mzima) and lakes (Chala, Jipe) to determine their relationships with aquifers of the Kilimanjaro and of the adjoining Chyulu Hills.

Output 1.1.3: Transboundary Diagnostic Analysis: based on the findings of 1.1 and 1.2, as well as on extensive consultations with key stakeholders (including particularly gender experts, women and women's organizations, indigenous representatives and local communities) the diagnostic will focus on identifying issues of transboundary concern, their causes and possible solutions, and the impacts on local communities and biodiversity of future climatic scenarios.

Component 2: Expanding groundwater resources, and enhancing underground storage capacity

Component Type	Trust Fund
Technical Assistance	GET
GEF Project Financing ($)	Co-financing ($)
2,030,267.00	15,817,500.00

Outcome:

Outcome 2.1: Increased access to, quantity and sustainability of groundwater reserves.

Indicator 3: Drilling campaign results expand the groundwater resource base.

Indicator 4: Plan for underground water storage and flood management submitted for adoption by governments.

Indicator 5: Cloud forests protection system in place and operational.

Indicator 6: Comprehensive water demand analysis completed for major sectors, including agriculture and urban centers.

Output:

Output 2.1.1: Drilling of deep exploratory wells in areas selected based on Component 1 findings, to assess the existence and quality of new confined aquifers at economically reachable depths. The use of directional drilling techniques will be considered in areas of predominantly fractured volcanic nature.

Output 2.1.2: Identification of sites suitable for Managed Aquifer Recharge, and preparation of regional underground water storage and flood water management plans.

Output 2.1.3: Pilot demonstrations of (i) managed underground water storage/retrieval systems, and of (ii) flood water management including through nature-based and other technical solutions.

Output 2.1.4: Protection of groundwater recharge areas, in particular the cloud forests of the Kilimanjaro, by addressing main threats, engaging local communities, and empowering women.

Output 2.1.5: Comprehensive water demand analysis completed for major sectors, including agriculture and urban centers.

Component 3: Establishing essential groundwater management tools

Component Type	Trust Fund
Technical Assistance	GET
GEF Project Financing ($)	Co-financing ($)
1,353,512.00	11,495,000.00

Outcome:

Outcome 3.1: Countries practicing conjunctive management sustainably the surface and groundwater resources of the Kilimanjaro region.

Indicator 7: Design of groundwater monitoring networks and standards agreed upon by Countries.

Outcome 3.2: Increased capacity of national water managers and local communities to conjunctively manage surface and groundwater.

Indicator 8: The Kilimanjaro Hydro -environmental Observatory established and operational.

Indicator 9: At least 200 gender balanced national agencies staff and local communities' representatives participate to training programs.

Output:

Output 3.1.1: Design of multi-purpose monitoring networks of groundwater quality and quantity based on equipment, methodologies, indicators and protocols agreed upon by the two countries.

Output 3.1.2: Pilot monitoring demonstrations: ad hoc wells drilled in irrigation and local communities' contexts, and instrumented with modern equipment for real time data transmission.

Output 3.1.3: Groundwater Information Management System, harmonized in the two countries, to enable storage, retrieval, processing, visualizing groundwater data and information.

Output 3.1.4: Creation of an "Hydro-environmental Observatory" conceptual and model of the Kilimanjaro Water Tower, as a reference information center that will receive data from existing and newly established national monitoring networks, harmonized at the transboundary level in terms of technology and protocols.

Output 3.1.5: Gender-sensitive training programs for relevant national agencies staff and for local communities - focused on main outputs of the project, on groundwater management and surface/groundwater interactions - designed and implemented.

Component 4: Strengthening transboundary cooperation and groundwater management capacity

Component Type	Trust Fund
Technical Assistance	GET
GEF Project Financing ($)	Co-financing ($)

1,015,134.00	7,908,750.00

Outcome:

Output 4.1: Countries commence efforts to cooperate in the management of the KTAS and strengthen their commitment to undertake agreed priority reforms and investments.

Indicator 10: ToRs of consultation mechanism submitted to governments for approval.

Indicator 11: The SAP endorsed at ministerial level.

Indicator 12: Strengthened national and local groundwater governance in both countries

Output:

Output 4.1.1: Terms of reference for the creation and functioning of a permanent transboundary consultation and information exchange body on the Kilimanjaro transboundary aquifers, prepared and submitted for governments approval.

Output 4.1.2: The Kilimanjaro Aquifer System Strategic Action Program (SAP) for the long-term environmentally sustainable management of the groundwater resources in the project region, prepared and submitted for government approval at ministerial level.

Output 4.1.3: A partnership conference aimed at consolidating international support for the implementation of the SAP held with broad participation of the donor community.

Output 4.1.4: A comprehensive review of existing groundwater policies and regulations in both Kenya and Tanzania, identifying gaps and inconsistencies and opportunities for improvement.

Component 5: Coordination, knowledge management, stakeholder's engagement and dissemination

Component Type	Trust Fund
Technical Assistance	GET
GEF Project Financing ($)	Co-financing ($)
609,080.00	4,745,250.00

Outcome:

Outcome 5.1: Structured and effective gender-sensitive engagement of relevant stakeholders in project activities, integration of local communities' perspectives, enhanced public awareness and information accessibility, and active involvement of the productive sector contribute to the realization of the project's outcomes and the broader commitment to the implementation of SAP reforms and investments.

Indicator 13: Regional and District/County administrators, and all stakeholders actively participate to periodic consultations and contribute to SAP definition and adoption.

Indicator 14: Webinars/reports/ publications/local awareness-raising events and other knowledge products delivered to IW: LEARN and disseminated.

Output:

Output 5.1.1: Regular consultations with stakeholders including the private sector , women and youth associations and local communities.

Output 5.1.2: Establishment of knowledge-exchange and coordination mechanisms with other relevant projects and initiatives.

Output 5.1.3: High-profile outreach events at the national and regional levels to highlight project's progress and achievements.

Output 5.1.4: Participation to activities of IW LEARN, establishment of project website and other knwoledge management tools, and publication and dissemination of key project documents (TDA, SAP etc.).

M&E

Component Type	Trust Fund
Technical Assistance	GET
GEF Project Financing ($)	Co-financing ($)
338,378.00	2,636,250.00

Outcome:

Outcome 6.1: Operational project M&E systems successfully implemented and informing adaptive management.

Indicator 15: Recommendations from operational M&E systems fed back into project implementation

Output:

Output 6.1.1: A gender-sensitive project M&E system designed and operational

Output 6.1.2: Independent Mid-term Review and Terminal Evaluation undertaken with results fed back to project management

Component Balances

Project Components	GEF Project Financing ($)	Co-financing ($)
Component 1: Groundwater assessment: making the invisible visible.	1,421,187.00	11,072,250.00
Component 2: Expanding groundwater resources, and enhancing underground storage capacity	2,030,267.00	15,817,500.00
Component 3: Establishing essential groundwater management tools	1,353,512.00	11,495,000.00

Component 4: Strengthening transboundary cooperation and groundwater management capacity	1,015,134.00	7,908,750.00
Component 5: Coordination, knowledge management, stakeholder's engagement and dissemination	609,080.00	4,745,250.00
M&E	338,378.00	2,636,250.00
Subtotal	**6,767,558.00**	**53,675,000.00**
Project Management Cost	338,378.00	2,825,000.00
Total Project Cost ($)	**7,105,936.00**	**56,500,000.00**

Please provide justification

PROJECT OUTLINE

A. PROJECT RATIONALE

Briefly describe the current situation: the global environmental problems and/or climate vulnerabilities that the project will address, the key elements of the system, and underlying drivers of environmental change in the project context, such as population growth, economic development, climate change, sociocultural and political factors, including conflicts, or technological changes. Describe the objective of the project, and the justification for it. (Approximately 3-5 pages) see guidance here

Mount Kilimanjaro - the highest mountain in Africa, and one of the world's largest central volcanoes - serves as a crucial 'water tower' in a densely populated region. It gives rise to two major river basins, the Pangani and Athi River Basins, and to the Amboseli Internal Drainage Basin, all shared by Kenya and Tanzania. Additionally, it contributes to a vast and intricate aquifer system known as the Kilimanjaro Transboundary Aquifer System, one of Africa's most important aquifers, providing water for millions of people and supporting agriculture, industry, and ecosystems. Most groundwater recharge occurs in Tanzania between 1,500 m asl and 3,000 m asl. due to the high rainfall and air moisture characterizing Mt Kilimanjaro forested upper slopes (cloud forests), while the contribution of snow melting appears to be negligible. Water infiltrates along the complex faulting and fracture systems characterizing central volcanoes, recharging multiple interconnected aquifers along its flanks at shallow and deeper levels, some of which extend into the surrounding plains in Tanzania and Kenya. The aquifer is hydraulically linked to rivers that flow across the border from Tanzania to Kenya, and outcrops as springs, interacting with surface waters and freshwater ecosystems such as the transboundary Chala and Jipe lakes [2], and numerous wetlands and humid areas. There is therefore a clear upstream-downstream context, where recharge in Tanzania influence groundwater availability in Kenya. The tentative delineation of the aquifer, as illustrated in Figure 1, is based on geology and topography, encompassing volcanic pyroclastic and volcanic alluvium deposits at the base of Mount Kilimanjaro. These deposits form basins extending outward from the mountain, limited by the surrounding Precambrian basement rocks. Confined aquifer conditions exist in the upper and intermediate slopes of the volcano transitioning to a shallow unconfined aquifer beneath the lower slopes, overlaying deeper, confined aquifers. Groundwater occurrence in the surrounding basement plains is limited to faults, fractures, and small weathered zones.

Drivers of change

The region surrounding the Kilimanjaro 'water tower,' spanning the Taita-Taveta and Kajiado districts in Kenya, as well as the Kilimanjaro and parts of the Manyara regions in Tanzania, confronts substantial challenges to its environmental and developmental sustainability. These challenges encompass demographic growth, the expanding footprint of agricultural land, and the overexploitation of water resources. The situation is further compounded by the adverse effects of climate change and variability, which have been evident in the region since the early 1960s. Projections related to climate change paint a concerning picture, anticipating a heightened frequency and severity of extreme drought and flood events. These events, in turn, disproportionately impact the local population, posing a serious threat to livelihoods and overall socio-economic development. Over the past four decades, the region has experienced severe and recurrent droughts, notably in 2003, 2005, 2009, and 2023, which had devastating effects on vital sectors such as agriculture, energy, and commerce. The environmental and ecological repercussions of these droughts were profound, leading to compromised agriculture, loss of livestock and wildlife due to starvation, and scarcity of water resources.

The 2023 drought in the Taita and Taveta Districts in Kenya

The 2023 drought has had a devastating impact on the Taita and Taveta districts of Kenya creating a serious humanitarian crisis. The region has been hit by a severe water shortage, which has led to a loss of crop yields, livestock deaths, and an increase in food insecurity. The affected communities are facing a severe shortage of food and water, which is putting a strain on their livelihoods and exacerbating malnutrition. The lack of rain has caused severe crop failure in Taita Taveta. In the rain-fed lowlands, most crops, such as maize, beans, green grams, and cowpeas, are in poor condition due to moisture stress. This has led to a significant drop in crop yields, putting a strain on food security. The drought has also had a devastating impact on livestock. The lack of water and pasture has caused livestock deaths, particularly among goats, sheep, and cattle. The weakened livestock are also more susceptible to diseases. The combination of crop failure and livestock losses has led to a significant increase in food insecurity in Taita Taveta. The affected communities are now struggling to meet their basic food needs. Many people in the region rely on agriculture and livestock for their income. The loss of crops and livestock has severely affected their ability to earn a living. The Kenyan government has taken steps to address the drought in Taita Taveta. They have provided food assistance to the affected communities and are working to improve access to water. International organizations such as the United Nations World Food Programme (WFP) and the International Committee of the Red Cross (ICRC) are also providing assistance to the affected communities.

A striking environmental transformation is the swift decline of Kilimanjaro's glaciers and snow cover. Between October 1912 and June 2011, almost 85 percent of the ice cover vanished, and current projections indicate that the majority of the ice will disappear by 2040, with a high likelihood that no ice will persist after 2060.

Melting glaciers

The melting glaciers on Mount Kilimanjaro have significant impacts on the water resources originating in the Kilimanjaro water tower. As the glaciers melt, they contribute to increased water flow in the rivers and streams originating from the mountain. However, this initially increased flow is followed by decreased water availability in the long term as the glaciers continue to shrink. The reduced glacier mass leads to a decline in water storage capacity, affecting the availability of water during dry seasons. This poses challenges for water supply for local communities, agriculture, and hydropower generation downstream. The changes in water availability can also impact the local ecosystems and biodiversity that depend on these water resources. The changes in water flow patterns and sediment transport due to glacier melting can alter the hydrological cycle, affecting downstream water quality and ecosystem dynamics. Overall, glacier melting on Mount Kilimanjaro has far-reaching implications for the water resources originating in the Kilimanjaro water tower, highlighting the vulnerability of this key water source to climate change.

Furthermore, the loss of 'cloud forests' since 1976 has led to a 25% annual reduction in water sources derived from fog. This decline significantly impacts the annual drinking water supply for one million people residing in the slopes of Kilimanjaro.

Fire incidents in Mt. Kilimanjaro

Two types of fires are affecting Mt Kilimanjaro: (i) Forest Fire: Occurs between 1700-2800m above mean sea level, this type of fire has no major effect has it occurs at the zone, which is highly covered by vegetation and evergreen, the fire occurs for a very long time with small scope due to thick green vegetation cover; (ii) Earth Zone Fire: Occurs between 2800-4500m above mean sea level, this area is dominated by the erica vegetation type which is flammable and regenerates after burning. This type of fire is fast and covers a large area with major effects. Fire on Mount Kilimanjaro results from two major causes: burning by local communities for agriculture and hunting. This is common at the Forest Zone, covers small areas but occurs almost every month or 10 times annually. The second type is the fire occurring at the Earth Zone resulting from smoking by the tour guides or visitors, the fire has great impact and occurs at most one-time per year. Some of the effects of fire on the Mount Kilimanjaro include extinction of plant and animal species, change of vegetation cover mostly to shrubs, destruction of tourism infrastructures,

degradation of water sources due to burning and extinction of hydrophilic vegetation and loss of tourism terrane.

The IPCC (Intergovernmental Panel on Climate Change) forecasts for Kenya and Tanzania indicate potential changes in climate patterns and impacts based on various scenarios. These forecasts consider factors such as temperature changes, precipitation patterns, sea-level rise, and extreme weather events. Here are some key projections for Kenya and Tanzania based on IPCC reports:

- Temperature Increase: Both Kenya and Tanzania are likely to experience an overall increase in temperatures. This could lead to heatwaves and changes in thermal conditions across various regions.
- Changes in Precipitation: The IPCC forecasts suggest that there may be changes in precipitation patterns in Kenya and Tanzania. This could result in alterations to the timing and intensity of rainfall, potentially leading to periods of drought or increased rainfall in certain areas.
- Impact on Agriculture: Changes in climate patterns could significantly affect agricultural productivity in both countries. Shifts in rainfall patterns and temperature could impact crop growth, water availability, and food security.
- Water Resources: Changes in precipitation patterns could also have implications for water resources in Kenya and Tanzania. This includes potential changes in freshwater availability, impacting agricultural irrigation, drinking water supply, and hydropower generation.
- Extreme Weather Events: Both countries may experience an increase in extreme weather events such as floods, droughts, and severe storms. These events could have damaging effects on infrastructure, livelihoods, and natural ecosystems.

These cumulative environmental challenges emphasize the pressing need for sustainable management practices and targeted interventions to preserve the ecological balance of the region and ensure the well-being of its inhabitants. Immediate action is crucial to address these environmental changes and develop strategies that foster resilience and sustainability in the face of ongoing environmental shifts.

Fig. 1 Ths Kilimanjaro Aquifer system

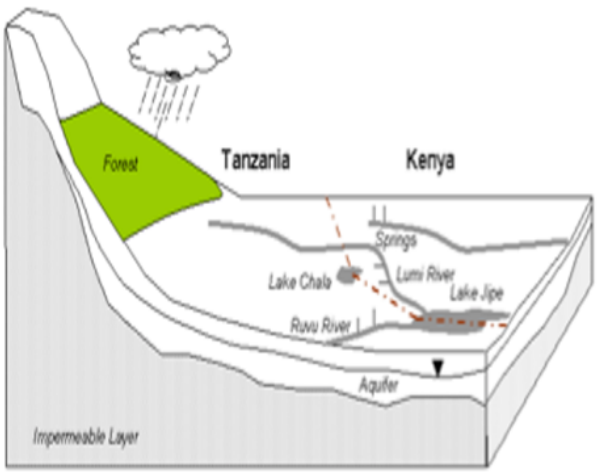


Fig.2 Recharge and discharge areas

The Pangani Basin that is majorly in Tanzania (95%) and extends to Taita-Taveta county (5%) in southeastern Kenya is a critical water tower in East Africa that faces complex water use challenges as it supports diverse needs, including irrigation for agriculture, hydropower generation, domestic water supply, and industrial activities. Additionally, pastoralist groups rely on the basin's water for livestock, adding to the competition for limited resources. The basin's ecosystems and cultural practices also depend on consistent water flows, while climate change exacerbates water scarcity and variability. Managing these competing demands from a transboundary perspective requires careful coordination to ensure sustainable and equitable water distribution among all users.

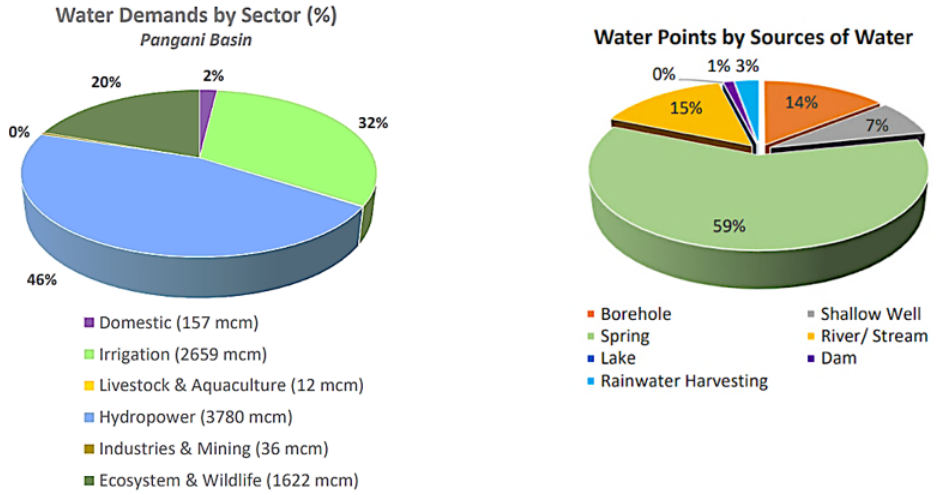
The basin accommodates a population of approximately 2.05 million, with varying growth rates across regions. The Arusha Region experiences a growth rate of 4.0%, the Kilimanjaro Region at 1.6%, and Taita-Taveta in Kenya estimates a growth rate of 1.7%. Migration within the basin is common, with individuals often moving from overpopulated highland areas to the lowlands in search of available land. Despite the perception of significant migration to the lowlands, the overall population increase since the 1988 census has been more pronounced in highland areas, constituting around 90% of the total population. This concentration results in high population densities, reaching up to 900 people per square km on Mount Kilimanjaro, while the dry lowland areas exhibit considerably lower population densities.

The historical economies of the project region have been shaped by distinct environmental conditions. The lowland plains support pastoralists, while the higher areas on Mount Kilimanjaro sustain agriculturalists. In the Kenyan part of the aquifer, characterized by semiarid land unsuitable for rain-fed agriculture, there has been a significant expansion of agriculture in the lowlands over the past 50 years, primarily relying on groundwater. This expansion has led to the settlement of a distinct group of farmers in previously considered unsuitable dry lowlands. Simultaneously, pastoralists have transitioned to crop farming. However, due to the marginal water supply in lowland farmland, these farmers face heightened vulnerability. Population pressure has not only resulted in agricultural expansion but also in its intensification and diversification, presenting a complex interplay of human activities, land use changes, and water resource management in the basin.

The surging demand for groundwater is evident in both Kenya and Tanzania, propelled by the expanding populations in Nairobi and Arusha. This demographic growth is pushing more individuals into the agricultural lands surrounding Mount Kilimanjaro. Groundwater abstraction points, such as springs and shallow wells, serving irrigation and local domestic needs, are predominantly situated in the foothills and plains surrounding Mt. Kilimanjaro. The concentration of these points raises legitimate concerns about the imminent risk of over-abstraction.

In contrast, the considerable groundwater resources potentially housed in the fracture systems within the main volcanic edifice of Mount Kilimanjaro have not undergone a comprehensive assessment. Currently, these resources are only exploited when they naturally emerge as springs. *This untapped groundwater reservoir within the fracture systems represents a substantial and mostly unexplored freshwater source, holding potential for addressing the escalating demands for water in the region. Recognizing and properly evaluating these resources could play a pivotal role in sustainable water management and mitigating the risks associated with over-abstraction in vulnerable areas*.

In Tanzania, the basin, is the second water stress in Tanzania that sees 75% of its residents experiencing significant water scarcity. Irrigated farming is the leading water use covering over 40,000 hectares, using 400 and 480 million cubic metres of water annually (approximately 93%) of the basin's water, contributing to substantial reductions in river discharges. Hydropower, though non-consumptive, captures 51% of surface water resources, supporting three major power stations, which generate 45% of Tanzania’s electricity. In addition, pastoralist groups, whose exact water use is not fully documented, add another layer of demand, historically consuming about 36,400 cubic meters of water daily.



Water demand by sector in the Pangani Basin (Tanzania) based on the Pangani Basin Facts and Figures

Taita Taveta County, located in Kenya, relies on a diverse array of water sources for various uses. The main rivers in the county are the Tsavo, Lumi, and Voi rivers. Several springs serve the local communities that include pastoralist and provide urban water supply for Voit town and Mombasa city. These springs include Mzima Springs, Njukini, Njoro Kubwa, Kitobo, Sanite, Maji Wadeni, Humas Springs, and Lemonya Springs, and are important water supply sources in the county.

The Mzima Springs, strategically situated within Tsavo West National Park near the southwestern base of the Chyulu Hills, serve as a crucial water source for major cities such as Mombasa, Moshi, and Tanga, as well as other coastal towns. Recognizing the increasing demand for water, plans are underway to develop a second pipeline from Mzima Springs to enhance the water supply to coastal towns. Operating in a semi-arid to arid environment, the exact recharge zones of the Mzima Springs remain undefined, with potential recharge areas identified on the Chyulu Hills and, despite being approximately 60km to the west of the springs, also on Mount Kilimanjaro. The planned second pipeline project highlights the strategic importance of Mzima Springs in sustaining water access for significant urban populations and underscores the need for meticulous management and a comprehensive understanding of potential recharge sources to ensure the long-term water security of the region.

Estimated water uses in Taita Taveta county - Kenya

Water Use	Estimated Daily Use (cubic meters)	Primary Sources
Domestic	10,000	Tsavo, Lumi, Voi rivers, Mzima Springs, Njukini, Njoro Kubwa, Kitobo, Sanite, Maji Wadeni, Humas Springs, Lemonya Springs
Agricultural	50,000	Tsavo, Lumi, Voi rivers, various small springs and streams
Livestock	15,000	Tsavo, Lumi, Voi rivers, various small springs and streams
Industrial	5,000	Tsavo and Lumi rivers
Municipal	20,000	Mzima Springs (major supplier to Voi town and Mombasa City)

Source: County Development Plan

The water demand estimates throughout the Pangani basin reported for both Tanzania and Kenya, are underestimated. For instance, additional information from the Mombasa Water Fund has indicated that the current water supply from the catchment areas is at 46,500 m3 per day against the total water demand of 155,840 m3/day in 2022. The future water demand projects beyond the evolving project to expand the water supply by the Water Fund indicate that Mombasa will receive a water supply of 312,309 m3/day against the water demand of 317 715 m3/day, significantly reducing the current deficit. The lack of documented water demand and supply information within the project area makes it challenging to manage the resources. This project will aim to:

- Conduct, as part of the TDA, a comprehensive water demand analysis for major sectors, including agriculture and urban centres, taking into account the latest data from the Mombasa Water Fund and other relevant sources in both Kenya and Tanzania.
- Once the KTAS assessment will be completed, develop water allocation scenarios that balance economic development needs with environmental sustainability, considering the projected increase in water supply and demand.
- Engage with national and local governments to promote water-efficient technologies and practices in agriculture and urban water supply, aiming to reduce the gap between supply and demand.

Besides the complex water needs, the Pangani River Basin exhibits a strong surface water-groundwater interaction, with major lakes such as Chala and Jipe believed to be primarily fed by groundwater. This interaction is crucial during the dry season when surface water availability is drastically reduced, leading to heightened competition for limited water resources. The competition for water in the basin intensifies during the dry season, particularly in the upstream catchments where irrigation is the leading water use. Large-scale irrigation schemes, essential for crops like sugar cane and flowers, consume vast amounts of water, which exacerbates the scarcity faced by other users. This situation is especially critical in border communities where pastoralist communities, who rely on groundwater for livestock, often find themselves in direct conflict with competing demands for water.

This project can play a pivotal role in sustainable conflict management over water use by promoting inclusive and equitable resource management that integrates the needs of all stakeholders, including pastoralist communities. Rather than adopting traditional approaches that often marginalize or attempt to eliminate pastoralism, the project can focus on enhancing water availability and accessibility through improved groundwater extraction and management practices. This can be achieved through collaboration and awareness creation among different water users using existing governance structures in both Tanzania and Kenya such as community Water Users Associations. Additionally, building a solid Grievance Redress Mechanism along with an inclusive stakeholder engagement strategy will further ensure that the needs and concerns of all parties are addressed effectively.

Barriers

The threats to livelihoods, biodiversity, and ecosystems in the Kilimanjaro region arise from a combination of factors, including population growth, increased water demand, and climatic variability. Addressing these challenges requires overcoming several barriers that hinder effective mitigation efforts. The main barriers include:

(i) Rapidly Expanding Water Demands: The Kilimanjaro region is experiencing significantly underestimated and rapidly growing water demands, particularly in the Pangani basin. Current water supply falls far short of total demand, with recent data revealing a substantial gap between available resources and consumption needs. This mismatch poses a critical challenge for sustainable water management and threatens long-term water security. There is an urgent need for comprehensive water demand analysis across major sectors, including agriculture and urban centres, to inform effective allocation strategies.

(ii) Lack of Understanding of Aquifer Characteristics: The potential of groundwater originating in Mt. Kilimanjaro is poorly understood, despite being a critical water source in the region. Comprehensive regional assessments of the aquifer system, including confined aquifers, have not been undertaken. There is a need for a unified body of knowledge regarding the extent and nature of interconnected aquifers, recharge and discharge mechanisms, use rates, and interactions with surface waters. Reliable data is crucial for sustainable development and transboundary cooperation. A Gender analysis will assess how this lack of understanding affects men and women differently. Their perspectives and knowledge should be included in aquifer assessments. Women often play crucial roles in water collection, management, and utilization therefore should be involved in data collection, research, and decision-making processes related to aquifer characteristics.

(iii) Lack of Recharge Enhancement and Protection Measures: The forests of Kilimanjaro constitute a major groundwater recharge zone. Changes in recharge have a transboundary impact on discharge zones in Kenya. The shrinking forest belt negatively affects surface water runoff and groundwater recharge, impacting water availability for the Amboseli ecosystem and surrounding plains. Changes in the forest zone, including the replacement of fog-intercepting forests by low-lying shrubs, have affected runoff and recharge [3]. Encroachment is partly contained because the remaining forest is under protection as part of the Kilimanjaro Forest Reserve and National Park. Gender-Sensitive Approaches: women are often primary users of water resources for household needs and subsistence farming. Design recharge enhancement and protection measures with their needs in mind. Women's Participation: Engage women in forest conservation efforts. Their involvement can contribute to sustainable water management and ecosystem protection.

(iv) Lack of modern groundwater monitoring networks and protocols harmonized at the transboundary level.

Groundwater monitoring in Kenya and Tanzania faces several challenges but has seen some improvements in recent years. In Kenya, the government has made efforts to establish monitoring networks, but coverage remains limited due to factors like funding constraints, inadequate infrastructure, and limited capacity. There is also a lack of standardized approaches and coordination among various institutions involved in

monitoring. In Tanzania, groundwater monitoring is also fragmented and faces challenges such as modern technologies (mainly manual data acquisition), data scarcity, inadequate resources, and limited technical capacity. The country is working towards improving monitoring through initiatives like the National Water Policy and the Water Sector Development Program. Both countries are recognizing the importance of robust groundwater monitoring for sustainable water resource management and are poised to investing in technological solutions like remote sensing and geophysical methods to supplement traditional monitoring practices.

(v) Lack of transboundary coordination and information exchange mechanisms. Transboundary coordination and cooperation are essential to address recharge protection and sustainably manage shared groundwater resources. To date, groundwater extraction is a conflicting issue at the transboundary level only in the context of the local water management problems in the transboundary Lake Chala and Lake Jipe basins. These lakes feature prominently in the irrigation and water planning of Kenya's Taveta District, which is located mainly in the downstream section of the aquifer but in the upstream section of the emanating rivers. This situation is being addressed by the Memorandum of Understanding between Kenya and Tanzania for "The Joint Transboundary Management of Lakes Chala and Jipe, and Umba River Ecosystem", signed on February 14th , 2013, under the auspices and within the framework of the Lake Victoria Basin Commission. The MoU is expected to lead to the establishment of a Joint Cooperative Framework for the "sustainable development and management of the ecosystems of the basins".

(vi) Inadequate Groundwater Governance Frameworks: Groundwater governance frameworks in both countries are not fully equipped to address the challenges facing people and ecosystems dependent on Kilimanjaro Aquifer resources. Hydrogeological knowledge, policies, and tools for monitoring and managing this invisible resource need improvement and harmonization. Basic elements of groundwater governance, such as stakeholder participation, women's empowerment, and engagement of vulnerable communities, are in early stages of implementation despite being recognized by both governments [4].

(vii) Lack of general public and local communities' awareness and knowledge about groundwater potential and vulnerabilities, as well as lack of gender equality.

Threats to the Chala and Jipe lakes

The sustainability of Chala and Jipe lakes in Kenya and Tanzania faces several threats, including pollution from agricultural runoff, deforestation leading to soil erosion, overfishing, invasive species introduction disrupting the ecosystem balance, and water extraction for irrigation and human consumption impacting water levels and quality in the lakes. These threats collectively pose significant challenges to the ecological health and long-term viability of the Chala and Jipe lakes. Specific agricultural practices that contribute to pollution in Chala and Jipe lakes include the heavy use of chemical fertilizers and pesticides, improper disposal of agricultural waste, runoff from livestock farming activities carrying pollutants into the water bodies, and deforestation leading to increased sedimentation and nutrient runoff into the lakes. These agricultural practices have significant ecological consequences on the biodiversity of Chala and Jipe lakes. The use of chemical fertilizers and pesticides can lead to water contamination, harming aquatic organisms and affecting the overall water quality. Runoff from livestock farming introduces excess nutrients into the lakes, causing algal blooms that deplete oxygen levels and harm fish and other aquatic life. Deforestation results in soil erosion and sedimentation in the lakes, impacting habitats and reducing biodiversity. Overall, these agricultural practices contribute to habitat degradation, loss of species diversity, and disruption of the delicate ecological balance in Chala and Jipe lakes.

The proposed project aims to overcome existing barriers and establish conditions conducive to enhancing water security and ensuring the long-term sustainability of the groundwater resources originating in the Kilimanjaro central volcanic edifice.

The incremental nature of the costs covered by the Global Environment Facility (GEF) grant, is justified by several critical factors, namely:

1. This project involves implementing innovative technologies and practices that exceed standard approaches, necessitating additional financial investment.
2. The complexities associated with transboundary water management—where two countries collaborate—require tailored solutions and stakeholder engagement, further driving up costs.
3. The GEF projects aim to foster long-term environmental sustainability, which entails not only immediate expenditures but also ongoing monitoring and capacity-building efforts to ensure effective resource management.

Footnote:

[2] Lake Amboseli too might be dependent on groundwater. Its surface – groundwater interactions willIce be explored
[3] This is partly due to forest fires resulting from burning by local communities for agriculture and hunting.
[4] Kenya has made significant progress toward improving these inequities: its new constitution from 2010 lists access to water and sanitation as a basic human right and mandates equal gender representation in these public sectors. Likewise, the government's Vision 2030 plan recognizes that gender equality will play a critical role in achieving the country's development goals. Despite all this, In Kenya, women in water utilities face barriers in accessing equal employment opportunities throughout their career trajectory. This is due to entrenched social norms, biased hiring processes and limited training and networking opportunities. Accordingly, very few females occupy middle or senior management positions in these utilities.
Tanzania recognizes that realizing gender equality is a necessary step toward attaining sustainable socioeconomic development. The constitution of the United Republic of Tanzania guarantees equality between men and women, and supports their full participation in social, economic and political life. To ensure effective implementation of the Women and Gender Development Policy, a National Strategy for Gender Development (NSGD) to promote gender equality and equity was formulated. However, inequitable gender norms and limited women's autonomy have undermined the participation of women in water-related decisions at the community level.
[5] Focus will be on Tanzania's Pangani Basin Authority and Internal Basin Authority.
[6] GW4R The program fosters cooperation with Ethiopia, Kenya, Somalia, and the Intergovernmental Authority on Development (IGAD), who will work together to

tap into the region's largely untapped groundwater resources to cope with and adapt to drought and other climate stressors impacting their vulnerable borderlands. Djibouti and South Sudan have also expressed interest in joining the program subsequent phases.

B. PROJECT DESCRIPTION

Project description

This section asks for a theory of change as part of a joined-up description of the project as a whole. The project description is expected to cover the key elements of good project design in an integrated way. It is also expected to meet the GEF's policy requirements on gender, stakeholders, private sector, and knowledge management and learning (see section D). This section should be a narrative that reads like a joined-up story and not independent elements that answer the guiding questions contained in the PIF guidance document. (Approximately 3-5 pages) see guidance here

The Kilimanjaro Aquifer System is of volcanic nature as it originates in one of the largest central volcanoes of the world and is mostly made of volcanic rocks, with fracture permeability in the lava sequences and primary porosity in volcanic debris and pyroclastic products in the surrounding foothills and plains. The ability of the local population to cope with climatic extremes, and the health and sustainability of freshwater ecosystems and biodiversity largely depend on the aquifer water resources. Presently, groundwater resources in the Kenya-Tanzania border region are primarily utilized from natural springs and shallow, unconfined aquifers located near the plains surrounding the of Kilimanjaro volcanic edifice. The proposed project is set to enhance access to deeper, so far untapped confined groundwater sources, to improve transboundary cooperation, and establish a conducive environment for effective groundwater governance mechanisms. Such advancements will alleviate current water scarcity challenges in the area, fostering sustainable water management practices and ensuring an expanded and more reliable access to groundwater resources.

PDO level indicators:
Currently, the utilization of KTAS groundwater is restricted to natural springs and shallow, unconfined aquifers present in the subsurface of the plains surrounding the Mt Kilimanjaro volcanic edifice. Through the project, access to deeper, unconfined groundwater resources will increase, easing existing water scarcity pressures, and the enabling conditions for the aquifer sustainable management will be established: definition of, and agreement on the Kilimanjaro Transboundary Aquifer System conceptual model; establishment of harmonized monitoring networks and protocols.

To achieve its objectives and remove the barriers that so far have hindered progress towards environmental sustainability, the project will adopt two blended and mutually reinforcing methodological approaches:

(i) The "TDA – SAP" methodology developed by the GEF International Waters Focal Area. This methodology has been successfully applied in numerous 'foundational' projects with the aim of establishing the necessary conditions for coordinated action in transboundary contexts. The approach involves building trust among countries that share the waterbody, facilitating consensus on cooperation frameworks, and identifying the highest priority actions essential for moving towards long-term sustainability.

(ii) The hydrogeological assessment of the aquifer system. When addressing the challenges associated with an imperceptible resource like groundwater, the initial imperative is to render it perceptible and, consequently, manageable. This involves the creation of a comprehensive three-dimensional reconstruction, often referred to as the 'conceptual model,' elucidating the aquifer system's hydrogeological attributes, water extraction potential, recharge and discharge zones, dependent ecosystems and interactions with surface water, vulnerabilities, and prevailing processes impacting both groundwater quality and quantity. Fluoride

is a major drinking water problem in Arusha including the Pangani Basin. The stakeholders acknowledge both the surface water and groundwater in the region contain significant levels of fluoride that exceed the WHO guideline value of 1.5 mg/L. Specifically, the quality of groundwater in the Pangani basin is very poor due to high fluoride content as a result of natural contamination from surrounding geological environment, leading to dental and skeletal fluorosis among the local population. High values of F- (up to 41.2 mg/l) have been recorded with concentrations ranging from 3.87 to 41.2 mg/l with an average value of 15.7 mg/l. To address the concern about high fluoride levels in groundwater, the project will implement a comprehensive approach to mitigate the health risks associated with high fluoride levels in groundwater and improve overall water quality in the Kilimanjaro Transboundary Aquifer region. This includes:

- Conducting a thorough assessment of fluoride levels throughout the aquifer system to identify areas of concern.
- Developing and implementing a community awareness program to educate local populations about fluoride-related health risks and available water treatment options.
- Incorporating fluoride removal technologies into pilot interventions for water supply systems, ensuring safer drinking water for affected communities. The project can leverage on ongoing initiatives such as the "A Fluoride Treatment Technology Project" being implemented within Arusha (part of Pangani Basin".

The Nano Filer Technology project is one of the initiatives being undertaken to address the fluoride challenges in Arusha city as a pilot project to be upscaled in other areas, including the Pangani Basin. This project is developed in the framework of the Government of Korea funded UNESCO Project titled "Sustainable Water Security for Human Settlements in Developing Countries under Climate Change". It is the USD 3 million project implemented in 20 developing countries 10 in Asia and 10 Africa for the period of 10 years from 2020 by selecting 2 implementing countries annually. The project is scheduled for 12 months from September 2024 to September 2025 with the cost of $150,000. The project aims to support Member States' water security in the changing climate. The project includes piloting model studies and strengthening human resources capacity on the methodology used to continue the process even after UNESCO's support is completed.

Upon securing a robust understanding of the aquifer's functionality and potentialities, the project will aim to enhance overall water security in the Kilimanjaro region. This involves the mechanical exploration of hitherto untapped deeper confined and fractured aquifers that will likely be revealed by the comprehensive assessment, and mitigation of key factors jeopardizing the long-term sustainability of this invaluable resource, such as the degradation of the Kilimanjaro cloud forests, where the aquifer main recharge occurs. The project design recognizes the intricate interconnections between local livelihoods, established land and water use practices, evolving patterns, and the susceptibilities of groundwater resources to contamination and overexploitation. Additionally, it takes into account the vital ecosystem services provided by groundwater-dependent ecosystems. All of these challenges unfold within a context characterized by transboundary implications and the unpredictable impacts of climate change.

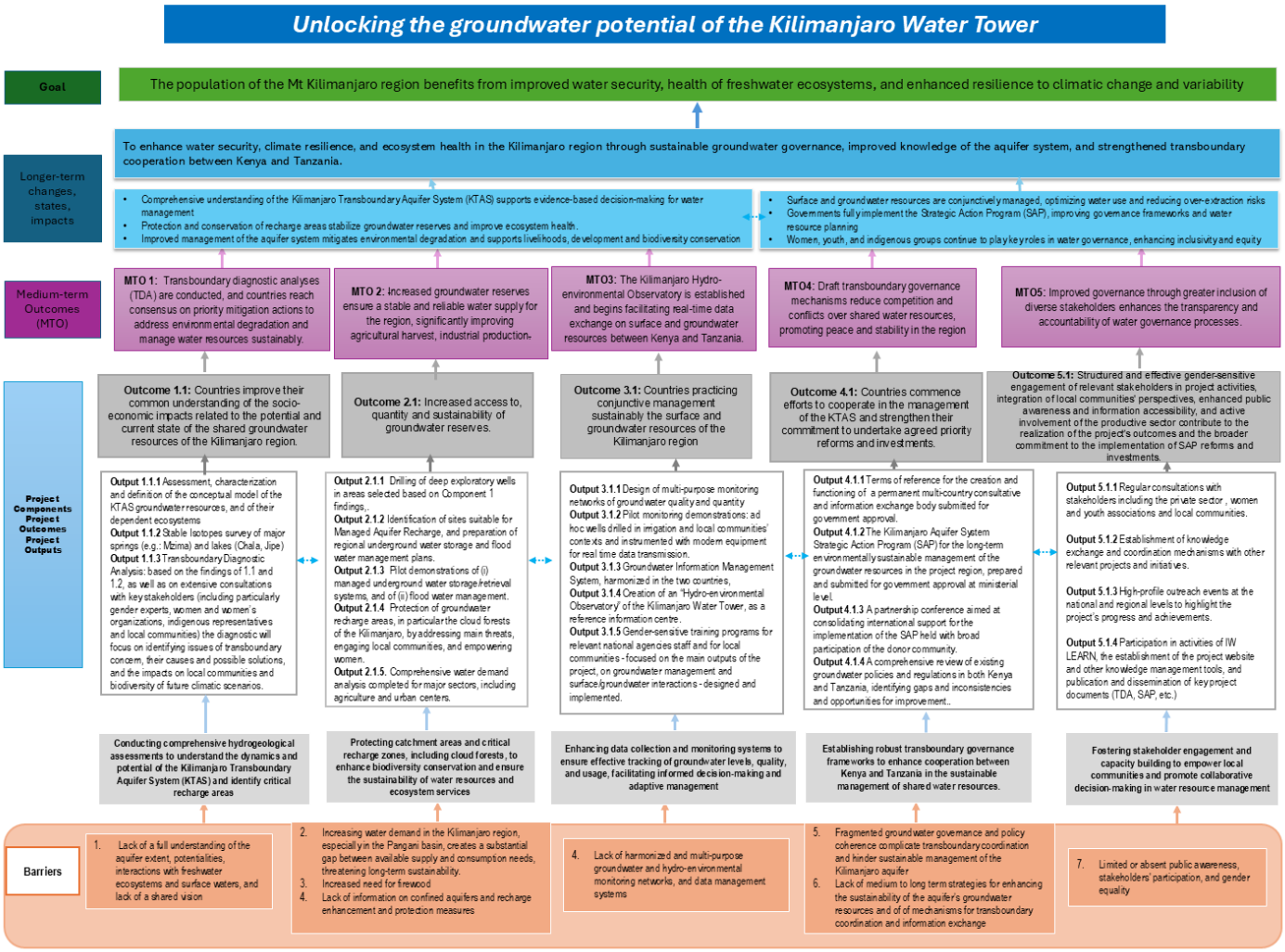
This comprehensive strategy, proven successful in various International Waters projects dealing with aquifers, stands in contrast to fragmented interventions that target specific concerns or entail uncontrolled aquifer exploitation without an overarching assessment of functionality and abstraction potential. The anticipations are that, by fostering trust, expanding knowledge, and involving stakeholders in the decision-making process, the project outcomes will lay a sturdy foundation for sustained transboundary action. This approach aligns with the principles of building consensus and ensuring the longevity of project impacts.

The Theory of Change that underlies the project design is built on the premise that if:

(i) Countries agree on the conceptual model of the aquifer and recognize the threats to its sustainability (Aligned with Assumptions A1, A5, and Drivers D1, D3);

(ii) The conceptual model unveils previously unexplored groundwater resources and is verified through comprehensive assessment and exploratory drilling, enhancing understanding of aquifer potential and recharge zones (Aligned with Assumptions A5, A6 and Drivers D2, D4);
(iii) Countries are provided with modern monitoring tools, training, and capacity-building support to sustainably manage surface and groundwater resources conjunctively (Aligned with Assumptions A2, A6, and Drivers D3, D4);
(iv) Transboundary cooperation mechanisms are strengthened to ensure long-term shared management of the aquifer (Aligned with Assumptions A1, A3, and Drivers D1, D6).
(v) Countries reach agreements and commit to implementing key reforms and investments needed to reverse degradation trends and enhance water security and climate resilience (Aligned with Assumptions A4, A5 and Drivers D2, D5).

Then, the population of the Kilimanjaro transboundary region will experience benefits such as improved water security, enhanced health of freshwater ecosystems, and increased resilience to climate change and variability.



Simplified set of key assumptions and drivers

Assumptions

A1. The governments of Kenya and Tanzania remain committed to transboundary cooperation and the implementation of shared water governance frameworks
A2. Local communities, private sector, and civil society actively participate in project activities and support sustainable water management practices
A3. Adequate funding and resources are available throughout the project's lifecycle from both international donors and national governments and entities (public or private)
A4. Climate conditions remain within predictable ranges, allowing the project to implement water management and recharge strategies effectively
A5. Necessary data on groundwater resources, land use, and climate patterns are accessible, reliable and statistically significant for conducting comprehensive assessments and planning
A6. National and local water management institutions possess the necessary capacity and expertise to implement and sustain the project's initiatives effectively or gain it within the project's lifetime

Drivers

D1. Existing frameworks and agreements, such as the East African Community (EAC) protocols and the Nile Basin Initiative, LVBC, other bilateral agreements that promote collaboration and sustainable management of shared water resources
D2. Growing populations in Kenya and Tanzania lead to heightened demand for water resources, creating urgency for sustainable groundwater management solutions.
D3. Heightened awareness of climate change impacts on water resources encourages stakeholders to adopt resilient water management practices and prioritize aquifer protection
D4. Innovations in groundwater monitoring and data management technologies facilitate more effective assessment and management of aquifer resources
D5. Commitment to the SDGs, particularly Goal 6 (Clean Water and Sanitation) and Goal 13 (Climate Action), drives initiatives aimed at improving water governance and resilience in the region.
D6. Increased recognition of the importance of involving local communities and marginalized groups in water management decisions enhances collaborative efforts and local ownership of the resources

Project Components and activities

Component 1: Groundwater assessment: making the invisible visible

Outcome 1.1: Countries improve their common understanding of the socio-economic impacts related to the potential and current state of the shared groundwater resources of the Kilimanjaro region.
Indicator 1: Assessment of the Hydrogeology of the Kilimanjaro Aquifer System and dependent ecosystems successfully conducted with the participation of experts from the beneficiary countries.
Indicator 2: Countries agreement on TDA findings and recommendations.

The project initiation will commence with the formation of a collaborative team of Kenyan and Tanzanian experts, supported by the project PMU and international experts. This multidisciplinary team will undertake the development of a scientifically grounded comprehensive assessment and conceptual model of the groundwater resources originating from Mount Kilimanjaro, as well as a Diagnostic Analysis focused on identifying issues of transboundary concern related to groundwater and surface water uses, their underlying causes, and potential solutions. The methodology applied will align with the 'Level 2 GEF TWAP Transboundary Aquifers Assessment Methodology' framework. This comprehensive study will not only draw from existing relevant information and data but will also involve additional elements such as volcanological surveys, geophysical surveys (resistivity soundings, and possibly gravimetry), satellite data analysis, hydro and gas geochemistry and stable environmental and water isotopes surveys in the Mzima Springs area – a critical water source for Mombasa. The assessment will extend to explore the feasibility of exploiting the deeper confined aquifers possibly present in the subsurface of the plains surrounding the Kilimanjaro edifice (down to 500m depth), and of the groundwater resources contained within the fracture systems of the main volcanic edifice, incorporating advanced techniques like directional drilling [7].

Stakeholder engagement will be based on a thorough stakeholder analysis that will map and characterize specific attributes and needs of each relevant group, therefore informing appropriate and inclusive participation strategies. Key aspects of the Diagnostic Analysis will encompass the protection of recharge areas through reforestation, the dynamics of surface and groundwater interactions, climate change projections, integration of indigenous knowledge, the role of women in water management, conflicts related to water nexus, mitigation of fertilizer-related pollution, exploration of options for the conjunctive surface and groundwater management, the identification of areas suitable for Managed Aquifer Recharge, and the development of Water Allocation Plans for the Kilimanjaro aquifer.

In terms of Knowledge Management (KM) the project aims to establish and share knowledge about the characteristics and functioning of the KTAS. This knowledge will be documented in the Conceptual Model of the aquifer system, which will be agreed upon and adopted by the beneficiary countries under Component 1. Table B integrates several KM elements in outcomes and outputs of component 1.

Component 2: Expanding groundwater resources, and enhancing underground storage capacity

Outcome 2.1: Increased access to, quantity and sustainability of groundwater reserves.
Indicator 3: Drilling campaign results expand the groundwater resource base.
Indicator 4: Plan for underground water storage and flood management submitted for adoption by governments.
Indicator 5: Cloud forests protection system in place and operational.
Indicator 6: Comprehensive water demand analysis completed for major sectors, including agriculture and urban centers.

Based on the findings of Component 1, the PMU will organize and lead four main lines of action:

1) A detailed water demand analysis will be conducted across major sectors (domestic, livestock, irrigation, industrial, hydropower etc., within the project area. This analysis will utilize the latest data from the local water management authorities and water users. The data will be used to develop water demand allocation scenarios that balance economic development needs with environmental sustainability, considering the projected increase in water supply and demand. The purpose is to develop a comprehensive understanding of water demands to inform sustainable allocation strategies and address the growing gap between water supply and consumption needs in the region.

2) Deep exploratory wells will be strategically sited and drilled in targeted locations within the volcanic edifice and surrounding plains to assess the presence and quality of confined aquifers at depths that are economically feasible. In areas characterized by predominantly fractured volcanic formations, directional drilling techniques will be explored. The purpose is to ascertain the presence of confined aquifers so far unexploited that could help countries to respond to the growing water needs for domestic and agricultural uses.

3) Promoting conjunctive surface and groundwater management: Identification of sites suitable for Managed Aquifer Recharge, and preparation of regional underground water storage and flood water management plans; Pilot demonstrations of (i) managed underground water storage/retrieval systems, and/or of (ii) flood water management through nature-based solutions. The sites chosen for the pilot demonstrations of infiltration schemes will be determined by the results of the aquifer assessment conducted in Component 1. At this stage, it is not possible to predict the impacts of these pilot projects in terms of water storage capacity and flood mitigation [8]. However, it is anticipated that these pilot initiatives will facilitate the formulation and implementation of regional plans under the same component. By leveraging the insights gained from the pilot demonstrations, the development and adoption of regional plans will be streamlined, setting the stage for more effective and informed decision-making processes.

The project will explore initiatives to foster collaboration between different water management entities, promote a holistic approach to water resource management, and ensure that groundwater considerations are fully integrated into existing surface water governance mechanisms. As a result, some of the activities to be implemented include:

- Establishing a joint working group comprising representatives from both groundwater and surface water management authorities.

- Develop an integrated water resources management (IWRM) framework that explicitly addresses conjunctive use of surface and groundwater.
- Carrying out capacity-building workshops on conjunctive water management for relevant stakeholders.
- In addition, the project also acknowledges the mechanism established in the Pangani River Basin Management project that can be enhanced to include the conjunctive use of groundwater and surface water.

ASR and MAR are nature-based solutions

The primary goal of aquifer storage and recovery (ASR) is to address imbalances between water supply and demand, particularly during drought periods. ASR involves storing water in a suitable aquifer through a well when water is abundant, then recovering it from the same well when needed. Managed aquifer recharge (MAR) shares similarities with ASR but focuses on supplementing natural groundwater recharge patterns, primarily from rain and snow. Unlike ASR, MAR does not involve storage and subsequent recovery. Managed Aquifer Recharge (MAR) provides an integrated solution that allows aquifer storage with flood waters to complement surface water storage.

3) Reforestation of the KTAS major groundwater recharge areas, in particular the cloud forests of the Kilimanjaro. The cloud forests in Mount Kilimanjaro face various threats, including:

- Deforestation: The stakeholder consultations have informed that the major causes of deforestation are illegal logging and land clearance for agriculture, infrastructure development, and human settlement contribute to the loss of cloud forest cover.
- Climate Change: Rising temperatures and altered precipitation patterns impact cloud forest ecosystems, affecting plant and animal species adapted to specific climatic conditions.
- Fire: Uncontrolled fires, often caused by human activities such as slash-and-burn agriculture or accidental ignition, can rapidly destroy large areas of cloud forest habitat.
- Invasive Species: Introduced plant species can outcompete native vegetation, leading to habitat degradation and loss of biodiversity in cloud forest ecosystems.
- Fragmentation: Fragmentation of cloud forest habitats due to human activities such as road construction or agricultural expansion disrupts ecological connectivity and reduces habitat quality for many species.
- Tourism Pressure: High levels of tourism activity, if not managed sustainably, can result in habitat disturbance, soil erosion, and pollution in cloud forest areas.

The cloud forest protection system will tackle the underlying causes of degradation by building on experience gained through several successful conservation projects in the Cloud Forests of Mt Kilimanjaro and similar regions and implementing a range of coordinated strategies. These include:

(i) Installing fire alarm and control systems to prevent and manage forest fires effectively.

(ii) Establishing nurseries to cultivate indigenous trees, promoting reforestation and biodiversity conservation.

(iii) Introducing economic incentives to incentivize local communities to actively engage in forest preservation efforts.

(iv) Conducting awareness campaigns to educate and engage local communities on the importance of forest conservation and sustainable land management practices.

The project will also explore other viable interventions based on the outcomes of the PPG phase focusing on critical assessment and evaluation of leading causes of deforestation, in consideration of specific geographic contexts. By employing these simultaneous and complementary approaches, the cloud forest protection system aims to address the multifaceted challenges facing the region's delicate ecosystems, promoting long-term sustainability and biodiversity preservation. It is expected that upon project completion, at least 40% of the cloud forest total surface of 1,775 sq Kms will be under protection measures (71,000 ha). Furthermore, implementation of these interventions will contribute to Sustainable Land Management (SLM) initiatives in Tanzania that aims to restore highly degraded areas in Pangani Basin by up to 50% by 2032.

Indigenous communities and women play a crucial role in protecting Cloud Forests due to their intimate knowledge of the local ecosystems, sustainable land use practices, and cultural connections to the environment. Collaborating with them, respecting their knowledge and rights, and engaging them as active participants in conservation efforts fosters effective partnerships and promotes shared stewardship of Cloud Forests. The Mombasa Water Fund has been involving the Maasai communities in tree planting activities within the Chyulu Hills, a catchment area for the Mzima springs in Taita Taveta county, under a public –private partnership for conserving watershed for nature, water, and people. Involving indigenous perspectives in decision-making processes can lead to more holistic and sustainable conservation outcomes. Overall, recognizing and supporting the role of indigenous communities and women in protecting Cloud Forests is essential for promoting conservation efforts that are inclusive, sustainable, and effective in safeguarding these critical ecosystems for future generations.

Lessons learned from indigenous communities:

Indigenous communities in Kenya and Tanzania, such as the Ogiek, Maasai, and Hadza, have preserved biodiversity and adapted to climate challenges through their rich cultural knowledge. Their sustainable practices in land restoration, wildlife management, and resource conservation offer valuable insights for addressing environmental challenges while maintaining harmony with nature.

The Maasai, who inhabit the arid and semi-arid lands (ASALs) across southern Kenya and northern Tanzania, have used their indigenous knowledge to coexist with local flora and fauna. As pastoralists, the Maasai's livestock-based livelihood aligns with the natural behavior of wildlife, reducing conflict between them and wild animals. Understanding that the wildlife mating season occurs annually between May and July—when animals can be more aggressive—the Maasai keep their distance, allowing the animals to reproduce in peace. In these ASALs, trees and shrubs provide medicinal value for both humans and livestock. The Maasai avoid cutting down trees and instead use sticks, dried branches, and bark for various purposes, including building traditional huts known as 'enkang' and for cooking. Species such as Acacia nilotica, Albizia anthelmintica, Warburgia ugandensis, and Solanum incanum are especially protected due to their medicinal properties. Culturally, the Maasai believe that cutting down trees brings curses and can lead to poverty by disrupting the food chain for both domestic animals and wildlife. They also perform cultural rituals and sacrifices beneath the sacred Ficus thonningii (Mugumo tree). During conflicts, the Maasai preserve the sandpaper tree, known locally as 'Oseki',

a symbol of peace. In unresolved disputes, a branch of 'Oseki' is placed between warring parties as a gesture of reconciliation.

The Maasai have continued to manage water sources such as springs, streams and rivers for livestock and wildlife watering purposes. The decision on water source management and use is determined by a male elder because the Maasai are patriarchal. The Maasai are residing in UNESCO-designated Biosphere Reserves of Amboseli and Lake Manyara under ongoing initiatives.
In Kenya, the Ogiek community, who live in forested areas, plant specific species like Carissa spinarum, Plectranthus barbatus, and Caesalpinia decapetala to restore degraded land and attract bees. These plants are also vital for soil stabilization, erosion control, and managing surface water runoff, particularly in the hilly regions where the Ogiek reside. The Ogiek traditionally manages water resources through protecting water catchment areas, using natural springs, and employing rotational grazing near water sources to prevent overuse.

In northern Tanzania, the Hadza people, a protected hunter-gatherer group, have long contributed to the conservation of the rich biodiversity and natural systems they have lived alongside for millennia. They rely on wild animals and plants for food and medicine. The baobab tree, for instance, plays a crucial role in the Hadza's diet, with its fruit constituting about a third of their nutrition. The baobab trees also conceal beehives that provide honey, another important food source. Like the Maasai, the Hadza do not kill animals for sport, instead hunting only older wildlife, such as the dik-dik, for meat. They are skilled in determining the age of animals and focus on hunting the elderly. Their diet includes meat, tubers, baobab fruit, berries, and honey, varying by season. During the dry season, animals gather at a few water sources, making it easier for hunters to procure meat from large prey such as antelope, monkeys, and bush pigs. In the rainy season, the Hadza rely more on plant-based food. They traditionally manage water resources by tapping into seasonal waterholes and relying on natural springs. The elders inform the community that a certain spring has been overused and they should move to another spring to avoid over-extraction. They also share water sources with wildlife. The Hadza community reside in UNESCO designated Geopark called Ngorongoro Lengai Geopark

In addition to the valuable lessons from the Maasai, the project also draws from other indigenous communities such as the Ogiek in Kenya and the Hadza in northern Tanzania. The Ogiek's practices of land restoration through planting species like Carissa spinarum and managing water catchment areas offer insights into sustainable land and water management. Similarly, the Hadza, a protected hunter-gatherer community, demonstrate how traditional knowledge can support biodiversity conservation and sustainable use of natural resources, as seen through their dietary reliance on the baobab tree and sustainable hunting practices. The project will further explore these practices during the PPG phase, aiming to incorporate indigenous knowledge into ecosystem restoration, water resource management, and climate resilience strategies. These insights will enhance the project's ability to address environmental challenges in a culturally sensitive and sustainable manner. Additionally, partnerships with initiatives like the Mombasa Water Fund will be leveraged to enhance community-driven efforts in safeguarding water resources and promoting sustainable livelihoods.

Successful conservation projects in cloud forests

1. Agroforestry Projects focused on promoting sustainable agroforestry practices among local communities living around the Kilimanjaro region. By integrating trees into agricultural landscapes, farmers can improve soil fertility, reduce erosion, enhance water retention, and provide habitat for wildlife,

contributing to the preservation of the Cloud Forest ecosystem.
2. Community-Based Ecotourism Initiatives: Community-based ecotourism projects empower local communities to benefit from tourism while preserving the Cloud Forests. By offering guided tours, homestays, and artisanal products, communities can generate income, raising awareness about the importance of conservation and incentivizing the protection of these habitats.
3. Forest Landscape Restoration Programs: Initiatives focused on restoring degraded areas within the Cloud Forests through tree planting, habitat restoration, and invasive species management have been successful in reviving biodiversity, enhancing ecosystem services, and improving the resilience of these ecosystems to climate change.
4. Protected Area Management: Establishing and effectively managing protected areas within the Cloud Forests have been instrumental in conserving key habitats, regulating human activities, and safeguarding biodiversity. Strict enforcement of regulations, community involvement, and monitoring programs are essential components of successful protected area management.
5. Research and Monitoring Projects: Scientific research and monitoring initiatives play a crucial role in understanding the ecology, dynamics, and threats facing Cloud Forest ecosystems. By collecting data on species distribution, habitat quality, and environmental changes, conservationists can develop evidence-based conservation strategies and adaptive management plans.
These successful conservation methods demonstrate the importance of integrating scientific knowledge, community engagement, sustainable practices, and effective governance in protecting and restoring Cloud Forests for the benefit of both wildlife and local communities.

Component 3 Establishing essential groundwater management tools

Outcome 3.1: Countries practicing conjunctive management sustainably the surface and groundwater resources of the Kilimanjaro region.
Indicator 7: Design of groundwater monitoring networks agreed upon by Countries.

Outcome 3.2: Increased capacity of national water managers and local communities to conjunctively manage surface and groundwater.
Indicator 8: The Kilimanjaro Hydro -environmental Observatory established and operational.
Indicator 9: At least 200 gender balanced national agencies staff and local communities' representatives participate to training programs.

The emphasis of the Component is on establishing an enabling environment for the sustainable management of groundwater conjunctively in watershed contexts. This indicates a strategic focus on facilitating the conditions and mechanisms necessary to support the effective implementation of integrated groundwater management practices within the broader framework of watershed management. Creating an enabling environment typically involves, as part of providing tools and technical capacity, addressing institutional, policy, regulatory, and capacity-related aspects to ensure that stakeholders have the necessary support, tools, and frameworks to successfully adopt and implement sustainable groundwater management strategies. In the context of watershed management, this approach recognizes the interconnected nature of surface water and groundwater resources and aims to encourage coordinated and holistic approaches that optimize water use and support ecosystem health.

As part of Component 3, the project aims to equip both national and local entities in the countries involved with the necessary tools and capacities for the sustainable management of their groundwater resources. The project will implement a two-pronged approach:

1. Introduction of Modern Groundwater Monitoring Networks and Protocols. This involves:

   - Designing multi-purpose monitoring networks for groundwater quality and quantity. These designs will be based on agreed-upon equipment, methodologies, indicators, and protocols between the two countries.
   - Conducting pilot monitoring demonstrations, involving the drilling of ad hoc wells in irrigation and local communities' contexts. These wells will be instrumented with modern equipment for real-time data transmission.
   - Establishing a Groundwater Information Management System harmonized between the two countries. This system will enable the storage, retrieval, processing, and visualization of groundwater data and information.
   - Creating a 'Hydro-environmental Observatory' of the Kilimanjaro Water Tower. Establishing this Observatory is paramount. The observatory will serve as a centralized hub for historical and current data on the KTAS region, hosting a digital information system encompassing maps, hydrometeorological data, biodiversity, climate change, and more. It will act as a reference center, facilitating the flow and analysis of information on critical issues related to surface and groundwater in the Kilimanjaro region. The observatory will involve contributions from the governmental institutions (see box below), and the technical and scientific communities, ensuring a collaborative approach to water security initiatives. It will receive data from national monitoring networks, harmonizing technology and protocols at the transboundary level. Additionally, the project will support the harmonization of national networks, fill gaps in existing networks, enhance monitoring capacities, introduce real-time data transmission, and provide training for technical personnel operating the observatory.

Key governmental institutions responsible for hydrological and environmental monitoring, data collection, analysis, and information dissemination

Kenya

- Regional Water Resource Authorities: Various regional water resource authorities at the basin level are responsible for hydrological monitoring and management within specific river basins in Kenya. Tanzania
- Ministry of Water and Sanitation: The ministry is responsible for water resources management, including hydrological monitoring, water quality assessment.
- Water Resources Authority (WRA): WRA is tasked with regulating and managing water resources in Kenya, including monitoring and assessing water availability, allocation, and use.
- Kenya Meteorological Department (KMD): KMD is responsible for weather forecasting, climate monitoring, and provision of meteorological information, including rainfall data crucial for hydrological monitoring.
  National Environment Management Authority (NEMA): NEMA oversees environmental monitoring, assessment, and compliance with environmental regulations in Kenya, including aspects related to water quality and environmental impact assessments.
- Ministry of Water and Irrigation: The ministry oversees water resources management and development in Tanzania, including hydrological monitoring, water allocation, and infrastructure planning.

Tanzania

- Meteorological Authority (TMA): TMA is responsible for weather forecasting, climate monitoring, and provision of meteorological data essential for hydrological assessments.
- Tanzania Hydrology and Meteorology Institute (TMA): The institute conducts research, provides training, and supports hydrological and meteorological monitoring programs in Tanzania.
- National Environmental Management Council (NEMC): NEMC is responsible for coordinating environmental management, conducting environmental impact assessments, and monitoring environmental compliance in Tanzania.
- Basin Water Boards: Tanzania has several basin water boards responsible for water resources management at the basin level, including hydrological monitoring, water allocation, and addressing water-related challenges within specific basins.

2. Implement a Capacity Reinforcement Program:

This initiative will focus on strengthening the capabilities of relevant national agencies and local communities in the Kilimanjaro region, with a specific emphasis on promoting gender equality and empowering women. The program will include on-site training courses and a selection of fellowships for advanced university degrees in hydrogeology, tailored specifically for volcanic areas. The training will cover topics such as groundwater vulnerability mapping, Managed Aquifer Recharge (MAR) as a climate mitigation measure, International Water Law principles, and global experiences from key directives, conventions, and guidelines. Land and water administrators will have access to a crucial management tool: a harmonized groundwater information management system spanning both countries. This system will facilitate the storage, retrieval, processing, visualization, and display of groundwater data and information.

In terms of Knowledge Management (KM) the Table B integrates several KM elements in outcomes and outputs of component 3. The project will set parameters and protocols for monitoring the evolution of the KTAS over time, including trends in quantity and quality (Component 3). All groundwater data will be centralized and shared through a Groundwater Information Management System (output 3.1.3) accessible to both countries.

Additionally, this data will be utilized in the Hydro-environmental Observatory of the Kilimanjaro Water Tower (output 3.1.4).

Component 4 Strengthening transboundary cooperation and groundwater management capacity

Outcome 4.1: Countries commence efforts to cooperate in the management of the KTAS and strengthen their commitment to undertake agreed priority reforms and investments.
Indicator 10 ToRs of consultation mechanism submitted to governments for approval.
Indicator 11 The SAP endorsed at ministerial level.
Indicator 12 Strengthened national and local groundwater governance in both countries.

Following the completion of Component 1 and based on its results, Component 4 of the project will facilitate dialogue between technical experts and inter-ministerial representatives of the two countries and other key stakeholders (e.g.: the private sector, civil society). The importance and effectiveness of intersectoral committees in promoting collaborative water management approaches, fostering stakeholder engagement, and addressing complex water challenges through coordinated efforts across different sectors and jurisdictions, cannot be underestimated. To establish such a Committee - that will be active throughout the project duration - the project will follow a structured methodology: (i) Stakeholder Mapping: Identify key stakeholders from relevant sectors such as government agencies, private sector, civil society organizations, and local communities involved in water management; (ii) Needs Assessment: Conduct a needs assessment to understand the current water management challenges, priorities, and gaps that require intersectoral collaboration; (iii) Objective Setting: Define the objectives and scope of the intersectoral committees, outlining the goals and expected outcomes of the collaborative water management efforts; (iv) Committee Structure: Establish a clear organizational structure for the intersectoral committees, including defining roles, responsibilities, and decision-making processes.

The aim of the Component is to reach an agreement on the creation and functioning of a permanent transboundary consultation body of the Kilimanjaro Transboundary Aquifer System, and a Strategic Action Program (SAP) to be implemented in the short term. The SAP will focus on the policy and legislative reforms, including the establishment of integrated water governance mechanisms to facilitate conjunctive surface and groundwater management within watershed contexts, and the investments needed to improve water quality and quantity, climate resilience, and environmental sustainability in the Kilimanjaro region, addressing key aspects such as the protection of groundwater recharge areas (cloud forests) in Mt Kilimanjaro, the exploitation of deep confined groundwater resources, the management of shared lakes and other freshwater ecosystems, and the consolidation of joint management mechanisms and tools.
Gender mainstreaming is essential for ensuring equitable and sustainable water resource management recognizing the diverse roles, needs, and vulnerabilities of women and men. The project will seek to amplify women's voices in shaping policies and actions related to the management of the the Kilimanjaro Transboundary Aquifer System (KTAS) through gender-responsive consultations across sectors and disciplines, involvement of civil society and indigenous women in joint management discussions, gender-balanced representation in the agreed transboundary frameworks, among others.
The SAP will prioritize nature-based solutions benefitting both genders, and consider the creation of financial mechanisms such as the Water Funds, the feasibility of which will be assessed during PPG.

Water Funds - Given the transboundary nature of the Kilimanjaro Aquifer, the presence of the Mombasa Water Fund on the Kenyan side presents a unique opportunity to develop a collaborative, cross-border Water Fund initiative that addresses shared water challenges in both Kenya and Tanzania. A water fund is a multi-stakeholder entity with discrete funding, governance and management mechanisms that promotes and implements land restoration, conservation and improved management practices to prevent water problems at the source, while also providing a number of co-benefits to both upstream and downstream communities. Typically involve collaboration between various stakeholders, including government agencies, non-

governmental organizations (NGOs), local communities, and private sector entities. The primary goal of Water Funds is to secure water resources, protect ecosystems, and ensure a sustainable water supply for both people and nature.

The proposed Kilimanjaro Transboundary Aquifer project will significantly benefit from the alignment with the Mombasa Water Fund, which is actively engaged in catchment conservation activities in the Chyulu Hills, a vital groundwater recharge zone supplying 30% of Mombasa's water through the Mzima Springs. The Water Fund's involvement can enhance the sustainability of project activities beyond the initial funding cycle by leveraging its existing partnerships with regional stakeholders, including the Ministry of Environment, and coordinating water supply initiatives. Furthermore, the Water Fund's experience in engaging local communities, such as the Maasai, in implementing Nature-Based Solutions (NBS) will be crucial in addressing issues like deforestation and sustainable land management within the Kilimanjaro project area. Their approach of providing alternative livelihoods, such as fruit tree planting, reduces reliance on wood and charcoal, thus protecting key catchment areas.

Key features of Water Funds include:

- Multi-Stakeholder Collaboration: Water Funds bring together diverse stakeholders to collectively address water challenges. This collaboration often includes government agencies, NGOs, local communities, businesses, and other relevant actors.
- Financial Investments: The funds mobilize financial resources from different stakeholders to invest in projects and initiatives aimed at improving water management. These projects may include reforestation, soil conservation, watershed protection, and infrastructure development.
- Ecosystem Conservation: Water Funds often focus on protecting and restoring ecosystems, such as forests and watersheds, as a means of safeguarding water quality and quantity. Healthy ecosystems play a crucial role in regulating water flow, preventing erosion, and maintaining overall watershed health.
- Payment for Ecosystem Services (PES): Some Water Funds incorporate the concept of Payment for Ecosystem Services, where downstream beneficiaries, such as municipalities or industries, contribute funds to upstream landowners or communities in exchange for maintaining or improving land practices that benefit water quality and availability.
- Community Engagement: Successful Water Funds involve local communities in decision-making processes and project implementation. This ensures that interventions are culturally sensitive, socially inclusive, and sustainable in the long term.
- Risk Reduction: By addressing water-related challenges at the source, Water Funds contribute to reducing the risks associated with water scarcity, poor water quality, and natural disasters.

Overall, Water Funds provide a mechanism for sustainable and integrated water resource management, promoting the conservation of ecosystems while meeting the water needs of both human and natural systems. Many Water Funds operate at the watershed level, recognizing the interconnectedness of upstream and downstream areas in the provision of water services.

To ensure long-term sustainability and protection of critical upstream recharge areas, including the cloud forest, the project will design and pilot sustainable financing schemes. These schemes will involve:

- Developing payment for ecosystem services (PES) mechanisms to incentivize conservation efforts by local communities.
- Establishing a dedicated conservation fund supported by water users and other basin-wide stakeholders.

- Implementing participatory forest management programs to engage local communities in conservation efforts.
- Creating guidelines for sustainable land use practices in critical recharge zones

The project will leverage on existing water funds to enhance this initiative. As a result, the project recognizes the Mombasa Water Fund (MWF) as a key partner in the implementation of the conservation and catchment protection activities. UNESCO is currently exploring strategies for collaboration with the MWF on the implementation of activities within the areas of synergies such as the catchment conservation initiatives with the indigenous communities. Furthermore, the MWF has proposed possible co-financing in a ratio of 1:1 up to one million USD. Based on the availability of funds for the project, FAO and UNESCO are considering a small allocation to the Water Fund towards the implementation of activities explored and agreed upon with the MWF during the PPG phase. In addition, we expect to include the lessons learned by the MWF through the involvement of the indigenous communities, particularly the Maasai in the catchment conservation activities in the project design. This approach will ensure that traditional ecological knowledge and sustainable practices of the Maasai are integrated into our conservation strategies, enhancing the project's effectiveness and cultural relevance.

Once technically cleared, the SAP will be submitted to the governments for adoption at the ministerial level. This collaborative process ensures that the SAP aligns with the shared vision and goals of both countries, promoting joint efforts in achieving sustainable and effective water resource management in the Kilimanjaro region.

A partnership conference will be organized to consolidate international support for the SAP's implementation, with broad participation from the development assistance community and International Financial Institutions (IFIs).

In parallel with the aforementioned activities, Component 4 will also concentrate on two critical products:

(i) The development of Terms of Reference for the creation and functioning of a permanent and operational multi-country consultative body of the Kilimanjaro Transboundary Aquifer and its dependent freshwater ecosystems (Lake Chala and Lake Jipe). This will be done by a joint expert group with the support of the Project Management Unit (PMU) and built on the Joint Memorandum of Understanding (MoU) on Lakes Jipe and Chala. The resulting document will be submitted for government approval. Tasks of this bilateral body will include:

- Periodic Transboundary Environmental Impact Assessments to prevent, control, and reduce any transboundary impacts and understand the groundwater flow regime. This involves monitoring activities.
- Equitable and reasonable utilization of the groundwater resource under an agreement suitable for the sharing countries.
- Ensuring the sustainability of transboundary groundwater-dependent ecosystems while maximizing the long-term benefits of cooperation. Parties should strive to prevent overexploitation through a balance between groundwater supply and demand.
- Joint efforts on monitoring the quality and quantity of the transboundary groundwater resource.
- Joint activities, actions, and plans to promote sustainable peace.
- Addressing conflicts, particularly in the Taveta-Loitoktok region where conflicts between pastoralists and agriculturalists have been reported, necessitating peace initiatives at the local level.

(ii) The establishment, for the duration of the project and possibly beyond, of an information exchange and coordination mechanism with other relevant projects and initiatives.

To strengthen national and local groundwater governance, we have evaluated existing water resource management policies in both countries (Table 1) and proposed several key activities. These include conducting a comprehensive review of groundwater policies and regulations in Kenya and Tanzania to identify gaps and improvement opportunities, providing technical assistance to national governments in developing sustainable groundwater management policies and strategic plans, and implementing capacity-building programs for local authorities on effective groundwater governance practices, following the guidelines produced by the "Groundwater Governance" GEF project (World Bank, FAO, UNESCO). We will also facilitate the integration of groundwater considerations into broader water resource management frameworks at both national and local levels. Additionally, we will enhance our approach by incorporating the lessons learned from the implementation of the MoU between Kenya and Tanzania on the management of Lakes Jipe and Chala, and from similar efforts between Kenya and other neighboring countries such as Uganda and Somalia, engaging with the Lake Victoria Basin Commission to align with regional strategies during the SAP phase, and documenting best practices from other transboundary aquifer management projects like the Nile Basin Initiative. These efforts aim to address current governance gaps and needs, ensuring a solid foundation for sustainable groundwater management at both national and transboundary levels.

Table 1: Institutional water related policies and regulations in Kenya and Tanzania

Category	Kenya	Tanzania
National Policies/Frameworks		
Constitutional	Kenya Law, Constitution 2010	The United Republic of Tanzania Constitution, 1977
Institution	Ministry of Water, Sanitation, and Irrigation (MoWSI)	Ministry of Water and Irrigation
Water Policy	National Water Policy 2002 with a sessional paper of 2021	The National Water Policy of 2002 (NAWAPO) with a revised version of 2023
Water Act	Water Act 2016	The Water Resources Management Act of 2009 The Water Supply and Sanitation Act, No. 5 2019
Institutional Reforms	WRA, WASREB, NWHSA, WSTF, BWRC, WWDAs, WSPs, NWF,	• Directorate of Water: BWBs, CWC & WUAs • Directorate of WSS: AUWSA, RUWASA • NWF, EWURA, NWBT,
National Water Master Plan	National Water Master Plan (NWMP) 2030 (Established in 2014)	
National Water Strategy	• National Water Services Strategy, 2020 –2025 • Third Medium-Term Plan (2018–2022) for WSTF • WASREB Guidelines, 2008	Water Utilization (Control and Regulation) Act No. 42, 1974 (Subsequent Amendments Act No. 10 of 1981)

Environmental and Land Regulations	• The Environmental Management and Coordination (Amendment) Act of 2015 • The Forest Conservation and Management Act, No. 34 of 2016 • The Environment and Land Court Act, 2011 • The Agriculture Act (Cap. 318), 1955 • The Community Land Act, 2016	• National Environmental Master Plan • For Strategic Interventions (2022 – 2032) • The Forest Act 2002 (URT, 2002) • Energy And Water Utilities Regulatory Authority (EWURA) Act • Wildlife Policy of 2007 • Fisheries Act 2003 • Land Act No. 4 1999 and Village Land Act (VLA) No. 5 1999
Heath Regulations	• The Public Health Act (Cap. 242), 1986 • Kenya Drinking Water Standards – primary parameters for routine water quality monitoring – KEBS • Water Quality and Pollution Control Division (WQPC)	• Occupation Health and Safety Act • National Guidelines on Drinking Water Quality Monitoring and Reporting • The Environmental Management (Hazardous Waste Control and Management) Regulations, 2019 • The Standard Act - primary parameters for routine water quality monitoring
Regional / Local Frameworks		
County/Regional	Taita Taveta County Water and Sanitation Act; Basin Water Resources Committee (BWRC); Water Works Development Agencies (WWDAs);	Regional Basin Water Boards, Tanzania Water and Sanitation Network (TAWASANET)
Urban Water Supply	The Taita Taveta Water and Sewerage Company (TAVASO)	Arusha Urban Water Supply and Sanitation Authority (UWSSA)
Local/Community	Water Resources Users Associations (WRUAs); Water Action Groups	• Water Users Associations (WUAs) • Community-based Water Supply Organizations (CBWSOs)

Component 5 Coordination, knowledge management, stakeholder's engagement and dissemination

Outcome 5.1: Structured and effective gender-sensitive engagement of relevant stakeholders in project activities, integration of local communities' perspectives, enhanced public awareness and information accessibility, and active involvement of the productive sector contribute to the realization of the project's outcomes and the broader commitment to the implementation of SAP reforms and investments.

Indicator 13 Regional and District administrators, and relevant stakeholders actively and meaningfully participate to structured consultations contributing to participatory design of SAP definition and adoption.
Indicator 14 Webinars/reports/ publications/local awareness-raising events and other knowledge products delivered to IW: LEARN and disseminated.

Through a dedicated analysis and characterization of relevant stakeholders, appropriate engagement strategies will be designed to ensure meaningful and effective participation of all identified groups. Specific attention will be devoted to ensure that no one is left behind, facilitating a participatory involvement of local communities, indigenous people, youth and women's organizations proactively trying to address potential barriers to their relevant engagement in project activities.

Throughout the project's duration, this component will implement activities to enhance project visibility at the national and regional levels and establish knowledge-exchange and coordination mechanisms with other relevant projects and initiatives, in particular with the World Bank funded program "Groundwater for Resilience" covering the Horn of Africa.
High-level and high-quality events with broad public and media participation will be organized to highlight project progress and achievements.

Additionally, gender mainstreaming and women empowerment activities will be developed according to the findings and recommendations of the Gender Analysis (part of the TDA).

Consistent with the practices of GEF IW projects, this component will facilitate participation in IW LEARN activities. This includes the establishment of a dedicated project website, the publication and dissemination of key project documents, experience notes, lessons learned, and active involvement in biannual IW Conferences.

- Structured and meaningful consultations with stakeholders, including the private sector, women and youth associations, and local communities as part of a targeted and stakeholder engagement strategy.
- High-profile outreach and awareness raising events at both the national and regional levels to showcase the project's progress and achievements.
- Active participation in activities organized by IW LEARN, the establishment of a dedicated project website, utilization of various knowledge management tools, and the publication and dissemination of key project documents such as the Transboundary Diagnostic Analysis (TDA), Strategic Action Program (SAP).
- Upscaling and strengthening the Kilimanjaro Water Stewardship Platform (KWSP) established by the World Bank in the Usa-River sub-catchment within the Pangani Basin to include the stakeholders in the entire basin (both countries). The current role of the KWSP include improving catchment management, strengthening WRM governance, promoting water stewardship standards and enhancing water use efficiency. Expanding the platform's reach can facilitate long-term engagement and coordination among stakeholders throughout the aquifer, ensuring a more comprehensive and collaborative approach to water management in the Kilimanjaro region.

KM is at the core of this component and it is integrated in several outcomes and outputs. The project will facilitate the sharing of knowledge with other relevant projects and initiatives through the Knowledge-Exchange and Coordination Mechanism established under Component 5 that will be operational throughout the project's duration.

Monitoring and Evaluation

Outcome 6.1: Operational project M&E systems successfully implemented and informing adaptive management

Indicator 15: Recommendations from operational M&E systems fed back into project implementation

***Output 6.1.1**: A gender-sensitive project M&E system designed and operational*

***Output 6.1.2:** Independent Mid-term Review and Terminal Evaluation undertaken with results fed back to project management including substantive reporting of gender-specific results.*

Under this Outcome an effective adaptive management and governance system will be established to ensure that the programme achieves its intended outcomes and key lessons are captured.

Global environmental benefits

The project is poised to deliver Global Environmental Benefits (GEBs) through the strengthening and expansion of transboundary cooperation in managing the Kilimanjaro Aquifer System and its associated ecosystems. Its primary objective is to enhance water security for both the local population and biodiversity.

The intervention by GEF, focusing on the comprehensive nature of the Kilimanjaro Transboundary Aquifer and leveraging modern science and technologies, is considered crucial for achieving these outcomes within the necessary timeframe, addressing impending threats to sustainability.

The global significance of this project is rooted in the hydrogeology of central volcanoes, intricately linked to their origin, magma feeding mechanisms, and volcanic history. These geological formations often give rise to tall mountains and extensive volcanic bodies, sometimes exhibiting complex structures, the superimposition of volcanic edifices, and caldera collapses. Abundant rainfall in the high slopes of these volcanoes infiltrates the subsurface through well-developed networks of sub-vertical faults and fractures, creating areas with high secondary porosities and permeability within the otherwise impervious volcanic sequence. However, there is limited knowledge about their groundwater potential and optimal exploitation methods.

The Kilimanjaro case, with its unique characteristics, could serve as a valuable example. If the insights gained from this project are broadly disseminated, they could be applied in various parts of the world, particularly in volcanic oceanic islands, contributing to improved groundwater management and sustainable utilization.

In terms of contribution to the GBFF targets, although the project does not aim to generate “direct” biodiversity benefits, the protection of groundwater recharge areas, in particular the restoration of the cloud forests of the Kilimanjaro (estimated that at least 40% of the cloud forest total surface of 1,775 sq Kms will be under protection measures (40,000 ha), will generate additional biodiversity benefits in line with Target 3 of the Kunming-Montreal Global Biodiversity Framework “Conserve 30% of Land, Water and Seas”. A precise quantification and commitment under specific GBF indicator(s) (for example “Target 3, Goal B, Indicator B.1 Services provided by ecosystems”) will be assessed and established during PPG phase in consultation with the countries.

Footnote:

[7] The Kilimanjaro volcano is not considered as totally extinct, but “dormant”. Hence, groundwater contained within the volcanic edifice might have a geothermal potential that could be exploited for the cold storage of agricultural products, and many other uses.
[8] It is expected that at least two “basin infiltration schemes” for flood waters will be constructed, likely located in the lower slopes of Mt. Kilimanjaro (estimated cost 0,13$/m3 for 0,5Mm3/year scheme).

Coordination and Cooperation with Ongoing Initiatives and Project.

Does the GEF Agency expect to play an execution role on this project?

No

If so, please describe that role here. Also, please add a short explanation to describe cooperation with ongoing initiatives and projects, including potential for co-location and/or sharing of expertise/staffing

The project will establish strong links with initiatives and projects at the regional level in the Kilimanjaro catchment and with national initiatives and projects at the national level in both Kenya and Tanzania. The proposed project will build on the achievements and

ownership of these ongoing processes, ensuring that strategies and collaborations are discussed and implemented as appropriate during the PPG phase.

Ongoing Initiatives in Tanzania:

Hydromet modernization project funded by the World Bank – covers Pangani basin: Sub-component 2 –Hydromet Systems Strengthening: is designed to strengthen the hydromet system by construction and rehabilitation of water resources monitoring stations, mapping groundwater aquifers, assessment of the water quality, modernizing the hydromet and raw data portal and development of an Operational Decision Support System (ODSS) with Flood Early Warning System (FEWS) as a major component, among others. Specific training will also be undertaken to enable sustainable management of the hydromet systems.

Aquifer mapping include drilling of wells in Pangani Basin – being undertaken by the Ministry of water, Tanzania and include borehole drilling for monitoring and water supply. The objective was to enable more informed water resource planning, management, and development and to ensure the delivery of efficient, reliable, and sustainable water supply and sanitation services benefitting the Tanzanian people for years to come. The current project leverage on borehole drilling and completion records to understand the sub-surface geology, aquifer characteristics and water quality dynamics in the basin.

WMO - Climate Services Adaptation Programme in Africa: Zambia & Tanzania: The project is focused on the detection, observation, monitoring, analysis and forecasting of climate hazards. The project builds upon ongoing activities and provides direction in addressing weather, water, and climate service-related challenges. Although it is being implemented outside the Pangani basin, the innovative approaches and lessons learned can be upscaled by the current project within the Kilimanjaro Transboundary aquifer.

Enhancing Hydromet Services through Regional Water Monitoring Innovation Hubs in Africa Funding - USD 5,000,000 – Being implemented by the World Meteorological Organization (WMO). Executing Entities: National Meteorological and Hydrological Services (NMHSs) of Tanzania and The Gambia; UK Centre for Ecology & Hydrology (UKCEH). The proposed project will execute a portfolio of activities through the Global Hydrometry Support Facility (WMO HydroHub) Phase II – that started in September 2021 – to advance innovation in the hydrometry agenda, which is one of its Pillars. The project will deliver activities that accelerate the pull-through of new cost-effective approaches, innovative technologies (including Artificial Intelligence, Internet of Things, and Big Data analytics) and emerging monitoring schemes (e.g., crowdsourcing) into operational use by monitoring agencies in Tanzania and Gambia. It will develop new sustainable partnerships, through providing actors across the public (including communities), private and academic sectors at regional, national and sub-national levels with capacity, innovation, and engagement opportunities. Together, these actions will lead to an increase in availability and integrity of reliable hydrological data and information needed for the provision of hydromet services in the region. These improved hydromet services will support data-driven decisions in agriculture and food security, disaster risk reduction, water resources management and environmental protection, among others.

African Development Bank - Arusha Sustainable Water and Sanitation Delivery Project (2016-2019) - The project aimed to provide safe, reliable, and sustainable water and sanitation services in Arusha city, Tanzania, thereby contributing to the improvement in health, social well-being, and living standards of the beneficiaries. The project improved the quality of water supply and sewerage services in the service area under the Arusha Urban Water Supply and Sanitation Authority (AUWSA) and comprised the following three main components: (a) Sanitation Infrastructure and Services Improvement; (b) Water Supply Infrastructure and Services Improvement; and (c) Institutional Support and Project Delivery. The total cost of the project was USD 233.92 million (equivalent to UA 166.32 million).

GIZ projects: (1) Supporting water sector development in Tanzania (2016-2019) commissioned by German Federal Ministry for Economic Development and Cooperation (BMZ). The MoWI Tanzania was the implementing agency. The programme supports national structure-building measures, promotes selected water utilities in the regions and advises the authorities responsible for water resources management in the Lake Rukwa and Lake Nyasa water basins.

GIZ projects: (2) Enhancing water security and climate resilience (includes Pangani basin) - GIZ, in partnership with the Ministry of Water in Tanzania, has signed an implementation agreement for a technical cooperation programme aimed at enhancing water security and climate resilience in urban areas. The programme is set to run until August 2025 and has a funding budget of EUR 3,000,000 (three million Euros). The project focuses on three major areas; (i) support the Ministry of Water's core process resilient to climate change and ensure water security; (ii) support Water Supply and Sanitation Authorities (WSSA's) in providing climate-resilient water supply and sanitation services; (iii) undertaking Basin Water Boards (BWBs) catchment committees and water user associations will receive technical training to manage data and information for climate-resilient water resources management.

The UNDP Pangani River Basin Management Project (PRBMP) aimed to generate technical information and create participatory forums to strengthen Integrated Water Resources Management (IWRM) in the Pangani Basin. The project focused on mainstreaming climate change into water management practices to support equitable water governance for livelihoods and the environment. The climate change component included understanding the impacts of climate change on water resources, fostering collaboration between water and climate sectors, piloting adaptation actions, and exchanging lessons learned. The project spanned from 2002 to 2010 with a total funding of US $4,783,336, and additional funding of US $506,200. It was the largest basin project at the time.

The World Bank – IDA and Tanzania Government's Water Sector Development Program (WSDP), currently in its third phase, has set ambitious targets to improve access to water and sanitation services across Tanzania. The program aims to connect 9.7 million people

to new water supplies, rehabilitate water points for 3.87 million people, and provide basic WASH infrastructure to 1,500 health care facilities (HCFs) and 2,800 primary schools. New infrastructure will also be developed for 2,000 HCFs and 1,000 primary schools. The project has a budget of US $3.2 billion from 2022 to 2025, with 37% of funds already disbursed.

The Water Infrastructure Green Bond is a sub-national project designed to improve water supply in East Africa, with a focus on increasing coverage in Tanga City from 96% to 100%. This project does not include the Pangani Catchment area and is funded with US $20.8 million.

The Tanzania Government's National Water Investment Programme (TanWIP) is structured around four investment focus areas: water for social well-being and development, water governance and institutional strengthening, water for sustainable economic development, and resilience for sustainable development through water investments. The total funding for TanWIP is US $20.8 million, with 5% allocated to the Pangani Catchment.

The NGO BridgIT Water Foundation's project in Naisinyai District (foothills of Mt. Kilimanjaro, Arusha region) focuses on conservation, education, and health. It is developing a Strategic Water Plan aimed at guiding the development and upgrading of water resources to prevent competition between wildlife and humans. The project is funded with US $15,000.

Ongoing initiatives in Kenya:

The World Bank's Horn of Africa Groundwater for Resilience Project is being implemented in Djibouti, Ethiopia, Kenya, and Somalia. In Kenya, the project covers five northern counties (excluding Taita-Taveta and Kajiado) and focuses on aquifer systems with regional and transboundary significance, particularly in the ASAL areas. It aims to support drought-affected communities within the North and Northeastern Development Initiative (NEDI) counties, including Turkana, Marsabit, Mandera, Wajir, and Garissa, which border Ethiopia and Somalia. The total project funding is US $385 million, with Kenya receiving an allocation of US $136 million for the period 2022-2028.

The USAID Global Water Strategy High Priority Country Plan supports Water, Sanitation, and Hygiene (WASH) activities in Kenya. The program emphasizes providing sustainable and affordable water and sanitation services, especially in the ASAL regions and the growing number of informal settlements. This initiative is funded with a total budget of US $100 million.

The USGS/USAID Groundwater Exploration Project in Northwest Kenya (Phase 1) was conducted in Turkana and Marsabit Counties. In collaboration with Northern Arizona University and New Mexico State University, the project aimed to map groundwater potential, assess hydrogeological conditions, and conduct an economic assessment of groundwater use. This project, running from 2017 to 2020, had a budget of US $88 million, funded by USAID-Kenya and East Africa Mission.

The GCF-funded project 'Enhancing Community Resilience and Water Security in the Upper Athi' is being executed by the National Environment Management Authority (NEMA), in collaboration with the Water Resources Authority (WRA) and the Kenya Meteorological Department (KMD). The project focuses on increasing water security and strengthening climate resilience in Kenya's Upper Athi River Catchment area, covering four vulnerable counties: Kiambu, Nairobi, Nyandarua, and Machakos. Key interventions include integrated water resources management, investment in water supply infrastructure, hydrological and meteorological information management, installation and rehabilitation of water infrastructure, and enhancing regulatory frameworks for water resource management. The project is funded with US $10 million but does not directly benefit the study area.

The Mombasa Water Fund Mombasa Water Fund is an innovative initiative in Kenya designed to enhance water security and improve water quality in coastal cities while conserving the Chyulu Hills. This fund focuses on protecting and restoring the watersheds that supply Mombasa with clean water by promoting sustainable land-use practices and engaging local communities in conservation efforts. The project also emphasizes stakeholder collaboration and community engagement, ensuring that the benefits of improved water management are felt by all, particularly vulnerable populations. Through these comprehensive efforts, the Mombasa Water Fund contributes to the long-term sustainability of water resources for Mombasa and surrounding areas.

Lake Chala and Jipe Initiatives:

The Lake Challa Water Resources Integrated Development Project is an international initiative aimed at enhancing the living standards of residents in Taveta, Taita Taveta County, through poverty alleviation and sustainable development. This comprehensive project focuses on improving domestic and livestock water supply, promoting irrigated agriculture, and supporting forestry initiatives. It falls under the sectors of Water and Sanitation and Agriculture, with an estimated cost of USD 118,200,000. A household survey revealed that access to water for domestic and livestock use poses a significant challenge, especially during dry seasons, with 77% of respondents indicating they rely on purchased water. Additionally, 81.1% of the population depends heavily on agriculture, primarily subsistence farming and livestock production. The project requires private sector engagement in building construction and agriculture, and it is structured as a Public-Private Partnership (PPP). Currently, the project is in the feasibility study stage. The project would address critical water supply issues and seeks to empower the local community and foster sustainable agricultural practices, ultimately contributing to improved livelihoods in the region.

The Lake Jipe Restoration Project: Lake Jipe has been subjected to numerous environmental threats which have had negative impacts on the management and conservation of the basin. The Lake Jipe Conservation Project, implemented by the Global Nature Fund, aims to preserve the ecological health of Lake Jipe while promoting sustainable livelihoods for local communities while focusing on the restoration and sustainable management of the lake, which has suffered from siltation, reduced water inflow, and loss of biodiversity. The project involves desilting the lake, rehabilitating surrounding wetlands, and promoting sustainable fishing practices to restore its ecological health and improve the livelihoods of the communities dependent on the lake. The current project could collaborate with this initiative by sharing data, coordinating conservation efforts, and aligning water management strategies, particularly in addressing the impacts of climate change on shared water resources. The project budget stands at approximately US $2 million, funded by national and regional water authorities.

The Lake Challa Smallholder Irrigation Project Phase One aims to enhance agricultural productivity and food security among smallholder farmers in the Lake Challa region, which borders Kenya and Tanzania. This initiative, funded by the International Fund for Agricultural Development (IFAD) with a budget of US $1.5 million, focuses on developing sustainable irrigation systems to improve water management and increase crop yields, thereby addressing the challenges posed by climate variability and water scarcity. The project provides training and resources, empowering local farmers to adopt efficient irrigation practices and diversify their crops, leading to increased income and resilience against climate change. Furthermore, it promotes community engagement and capacity building, ensuring that the benefits of improved irrigation extend beyond immediate agricultural outputs to enhance overall livelihoods in the region.

Core Indicators

Indicator 3 Area of land and ecosystems under restoration

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
40000	0	0	0

Indicator 3.1 Area of degraded agricultural lands under restoration

Disaggregation Type	Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Indicator 3.2 Area of forest and forest land under restoration

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
40,000.00			

Indicator 3.3 Area of natural grass and woodland under restoration

Disaggregation Type	Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Indicator 3.4 Area of wetlands (including estuaries, mangroves) under restoration

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Indicator 7 Shared water ecosystems under new or improved cooperative management

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Shared water Ecosystem	Kilimanjaro Aquifer			
Count	1	0	0	0

Indicator 7.1 Level of Transboundary Diagonostic Analysis and Strategic Action Program (TDA/SAP) formulation and implementation (scale of 1 to 4; see Guidance)

Shared Water Ecosystem	Rating (Expected at PIF)	Rating (Expected at CEO Endorsement)	Rating (Achieved at MTR)	Rating (Achieved at TE)
Kilimanjaro Aquifer	1			

Indicator 7.2 Level of Regional Legal Agreements and Regional management institution(s) (RMI) to support its implementation (scale of 1 to 4; see Guidance)

Shared Water Ecosystem	Rating (Expected at PIF)	Rating (Expected at CEO Endorsement)	Rating (Achieved at MTR)	Rating (Achieved at TE)
Kilimanjaro Aquifer	1			

Indicator 7.3 Level of National/Local reforms and active participation of Inter-Ministeral Committees (IMC; scale 1 to 4; See Guidance)

Shared Water Ecosystem	Rating (Expected at PIF)	Rating (Expected at CEO Endorsement)	Rating (Achieved at MTR)	Rating (Achieved at TE)
Kilimanjaro Aquifer	1			

Indicator 7.4 Level of engagement in IWLEARN throgh participation and delivery of key products(scale 1 to 4; see Guidance)

Shared Water Ecosystem	Rating (Expected at PIF)	Rating (Expected at CEO Endorsement)	Rating (Achieved at MTR)	Rating (Achieved at TE)
Kilimanjaro Aquifer	1			

Indicator 11 People benefiting from GEF-financed investments

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female	50,000			
Male	50,000			
Total	**100,000**	**0**	0	**0**

Explain the methodological approach and underlying logic to justify target levels for Core and Sub-Indicators (max. 250 words, approximately 1/2 page)

The project is expected to contribute to Core Indicator 7 (shared water ecosystems under new or improved cooperative management). The Ci 7 has been triggered for the Kilimanjaro aquifer.

The project will also generate results to be measured under Core Indicator 3 (area of land and ecosystems under restoration), more precisely its sub-indicators 3.2 (area of forest and forest land under restoration). Kindly note that a precise estimate (hectares) for this indicator is not available at this stage. For this reason, a conservative estimate of 40,000 ha of the total cloud forest area has been included. This value will be refined during the Project Preparation Grant (PPG). This corresponds to about 20% of the total cloud forest area. The aim of the project is to restore the existing cloud forest rather than to create new protected areas. The project team will explore with the countries the possibility of reforestation as a means of compensation for use by local communities during the PPG phase.

Kindly note that the activities contributing to sub-indicator 3.2 do not aim to establish protected areas. This could be an indirect benefit that the governments could pursue as a result of the improved understanding of aquifer characteristics.

Similarly, for core indicator 11 (number of high and low intensity beneficiaries), the estimated value of 100,000, representing the population living in the aquifer region, half of whom are women, will be further refined during the PPG.

In addition, co-benefits are expected to be generated by the project, particularly through the activities of components 2 and 3. The values of these co-benefits will also be estimated during the PPG.

For example, although the project does not aim to generate “direct” biodiversity benefits, the protection of groundwater recharge areas, in particular the restoration of the cloud forests of the Kilimanjaro (estimated that at least 40% of the cloud forest total surface of 1,775 sq Kms will be under protection measures (40,000 ha), will generate additional biodiversity benefits in line with Target 3 of the Kunming-Montreal Global Biodiversity Framework “Conserve 30% of Land, Water and Seas”. A precise quantification and commitment under specific GBF indicator(s) (for example “Target 3, Goal B, Indicator B.1 Services provided by ecosystems”) will be assessed and established during PPG phase in consultation with the countries. Therefore the proponents confirm the activation of the Marker on Biodiversity at PIF stage with the reservation to refine and agree on specific commitment after evaluation with the Partners and beneficiaries.

Key Risks

	Rating	Explanation of risk and mitigation measures
CONTEXT		
Climate	Moderate	Risk: IPCC forecasts indicate that both countries will be heavily impacted by CC in terms of temperatures, precipitation, extreme events etc. all of which might complicate estimates of aquifer recharge, and other hydrogeological parameters. Mitigation: A Comprehensive Climate Impact Assessment will incorporate historical data on temperature, precipitation, and extreme weather events alongside future projections. This will allow to implement Adaptive Management Strategies, including setting operational thresholds for groundwater extraction that can be adjusted as climate conditions change. Impacts of climate variability and change on the aquifer functioning (Component 1) will be factored in the assessment of present and future exploitable groundwater resources.
Environmental and Social	Low	Risk: Decreasing freshwater resources availability may lead to conflicts at the water-food-environment nexus. Mitigation: Improved understanding at the national, regional and local levels of the aquifer system extent, vulnerability, and potentialities will help reconcile competing uses of surface and groundwater. Risk: Increased availability of groundwater produced by the project might cause over-exploitation. Mitigation: Advanced monitoring equipment installed by the project will detect over-abstraction in real time. Although this will not prevent over-abstraction per se, the activities funded by

		the project will encourage the development and implementation of appropriate policies and regulations.
Political and Governance	Moderate	Risk: The transboundary nature of the aquifer recharge mechanism might hinder efforts to implement protection measures, and reach agreement on the Strategic Action Program. Mitigation: Working closely with relevant government offices and representatives to resolve any issues to be addressed, and ensure regular meetings of coordination mechanisms (Steering committee, technical direction, national coordination unit, etc.). The work will include the assessment of governance and the local level conflict during droughts.
INNOVATION		
Institutional and Policy	Moderate	Risk: Legislative and policy changes aimed at reforming informal institutions and behaviours required to ensure the long-term sustainability of groundwater exploitation are novel to the region. Mitigation: Targeted capacity reinforcement involving all administrative levels and local communities, facilitating the introduction of innovative approaches to groundwater governance and management.
Technological	Low	Risk: The project will introduce modern technologies for groundwater exploratory surveys and drilling, multi-purpose real time aquifer monitoring and data management that are novel to the region. Mitigation: Adopted technologies have been proven effective in similar geologic and socio-economic contexts.
Financial and Business Model	Low	Risk: Global recession impacts the amount of the government and donors' contribution to the project. Lack of funds to ensure long term sustainability of project outcomes. Mitigation: the project is structured so that if there is a cut in funding the scope of the project can be revised/or reduced respectively, e.g. virtual capacity building activities instead of in-person to save funds, decreasing number of demo projects or fewer targeted pilots, etc. During the project detailed design, sustainability beyond the project lifetime will be tailored in as part of SAP negotiations (Component 4)
EXECUTION		
Capacity	Low	Risk: To ensure the project success, the Executing Agency will engage national entities and experts in all project activities. Mitigation: Throughout its implementation the project will build capacity of countries' relevant entities in groundwater assessment and management.
Fiduciary	Low	Risk: Mismanagement of donor funds. Mitigation: UNESCO and FAO have comprehensive financial management and procurement systems in place that ensure no misuse of GEF funds occurs. FAO and UNESCO will be fully responsible for administering the funds in accordance with their financial regulations, rules, policies and procedures, and administrative instructions, in accordance with the common UN practices.
Stakeholder	Low	Risk: Inadequate participation, engagement and inclusion of stakeholders, may impact results and may affect country ownership and partnerships. Mitigation:

		Full stakeholders' participation to project design and implementation – in particular of local communities, women, and the private sector - is one of the key targets and mode of operation of the project.
Other		
Overall Risk Rating	Low	

C. ALIGNMENT WITH GEF-8 PROGRAMMING STRATEGIES AND COUNTRY/REGIONAL PRIORITIES

Describe how the proposed interventions are aligned with GEF- 8 programming strategies and country and regional priorities, including how these country strategies and plans relate to the multilateral environmental agreements.

Confirm if any country policies that might contradict with intended outcomes of the project have been identified, and how the project will address this.

For projects aiming to generate biodiversity benefits (regardless of what the source of the resources is - i.e., BD, CC or LD), please identify which of the 23 targets of the Kunming-Montreal Global Biodiversity Framework the project contributes to and explain how. (max. 500 words, approximately 1 page)

The proposed project aligns with Objective 3 of the GEF-8 Programming Directions for the International Waters focal area, which emphasizes the enhancement of water security in shared freshwater ecosystems. Recognizing the critical role of groundwater in ensuring food, water, and ecosystem security, as well as resilience to a changing climate, the project is designed to introduce transformative changes in the management of shared water resources. In accordance with the Programming Directions, the project will support various actions, including the formulation of Transboundary Diagnostic Analysis and Strategic Action Programs, implementation of conjunctive surface and groundwater management, capacity-building for synthesizing scientific and local knowledge, and mainstreaming these insights into decision-making processes. Additionally, the project aims to contribute to the achievement of SDG 6.5 and 6.6 targets, as well as compliance with the Water Convention (UNECE) and the UNGA Resolution on Transboundary Aquifers.

In addition, the proposed project is fully aligned with the pertinent river basin management plans and environmental priorities of both Kenya and Tanzania. It adheres to the broader objective of sustainably developing groundwater resources by bolstering transboundary cooperation and enhancing hydrogeological knowledge. The project is poised to actively support the implementation of Water Sector Development Plans and National Environmental Master Plans in both countries. This support will be achieved through the creation of the enabling conditions for the establishment of robust governance frameworks for transboundary groundwater resources, including comprehensive assessments and quantification of shared water resources, harmonized monitoring protocols, and sustained engagement of national and local stakeholders (all Components).

The project's approach is deeply rooted in the strong foundation of transboundary water governance established by Kenya and Tanzania through various regional initiatives. Building on the East African Community (EAC) framework, , and in particular Article 40 on Environmental Management of the protocol, which was established in 1999, and other key subsequent protocols such as the 2002 Protocol on Shared Watercourses and the 2003 Protocol for Sustainable Development of the Lake Victoria Basin, the project seeks to create robust linkages with regional bodies like the and the Nile Basin Initiative (NBI), EAC and the Lake Victoria Basin Commission (LVBC). By leveraging these connections, the project aims to facilitate joint studies on transboundary water resources and develop effective management arrangements for transboundary aquifers. The experience gained from major projects such as LVEMP II and the Mara River Basin Projects co-

implemented by both Kenya and Tanzania further strengthens the project's capacity to contribute to sustainable water resource management across borders by leveraging on lessons learnt. This strategic collaboration is intended to set a regional benchmark in hydrogeological assessments, diagnostics, and the formulation of groundwater governance frameworks at both national and transboundary levels. SADC's experience in regional collaboration and policy development can guide the creation of effective governance structures and ensure successful data sharing and stakeholder engagement, ultimately leading to a more efficient and sustainable management system for the Kilimanjaro Aquifer.

Moreover, the project aligns with the Blue Economy Strategy and Action Plan for the East African Community (EAC) under the Strategic priority 3 on “Implementing regional initiatives on watershed management”. This strategic priority area advocates for regional activities to be implemented in-line with a watershed management approach. Watershed management takes a broader spatial perspective of management and also includes the surface management of land, rivers, lakes, wetlands and swamplands in a holistic and integrated manner.

It is foreseen that the project will provide evidence and knowledge to expand the content of the Action Plan to include the transboundary groundwater element and the conjunctive management of the freshwater resources within the watershed.

The element of groundwater has not been well articulated in the EAC and the project will provide an opportunity to a paradigm shift form a surface water driven approach to a more water security approach integrating the concepts of IWRM and flood and drought management.

The project will benefit from similar initiatives in the region focusing on the management and governance of transboundary aquifers, such as the GEF project ID 9912 on Enhancing Conjunctive Management of Surface and Groundwater Resources in Selected Transboundary Aquifers: Case Study for Selected Shared Groundwater Bodies in the Nile Basin as well as recent cooperation efforts between Kenya and Uganda.

Furthermore, the project will complement the upcoming Groundwater for Resilience Program (GW4R), funded by the World Bank (IDA), which focuses on expanding the role of groundwater in building resilience to climatic variability and change in the Horn of Africa, to which Kenya participates . The Kilimanjaro Aquifer project will serve as a regional example, contributing valuable hydrogeological information and insights. It will also draw upon the experience gained from other relevant GEF projects, including the recently completed 'To create a sustainable enabling environment for integrated sustainable land management that reduces land degradation and improves livelihoods in the Kilimanjaro Highlands, Tanzania' (Land Degradation), and 'Strengthening climate information and early warning systems in Tanzania for climate-resilient development and adaptation to climate change' (CC). This collaborative approach ensures a comprehensive and synergistic contribution to regional sustainability and resilience initiatives.

The project aligns with other related initiatives, such as the GIZ project on Enhancing Water Security and Climate Resilience in Tanzania, which focuses on strengthening water resource management and climate resilience, including efforts within the Pangani Basin. The programme is set to run until August 2025 and has a funding budget of EUR 3,000,000 (three million Euros). The project focuses on three major areas; (i) support the Ministry of Water's core process resilient to climate change and ensure water security; (ii) support Water Supply and Sanitation Authorities (WSSA's) in providing climate-resilient water supply and sanitation services; (iii) undertaking Basin Water Boards (BWBs) catchment committees and water user associations will receive technical training to manage data and information for climate-resilient water resources management.

The project will actively support the actions of Kenya's Water Resources Authority (WRA), which is responsible for managing the country's water resources, including groundwater. The WRA, with regional

offices in six river basins, will monitor water resources, administer water resource regulation, and issue permits for water extraction and discharge. At the local level, the project will assist in establishing water resources user associations with WRA support, ensuring the active participation of water users in decision-making processes related to water resource management in sub-catchment areas.

In Tanzania, where private sector involvement is prominent in groundwater development, the project will enhance the advisory role of the Pangani Basin Water Office (PBWO). The PBWO administers the Tanzanian part of the Pangani River Basin and, under the existing institutional setup, encourages the formation of water user associations (WUA) with the authority to approve water abstractions for irrigation. The project will provide the necessary knowledge and tools to strengthen the PBWO's capacity in facilitating sustainable groundwater development in collaboration with the private sector.

D. POLICY REQUIREMENTS

Gender Equality and Women's Empowerment:

We confirm that gender dimensions relevant to the project have been addressed as per GEF Policy and are clearly articulated in the Project Description (Section B).

Yes

Stakeholder Engagement

We confirm that key stakeholders were consulted during PIF development as required per GEF policy, their relevant roles to project outcomes and plan to develop a Stakeholder Engagement Plan before CEO endorsement has been clearly articulated in the Project Description (Section B).

Yes

Were the following stakeholders consulted during project identification phase:

Indigenous Peoples and Local Communities: No

Civil Society Organizations: No

Private Sector: No

Provide a brief summary and list of names and dates of consultations

The current proposal is a culmination of thorough stakeholder consultation events conducted in Dodoma and Nairobi in 2023, supplemented by a virtual gathering in February 2024. Key participants included relevant stakeholders at national and local levels, such as Ministry officials overseeing transboundary waters and groundwater, academic institutions like the University of Dar Es Salaam and Nelson Mandela University, the Chairperson of IHP NC, UNESCO NATCOM representatives, officials from the Pagani Basin Authority, Kenya's Coast Development Authority, and delegates from the Water Department of the County government of Taita Taveta. This collaborative engagement ensures that the proposed actions are well-informed, inclusive, and reflective of the diverse perspectives and expertise necessary for the successful implementation of the project.

Two national consultations have taken place in presentia, one for each country sharing the resource to develop a preliminary needs assessment and ensure the country driven process. The 1st Consultative Meeting on "Water Secure and Climate resilient future of the communities at the Kilimanjaro Aquifer system Project"

was held on 4 May, 2023 at DUWASA in Dodoma, Tanzania. The meeting was attended by the GEF Focal person from the Vice President Office; Ministry of Water Officials, National Commission for UNESCO Officials; Pangani Basin Authority; the Water Institute; Centre Of Excellence; Sokoine University of Agriculture; and the Pangani Basin Water Board. Similarly on 7 June 2023, a consultation was held in Nairobi, following the invitation of the Ministry of Water, Sanitation and Irrigation Transboundary Water Department, including MoWSI's National Water Resources Department, the Water Resources Authority; the Regional Centre on Groundwater Resources Assessment; Kenya Water Institute; University of Nairobi; the Geological Society of Kenya; County Government of Taita Taveta; County Government of Kajiado; Taita Taveta University and the Water Resources Users Association.

The table below shows the countries' participants to the virtual meeting held on February 13th 2024.

First Name (s)	Last Name	Organization	Title	Email	Sex
Gladys	Wekesa	MoWSI, Kenya	Director TBA- MoWSI , Kenya	gnwekesa@yahoo.com	F
Daniel	Laon	Oldonyo Orok, WRUA,Kajiado	Chairperson Water Resources Users Association (WRUA) Kajiado	matapatosouth@gmail.com	M
Sarah	Gatobu	RCGW, Kenya	Geologist	gatobu.sarah@gmail.com	F
Patrick	Murunga	RCGW, Kenya	Assistant Director	patrickmurunga@gmail.com	M
Moffat	Mokaya	TBA-MoWSI, Kenya	Transboundary Water Intern	moffatmokaya@gmail.com	M
Stephen	Mokaya	TBA-MoWSI, Kenya	Geologist, TBA- MoWSI , Kenya	stephenmokaya7@gmail.com	M
Lorraine	Vusha	TBA-MoWSI, Kenya	Geologist, TBA- MoWSI , Kenya	vushabuluku@gmail.com	F
Eunice	Nduta	TBA-MoWSI, Kenya	Transboundary Water Intern	ndutathuku6@gmail.com	F
Shalet	Idawo	MoWSI, Kenya	Geologist	idawoshalet2021@gmail.com	F
Kiprotich	Koskei	TBA-MoWSI, Kenya	Environmentalist	kiprotichkoskei@gmail.com	M
Josphat Kyalo	Mulwa	University of Nairobi	Geologist/Hydrogeologist	jkmulwa@uonbi.ac.ke	M
Dr. Benjamin	Kyalo	MoWSI- National Water Resources Department	Water Research Expert	Kyalob73@yahoo.com	M
Lesly	Dullo	Kajiado County, Kenya	County Hydrogeologist	lesdullo@gmail.com	M
Justin	Maganga	Taita Taveta University	Environmental and Analytical Chemistry	j.maghanga@ttu.ac.ke	M
Patrick	Wadu	Taita Taveta County, Kenya	Director, Department of Water and Saniation	patrick.waduofficial@gmail.com	M
Margaret	Irungu	TBA-MoWSI, Kenya	Deputy Director, Water Policy Division	mirungu20@gmail.com	F
Joline	Achieng	MoWSI, Groundwater Division, Kenya	Geologist and GIS and Remote Sensing Analyst	jolinachieng@gmail.com	F
Dr.Samson	Oiro	WRA, Kenya	Hydrogeologist	koirosammy@gmail.com	M
Joseph	Nyakore	TBA-MoWSI, Kenya	Environmentalist	nyakorejoseph@gmail.com	M
Robert	Sunday	MoW, Tanzania	Assistant Director of Water Resources (Transboundary Waters)	robert.sunday@maji.go.tz	M
Eng. Ramadhani	Yasini	MoW, Tanzania	Environmental Engineer	ramadhani.kabingwa@maji.go.tz	M
Lucia	Lema	MoW, Tanzania	Agricultural Engineer	lucia.lema@maji.go.tz	F
Mwanamkuu	Mwanyika	TBA- MoW, Tanzania	Hydrogeologist	mwanamkuu.zmwanyika@maji.go.tz	F
Rodney	Menza	MoWSI- National Water Resources Department	Hydrologist	menzarodney91@gmail.com	M
Msoleni	Dakawa	MoW, Tanzania	Community Development Officer	msoleni.dakawa@maji.go.tz	M
Fred	Reuna	Lower Lumi, WRUA, Taita Taveta	Chairperson Water Resources Users Association (WRUA) Taita Taveta	reuna24@gmail.com	M

Other consultations have recently taken place in between July 29, 2024, to 3rd August 03, 2024, that involved a site visit to Pangani basin. Details of these engagement and participants are include in the Tanzania visit report in the Annex attached in the roadmap of the submission.

Gender mainstreaming is essential for ensuring equitable and sustainable water resource management recognizing the diverse roles, needs, and vulnerabilities of women and men. By integrating gender considerations, the project will enhance water security, promote sustainable development, and improve the well-being of all communities in the region. The project will seek to amplify women's voices in shaping policies and actions related to the management of the Kilimanjaro Transboundary Aquifer System (KTAS) through gender-responsive consultations across sectors and disciplines, involvement of civil society and indigenous women in joint management discussions, gender-balanced representation in the agreed transboundary frameworks, among others.

Stakeholders will continue to play pivotal roles in both the project design (PPG) and implementation phases, constituting key contributors to the attainment of expected outcomes in terms of water security and environmental sustainability:

Universities and Research Centers: These institutions in both countries will assume central roles in assessing and evaluating the groundwater resources of the region. Their scientific expertise and research capabilities will significantly contribute to the comprehensive understanding of the aquifer system.

National and Local/County Water Entities: Governmental bodies responsible for water-related affairs at national and local levels will play a substantial role in project activities. Capacity reinforcement efforts in groundwater management will enhance their ability to actively contribute to the project's success.

Local Communities: The engagement of local communities is fundamental, considering they are not only major stakeholders but also direct beneficiaries of the project. An ad hoc engagement plan will be developed through a detailed analysis, recognizing the diverse cultural, economic, and geographic aspects of indigenous communities in the Kilimanjaro highlands. Understanding the dynamics that enable a harmonious balance between the use and preservation of forest ecosystems is crucial.

Civil Society Organizations (CSOs), NGOs, and Women Organizations: These entities will be systematically consulted and actively involved in both the design and implementation of the project. Their perspectives and contributions are valuable in ensuring a well-rounded and inclusive approach.

Private Sector: From smallholder farmers to major agricultural groundwater extractors, such as the Tanzanian Planting Corporation, the private sector will be engaged through periodic consultations. Their insights and experiences will provide valuable perspectives for the project.

This multi-stakeholder approach ensures a holistic and inclusive project design and implementation, incorporating diverse viewpoints and expertise to enhance the project's overall effectiveness and sustainability.

(Please upload to the portal documents tab any stakeholder engagement plan or assessments that have been done during the PIF development phase.)

Private Sector

Will there be private sector engagement in the project?

Yes

And if so, has its role been described and justified in the section B project description?

Yes

Environmental and Social Safeguard (ESS) Risks

We confirm that we have provided indicative information regarding Environmental and Social risks associated with the proposed project or program and any measures to address such risks and impacts (this information should be presented in Annex D).

Yes

Overall Project/Program Risk Classification

PIF	CEO Endorsement/Approval	MTR	TE

Low

E. OTHER REQUIREMENTS

Knowledge management

We confirm that an approach to Knowledge Management and Learning has been clearly described in the Project Description (Section B)

Yes

ANNEX A: FINANCING TABLES

GEF Financing Table

Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	Grant / Non-Grant	GEF Project Grant($)	Agency Fee($)	Total GEF Financing ($)
FAO	GET	Regional	International Waters	International Waters: IW-3	Grant	7,105,936.00	675,064.00	7,781,000.00
Total GEF Resources ($)						**7,105,936.00**	**675,064.00**	**7,781,000.00**

Project Preparation Grant (PPG)

Is Project Preparation Grant requested?

true

PPG Amount ($)

200000

PPG Agency Fee ($)

19000

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	Grant / Non-Grant	PPG($)	Agency Fee($)	Total PPG Funding($)
FAO	GET	Regional	International Waters	International Waters: IW-3	Grant	200,000.00	19,000.00	219,000.00
Total PPG Amount ($)						**200,000.00**	**19,000.00**	**219,000.00**

Please provide justification

Sources of Funds for Country Star Allocation

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Sources of Funds	Total($)
Total GEF Resources					**0.00**

Indicative Focal Area Elements

Programming Directions	Trust Fund	GEF Project Financing($)	Co-financing($)
IW-3	GET	7,105,936.00	56500000
Total Project Cost		**7,105,936.00**	**56,500,000.00**

Indicative Co-financing

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount($)
Recipient Country Government	Government of Tanzania	In-kind	Recurrent expenditures	5324000
Recipient Country Government	Government of Kenya	In-kind	Recurrent expenditures	4000000
Others	UNESCO	In-kind	Recurrent expenditures	6250000
GEF Agency	FAO	Grant	Investment mobilized	15000000
Recipient Country Government	Government of Kenya - Groundwater Resource Mapping and Modeling in the Republic of Kenya.	Grant	Investment mobilized	12000000
Recipient Country Government	Government of Kenya - Kenya Water Security and Climate Resilience Project Phase 1 (KWSCRP-1).	Grant	Investment mobilized	7000000
Recipient Country Government	Government of Tanzania - Enhancing Climate Change Resilience Through Lake Chala Management.	Grant	Investment mobilized	5926000
Others	Mombasa Water Fund	Grant	Investment mobilized	1000000

Total Co-financing				**56,500,000.00**

Describe how any "Investment Mobilized" was identified

USD 15,000,000 FAO - this amount corresponds to a number of projects implemented by FAO in the same region that directly and indirectly contribute to the same objectives of the proposed Kilimanjaro Water Tower project. The proposed co-financing will be fully detailed in the corresponding co-financing letter from FAO at the CEO endorsement stage.

USD 12,000,000 Government of Kenya – Groundwater Resource Mapping and Modeling in the Republic of Kenya: project of the Government of Kenya's Ministry of Water, Sanitation, and Irrigation together with U.S. Geological Survey (USGS) and U.S. Agency for International Development (USAID Kenya and east Africa) have proposed a study in the Athi and Tana River basins to help identify and map areas that have potential groundwater resources. The study will also produce decision support tools to help manage the groundwater resources.

USD 7,000,000 Government of Kenya - Kenya Water Security and Climate Resilience Project Phase 1 (KWSCRP-1): project of the Government of Kenya with two sub-components: (i) support for water sector transition and reforms and (ii) strengthening water management and planning. The project has contributed to the development of Integrated Water Resources Management and Development Basin Plan for the Athi Basin.

USD 5,926,000 Government of Tanzania – Enhancing Climate Change Resilience Through Lake Chala Management: project of the Government of Tanzania aiming at enhancing Climate Change Resilience Through Lake Chala Management.

USD 1,000,000 Mombasa Water Fund - set of investments in Nature Based Solutions to build Resilient Watersheds and offer water security to downstream cities, people and business. The co-financing will be fully detailed at CEO ER stage and discussed during PPG phase.

ANNEX B: ENDORSEMENTS

GEF Agency(ies) Certification

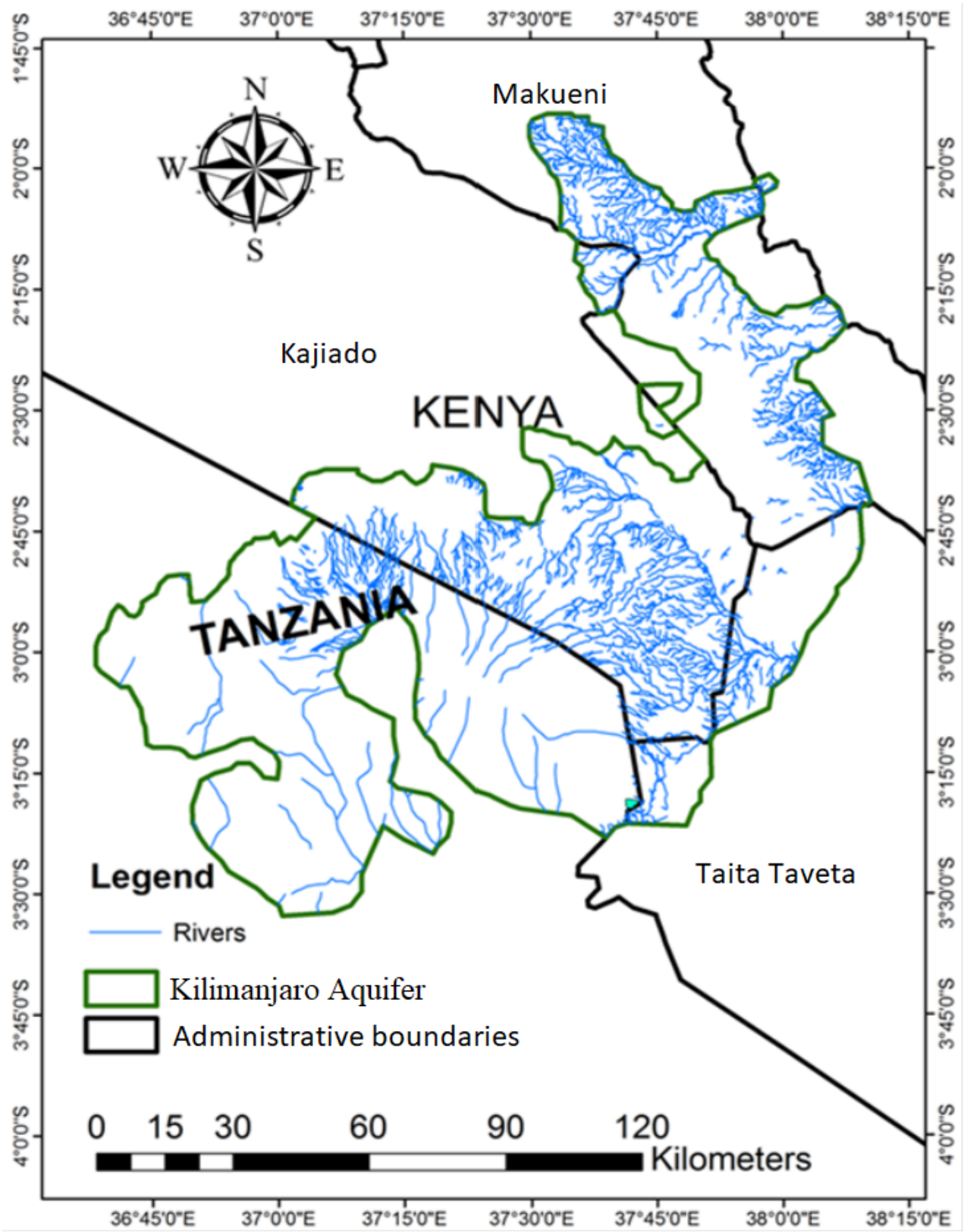
GEF Agency Type	Name	Date	Project Contact Person	Phone	Email
GEF Agency Coordinator	Jeffrey Griffin	3/20/2024	Lorenzo Paolo Galbiati	+393333981370	lorenzo.galbiati@fao.org

Record of Endorsement of GEF Operational Focal Point (s) on Behalf of the Government(s):

Name	Position	Ministry	Date (MM/DD/YYYY)
Eng. Festus K. Ngeno	GEF Operational Focal Point-Principal Secretary	State Department for Environment and Climate Change-Kenya	4/12/2024
Kemilembe Mutasa	GEF Operational Focal Point	Director of Environment-Tanzania	4/15/2024

ANNEX C: PROJECT LOCATION

Please provide geo-referenced information and map where the project interventions will take place



ANNEX D: ENVIRONMENTAL AND SOCIAL SAFEGUARDS SCREEN AND RATING

(PIF level) Attach agency safeguard screen form including rating of risk types and overall risk rating.

Title
Full ES Risk Screening Checklist
Full ES Risk Screening Certificate

ANNEX E: RIO MARKERS

Climate Change Mitigation	Climate Change Adaptation	Biodiversity	Land Degradation
No Contribution 0	Significant Objective 1	Significant Objective 1	Significant Objective 1

ANNEX F: TAXONOMY WORKSHEET

Level 1	Level 2	Level 3	Level 4
Influencing models			
	Transform policy and regulatory environments		
	Strengthen institutional capacity and decision-making		
	Convene multi-stakeholder alliances		
	Demonstrate innovative approaches		
	Deploy innovative financial instruments		
Stakeholders			
	Indigenous Peoples		
	Private Sector		
		Capital providers	
		Financial intermediaries and market facilitators	
		Large corporations	
		SMEs	
		Individuals/Entrepreneurs	
		Non-Grant Pilot	
		Project Reflow	
	Beneficiaries		
	Local Communities		
	Civil Society		
		Community Based Organization	
		Non-Governmental Organization	
		Academia	
		Trade Unions and Workers Unions	
	Type of Engagement		
		Information Dissemination	
		Partnership	
		Consultation	
		Participation	
	Communications		
		Awareness Raising	
		Education	
		Public Campaigns	
		Behavior Change	
Capacity, Knowledge and Research			
	Enabling Activities		
	Capacity Development		
	Knowledge Generation and Exchange		
	Targeted Research		
	Learning		

		Theory of Change	
		Adaptive Management	
		Indicators to Measure Change	
	Innovation		
	Knowledge and Learning		
		Knowledge Management	
		Innovation	
		Capacity Development	
		Learning	
	Stakeholder Engagement Plan		
Gender Equality			
	Gender Mainstreaming		
		Beneficiaries	
		Women groups	
		Sex-disaggregated indicators	
		Gender-sensitive indicators	
	Gender results areas		
		Access and control over natural resources	
		Participation and leadership	
		Access to benefits and services	
		Capacity development	
		Awareness raising	
		Knowledge generation	
Focal Areas/Theme			
	Integrated Programs		
		Commodity Supply Chains ([1][1]Good Growth Partnership)	
			Sustainable Commodities Production
			Deforestation-free Sourcing
			Financial Screening Tools
			High Conservation Value Forests
			High Carbon Stocks Forests
			Soybean Supply Chain
			Oil Palm Supply Chain
			Beef Supply Chain
			Smallholder Farmers
			Adaptive Management
		Food Security in Sub-Sahara Africa	
			Resilience (climate and shocks)
			Sustainable Production Systems
			Agroecosystems
			Land and Soil Health
			Diversified Farming
			Integrated Land and Water Management
			Smallholder Farming
			Small and Medium Enterprises
			Crop Genetic Diversity
			Food Value Chains
			Gender Dimensions
			Multi-stakeholder Platforms
		Food Systems, Land Use and Restoration	
			Sustainable Food Systems
			Landscape Restoration
			Sustainable Commodity Production
			Comprehensive Land Use Planning
			Integrated Landscapes
			Food Value Chains
			Deforestation-free Sourcing
			Smallholder Farmers
		Sustainable Cities	
			Integrated urban planning
			Urban sustainability framework

			Transport and Mobility
			Buildings
			Municipal waste management
			Green space
			Urban Biodiversity
			Urban Food Systems
			Energy efficiency
			Municipal Financing
			Global Platform for Sustainable Cities
			Urban Resilience
	Biodiversity		
		Protected Areas and Landscapes	
			Terrestrial Protected Areas
			Coastal and Marine Protected Areas
			Productive Landscapes
			Productive Seascapes
			Community Based Natural Resource Management
		Mainstreaming	
			Extractive Industries (oil, gas, mining)
			Forestry (Including HCVF and REDD+)
			Tourism
			Agriculture & agrobiodiversity
			Fisheries
			Infrastructure
			Certification (National Standards)
			Certification (International Standards)
		Species	
			Illegal Wildlife Trade
			Threatened Species
			Wildlife for Sustainable Development
			Crop Wild Relatives
			Plant Genetic Resources
			Animal Genetic Resources
			Livestock Wild Relatives
			Invasive Alien Species (IAS)
		Biomes	
			Mangroves
			Coral Reefs
			Sea Grasses
			Wetlands
			Rivers
			Lakes
			Tropical Rain Forests
			Tropical Dry Forests
			Temperate Forests
			Grasslands
			Paramo
			Desert
		Financial and Accounting	
			Payment for Ecosystem Services
			Natural Capital Assessment and Accounting
			Conservation Trust Funds
			Conservation Finance
		Supplementary Protocol to the CBD	
			Biosafety
			Access to Genetic Resources Benefit Sharing
	Forests		
		Forest and Landscape Restoration	
			REDD/REDD+
		Forest	
			Amazon

			Congo
			Drylands
	Land Degradation		
		Sustainable Land Management	
			Restoration and Rehabilitation of Degraded Lands
			Ecosystem Approach
			Integrated and Cross-sectoral approach
			Community-Based NRM
			Sustainable Livelihoods
			Income Generating Activities
			Sustainable Agriculture
			Sustainable Pasture Management
			Sustainable Forest/Woodland Management
			Improved Soil and Water Management Techniques
			Sustainable Fire Management
			Drought Mitigation/Early Warning
		Land Degradation Neutrality	
			Land Productivity
			Land Cover and Land cover change
			Carbon stocks above or below ground
		Food Security	
	International Waters		
		Ship	
		Coastal	
		Freshwater	
			Aquifer
			River Basin
			Lake Basin
		Learning	
		Fisheries	
		Persistent toxic substances	
		SIDS : Small Island Dev States	
		Targeted Research	
		Pollution	
			Persistent toxic substances
			Plastics
			Nutrient pollution from all sectors except wastewater
			Nutrient pollution from Wastewater
		Transboundary Diagnostic Analysis and Strategic Action Plan preparation	
		Strategic Action Plan Implementation	
		Areas Beyond National Jurisdiction	
		Large Marine Ecosystems	
		Private Sector	
		Aquaculture	
		Marine Protected Area	
		Biomes	
			Mangrove
			Coral Reefs
			Seagrasses
			Polar Ecosystems
			Constructed Wetlands
	Chemicals and Waste		
		Mercury	
		Artisanal and Scale Gold Mining	
		Coal Fired Power Plants	
		Coal Fired Industrial Boilers	
		Cement	
		Non-Ferrous Metals Production	
		Ozone	
		Persistent Organic Pollutants	
		Unintentional Persistent Organic Pollutants	
		Sound Management of chemicals and Waste	

		Waste Management	
			Hazardous Waste Management
			Industrial Waste
			e-Waste
		Emissions	
		Disposal	
		New Persistent Organic Pollutants	
		Polychlorinated Biphenyls	
		Plastics	
		Eco-Efficiency	
		Pesticides	
		DDT - Vector Management	
		DDT - Other	
		Industrial Emissions	
		Open Burning	
		Best Available Technology / Best Environmental Practices	
		Green Chemistry	
	Climate Change		
		Climate Change Adaptation	
			Climate Finance
			Least Developed Countries
			Small Island Developing States
			Disaster Risk Management
			Sea-level rise
			Climate Resilience
			Climate information
			Ecosystem-based Adaptation
			Adaptation Tech Transfer
			National Adaptation Programme of Action
			National Adaptation Plan
			Mainstreaming Adaptation
			Private Sector
			Innovation
			Complementarity
			Community-based Adaptation
			Livelihoods
		Climate Change Mitigation	
			Agriculture, Forestry, and other Land Use
			Energy Efficiency
			Sustainable Urban Systems and Transport
			Technology Transfer
			Renewable Energy
			Financing
			Enabling Activities
		Technology Transfer	
			Poznan Strategic Programme on Technology Transfer
			Climate Technology Centre & Network (CTCN)
			Endogenous technology
			Technology Needs Assessment
			Adaptation Tech Transfer
		United Nations Framework on Climate Change	
			Nationally Determined Contribution