

Funding Proposal

FP175: Enhancing community resilience and water security in the Upper Athi River Catchment Area, Kenya

Kenya | National Environment Management Authority of Kenya (NEMA) | Decision B.30/03

23 November 2021



**GREEN
CLIMATE
FUND**

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NOTE TO ACCREDITED ENTITIES ON THE USE OF THE FUNDING PROPOSAL TEMPLATE

- Accredited Entities should provide summary information in the proposal with cross-reference to annexes such as feasibility studies, gender action plan, term sheet, etc.
- Accredited Entities should ensure that annexes provided are consistent with the details provided in the funding proposal. Updates to the funding proposal and/or annexes must be reflected in all relevant documents.
- The total number of pages for the funding proposal (excluding annexes) **should not exceed 60**. Proposals exceeding the prescribed length will not be assessed within the usual service standard time.
- The recommended font is Arial, size 11.
- Under the [GCF Information Disclosure Policy](#), project and Programme funding proposals will be disclosed on the GCF website, simultaneous with the submission to the Board, subject to the redaction of any information that may not be disclosed pursuant to the IDP. Accredited Entities are asked to fill out information on disclosure in section G.4.

Please submit the completed proposal to:

fundingproposal@gcfund.org

Please use the following name convention for the file name:

“FP-[NEMA]-[Country/Region - Kenya]- [2020/02/14]”

A. PROJECT/PROGRAMME SUMMARY			
A.1. Project or programme	Project	A.2. Public or private sector	Public
A.3. Request for Proposals (RFP)	Not applicable Not applicable Not applicable Not applicable		
A.4. Result area(s)	<p>Check the applicable GCF result area(s) that the <i>overall</i> proposed project/programme targets. For each checked result area(s), indicate the estimated percentage of <i>GCF budget</i> devoted to it. The total of the percentages when summed should be 100%.</p> <p>Mitigation: Reduced emissions from:</p> <p><input type="checkbox"/> Energy access and power generation:</p> <p><input type="checkbox"/> Low-emission transport:</p> <p><input type="checkbox"/> Buildings, cities, industries and appliances:</p> <p><input type="checkbox"/> Forestry and land use:</p> <p>Adaptation: Increased resilience of:</p> <p><input checked="" type="checkbox"/> Most vulnerable people, communities and regions:</p> <p><input checked="" type="checkbox"/> Health and well-being, and food and water security:</p> <p><input checked="" type="checkbox"/> Infrastructure and built environment:</p> <p><input type="checkbox"/> Ecosystem and ecosystem services:</p>		
			<p>GCF contribution:</p> <p><u>Enter number</u>%</p> <p><u>Enter number</u>%</p> <p><u>Enter number</u>%</p> <p><u>Enter number</u>%</p> <p>30%</p> <p>35%</p> <p>35%</p> <p><u>Enter number</u>%</p>
A.5. Expected mitigation impact	Indicate t CO ₂ eq over lifespan	A.6. Expected adaptation impact	<p>1,156,620 direct beneficiaries</p> <p>3,693,380 indirect beneficiaries</p> <p>10.32% of population</p>
A.7. Total financing (GCF + co-finance)	9,999,983.26 USD	A.9. Project size	Micro (Upto USD 10 million)
A.8. Total GCF funding requested	<p>_____ Choose an item.</p> <p>For _____ multi-country proposals, please fill out annex 17.</p> <p>9,526,603.26 USD</p>		
A.10. Financial instrument(s) requested for the GCF funding	<p>Mark all that apply and provide total amounts. The sum of all total amounts should be consistent with A.8.</p> <p><input checked="" type="checkbox"/> Grant 9,526,603.26 <input type="checkbox"/> Equity <u>Enter number</u></p> <p><input type="checkbox"/> Loan <u>Enter number</u> <input type="checkbox"/> Results-based payment <u>Enter number</u></p> <p><input type="checkbox"/> Guarantee <u>Enter number</u></p>		
A.11. Implémentation period	4 years	A.12. Total lifespan	30 years

A.13. Expected date of AE internal approval	<i>This is the date that the Accredited Entity obtained/will obtain its own approval to implement the project/ Programme, if available.</i> 3/20/2020	A.14. ESS category	Refer to the AE's safeguard policy and GCF ESS Standards to assess your FP category. B
A.15. Has this FP been submitted as a CN before?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	A.16. Has Readiness or PPF support been used to prepare this FP?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
A.17. Is this FP included in the entity work Programme?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	A.18. Is this FP included in the country Programme?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
A.19. Complementarity and coherence	Does the project/Programme complement other climate finance funding (e.g. GEF, AF, CIF, etc.)? If yes, please elaborate in section B.1. Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
A.20. Executing Entity information	<i>If not the Accredited Entity, please indicate the full legal name of the Executing Entity(ies) and provide its country of registration and ownership type. Note that there can be more than one Executing Entity. Also indicate if an Executing Entity is the National Designated Authority. Refer to the definition of Executing Entity in the Accreditation Master Agreement.</i> The Executing Entities are as follows: <ol style="list-style-type: none"> 1. National Environment Management Authority (NEMA) – also the Accredited Entity 2. Water Resources Authority – WRA 3. Government of Kenya represented by Kenya Meteorological Department - KMD of the Ministry of Environment and Forestry. The Executing Entities are all government agencies / institutions in the Republic of Kenya.		
A.21. Executive summary (max. 750 words, approximately 1.5 pages)			

1. Kenya is highly vulnerable to erratic climatic patterns and limited water availability due to its reliance on agriculture, tourism, hydro-energy, among other activities, that are susceptible to rainfall and water availability. **Kenya has experienced frequent floods and droughts resulting from climate change impacts, leading to national economic losses.** The 2008-2011 droughts are estimated to have slowed down the GDP by an average of 2.8 % per annum, with total damage and losses estimated at USD 12.1 billion. Additionally, climate change has adversely affected water availability especially during frequent drought conditions.
2. The effects of climate change and related disasters have the potential to adversely impact many Kenyans given that about 75% of the population depends directly on land and natural resources for their livelihoods. In recent years, there has been increased attention to climate change due to its impacts on the lives of Kenyans. This has been mainly due to an increase in the intensity and frequency of extreme climatic events such as severe droughts and flooding. These extreme events have had negative socio-economic impacts on almost all sectors of Kenyan society such as health, agriculture, livestock, environment, hydropower generation, and tourism. The seriousness of the problem has made it imperative for policy makers to focus on mainstreaming climate change in development policies and strategies¹. Another important factor in determining Kenya's vulnerability to climate change is its social and economic inequalities. Forty-two percent of its population of 54 million lives below the poverty line. Access to basic facilities such as health care, education, clean water, and sanitation, is often a luxury for many people. Large segments of the population, including the burgeoning urban poor, are highly vulnerable to climatic, economic, and social shocks²
3. Climate change affects the global hydrological cycle and it has impacts on the quantity and quality of the water. Water security is a key issue given that Kenya's people and economy are highly vulnerable to erratic patterns and limited water availability. In the past two decades, from 1992–2012, Kenya was ranked first among African countries in terms of people affected by droughts (roughly 46 million people) and fifth in terms of those affected by floods (about 2.8 million people) during the same period. Kenya has limited freshwater endowments and is classified as a chronically "water-scarce" country in absolute and relative terms. It faces the additional challenge of high inter-annual and intra-annual rainfall variability.
4. Along the Athi River Catchment Area, there are 12 counties. Historically, drought and flooding risks were the highest in Kiambu, Machakos, Nairobi, and Nyandarua (main beneficiaries), in that order. Droughts and floods are likely to rise in the future, especially in Kiambu and Machakos County. Consequently, the water infrastructure of the study area has suffered damage or has not had enough capacity to withstand these droughts and floods; for example, the water storage or potable water supply infrastructure have been insufficient. Irregularity of water supply due to climate change has threatened the sustainability of those counties and has also caused waterborne diseases. Impacts on the quantity and quality of water are also expected due to changes in temperature, precipitation, floods and droughts in the area.
5. With climate extremes expected to increase, climate-informed water management, climate-resilient water infrastructure will be critical in order to prepare for and respond to floods and droughts. The project therefore seeks to enhance **community resilience and water security in the Upper Athi River Catchment Area** through interventions across three Outputs:
 - Output 1: enhance hydrological and meteorological monitoring system to support decision making, planning and policy development in water and climate change sector.
 - Output 2: improve climate water resilience by building, enhancing and rehabilitating prioritized water infrastructure and implementing conservation activities in the catchment.
 - Output 3: Strengthen water and adaptation planning, institutional and regulatory framework to respond to changing climatic conditions.
6. The project would directly benefit 1,156,620 people in the project site are (Kiambu, Machakos, Nairobi, and Nyandarua), with indirect benefit reaching **3,693,380** people in/from 4 counties within the catchment.
7. The Project supports the implementation and operationalization of several key national policies strategies and plan, including the National Climate Change Response Strategy (NCCRS), National Climate Change Action Plan (NCCAP), National Adaptation Plan (NAP), the Nationally Determined Contribution (INDC) and the National Water Master Plan (NWMP) 2030.
8. Capacity building of national level institutions will be an upscale of the ongoing Kenya's approved GCF NAP Readiness that has focused on training county government officials on climate change and climate finance. The proposal plans to support capacity building and training for relevant water governance structures and communities

within the project (Water Resource Users Associations -WRUAs, County Environment Committees - CECs, County Adaptation Committees, Community Based Organizations -CBOs. The project area refers to the four target counties Nairobi, Nyandarua, Kiambu and Machakos. Materials developed by GCF NAP Readiness will be utilized during mentioned trainings and the already trained personnel will play key roles in the training.

¹ Kenya National Human Development Report (2013) <http://hdr.undp.org/en/content/climate-change-and-human-development>
² <https://tradingeconomics.com/kenya/gdp-growth-annual>

B. PROJECT/PROGRAMME INFORMATION

B.1. Climate context (max. 1000 words, approximately 2 pages)

Kenya's vulnerability to climate change

9. Kenya was ranked 7th, on the 2018 Global Log Term Climate Risk Index published by Germanwatch and it is expected to be severely impacted by the negative effects of climate change in the future³. Much of the country's vulnerability is linked to seasonal rains. Between March and July 2018, Kenya experienced almost twice the normal rainfall of the wet season. Kenya's most important rivers in the central highlands overflowed affecting 40 out of 47 counties, causing the death of 183 people, injury of 97 and the displacement of 321 630 people, as well as the loss of livelihoods and livestock.
10. Kenya located in the Africa Region, 581,309 km², 80% of which is arid and semi-arid, and its population is approximately 54 million. Kenya has a complex climate that varies significantly between its coastal, interior and highlands regions and from season to season, year to year, and decade to decade. This climatic variability is influenced by naturally occurring factors such as movement of the Intertropical Convergence Zone (ITCZ) and the El Niño Southern Oscillation (ENSO). The climate impacts of El Niño (and its counterpart, La Niña) are not uniform across the African continent, making the impacts of El Niño or La Niña on rainfall in Africa vary according to location and season. Additionally, Northeastern Africa generally becomes anomalously dry during its primary and longer rainy season of June – September. **Since 1960, Kenya's mean annual temperature has increased by 1.0°C, at an average rate of 0.21°C per decade. The rate of increase has been most rapid in March-May (0.29°C per decade) and slowest in June-September (0.19°C per decade). This is evidently shown by Machakos Meteorological station as shown below where temperature data was analyzed for a period of 37 years between 1978 and 2015. The temperature trend for Machakos station shows an increase in temperature at the rate of 0.00008 °C per day which reflects to 0.0292°C per year. This further shows that there has been an increase of 0.292 °C per decade. Annex 32 details the basin level rainfall and temperature trend analysis.**

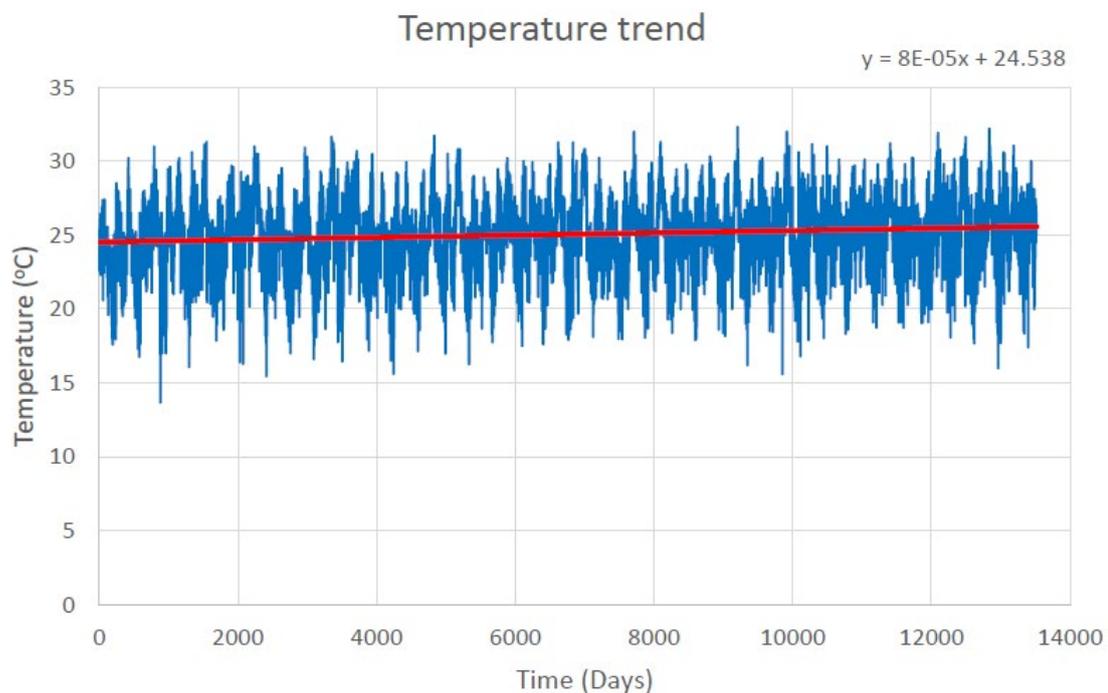


Figure 1: Time series chart for observed temperature

Athi River Catchment Area (Project Location) baseline scenario

11. Athi River Catchment Area (ARCA) located in South and South West Kenya, is one of the major water resources in Kenya. Athi Catchment Area has varied topographical characteristics, from the highland in the Aberdare Ranges of around 2,600M above mean sea level (amyl) to the coastal area at the sea level. Even though the water catchment area is relatively small compared to other water catchments, water demand in this catchment is large and will be even larger (see Figure 1). According to the current monitoring situation of water resource, the quality of surface and ground water attains the target level by 84–100%. However, the quantity of water resource is highly insufficient. **The ARCA has present water demands of 1,145 MCM/year which represents 76% of the available 2010 water resources of 1,503 MCM/year.**

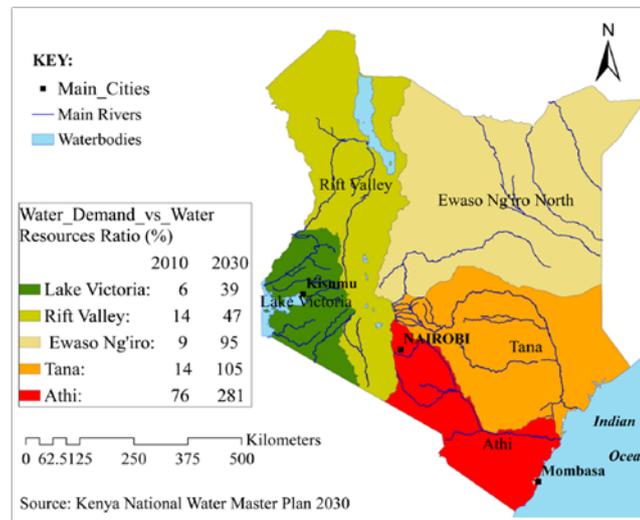


Figure 1. Water basins and water balance in Kenya

12. ARCA is classified as a semi-arid land except in the upstream area of the Athi River which is classified as a humid land non-Arid and Semi-arid Land (non-ASAL). The catchment has an annual average rainfall of 810mm. The annual rainfall differs spatially within the catchment area, ranging from around 500mm in the southern part near the border with Tanzania to 1,200mm in the western mountainous area. Evapotranspiration ranges from 1200-2500 mm per year in the catchment. Daily temperatures in the catchment area range between 10°C in the Upper Zone to 30°C in the Coastal Zone.
13. Wetlands and riparian zones: In Nairobi, Upper Athi, and Coastal Athi sub-regions, most wetlands and riparian land zones are rapidly being reclaimed and converted into residential estates or commercial/industrial centers. These wetlands and riparian zones need protection from degradation and restoration of their functional capacities. Croplands and rangelands: Croplands and rangelands constitute the largest land use areas in the catchment. Rangelands in the Middle Athi and Nolturesh Lumi area support pastoralism. Unfortunately, these rangelands are increasingly being converted to agro-pastoralism and urbanization with consequent loss of the protective vegetation cover. Their fragile soil once disturbed by cultivation becomes susceptible to soil erosion during rainy seasons. Agriculture and pastoralism: The Upper Athi consist of the areas of Kiambu and some parts of Nyandarua, where farming of coffee and tea is predominant. Horticultural farming is also practiced in these areas. Food crops like legumes, maize and fruits are grown in upper as well as middle Athi (Nairobi, Kajiado, Kiambu, Makeni, Machakos Counties and some parts of Kitui County). Other crops are cotton in Machakos County in the east of Nairobi. Cashew nuts, coconut and mangoes are grown in the coastal region of Kwale, Kilifi and Mombasa. Bananas are grown in Kiambu, Kwale and Taita Taveta Counties. Sisal is also grown in Makeni, Taita Taveta and Kilifi Counties.
14. The ratio of 76% of water demand to water resources, which is called a water stress ratio, shows a very tight balance between water resources and demands compared with the ratio of 40% regarded to indicate severe water stress. **It is projected that the water demands for 2030 are expected to increase to about 281% against the**

³ https://germanwatch.org/sites/germanwatch.org/files/20-2-01e%20Global%20Climate%20Risk%20Index%202020_10.pdf

2030 available water resources. Water users in the catchment include urban and rural populations, major industries, livestock and wildlife which use both surface water and ground water. Groundwater forms a substantial part of the available water. Annex 27 provides a Piezometric surface trend analysis for aquifers. In addition to this, **the targeted areas experience 7 dry months and 5 wet months in a year which means that for a number of months in a year, communities have to seek out water through travelling distances away from their homes. This work is mainly taken up by women and children in the communities, leaving them to spend a few hours each day fetching water.**

15. Currently, out of the 6 catchment areas, **the Athi catchment has a negative water balance and is the least water secure region. This situation is further exacerbated by climate change impacts. In the context of climate change, majority of the ARCA is ranked as highly vulnerable with certain areas being highest and moderately vulnerable.** In April 2016, the ARCA experienced massive floods escalating climate change impact. Flooding events in the catchment has an impact on the local economies of the towns within the area. In addition, poor drainage in major towns (e.g. Nairobi, Kiambu, and Mombasa) causes urban flooding events. In addition, **the availability of water resources is unevenly distributed spatially and temporally in the catchment, with large areas suffering from water deficit. With the per capita water availability being less than half of the global standard the catchment experiences water supply problems which become worse during drought events.** This is expected to get worse by 2030. The water deficits exacerbated by climate change suggest better planning and managing water resources.
16. **In a recent study on the impact of future climate on the upper Athi River water resources (Annex 29), 8 out of 9 simulations indicate increased flows in the upper Athi river basin in future. This study used CHIRPS (Climate Hazards Group Infra-Red Precipitation with Station) data n (Funk *et al.*, 2015) for precipitation and Rossby Centre regional atmospheric model (RCA4) for future climate data analysis. One scenario (rcp2.6 for the period 2011-2040) indicates that the flows will be below the baseline period of 1980-2010. However, the water demand deficit is likely to increase in future due to increased demand with a good proportion emanating from increased evapotranspiration, for which the increase in streamflow is unlikely to satisfy.** In particular, January-March and July-October are the months that the upper Athi will experience water shortage when comparing the supply and demands, with irrigation sector will being the worst affected. The study recommended development of new water storage facilities and rehabilitation of old ones to improve the storage capacities. It also recommended the improvement of the landscape by planting vegetation/trees in order to reduce bare land and retain as much rainfall in the soil. This will reduce incidence of flash floods as well as sediment transport that check the increase of operation and maintenance cost of water storage and treatment works.

Future Climate Data was based three on representative concentration pathways—RCP 8.5, 4.5 and 2.6. The model used for the study is the Rossby Centre regional atmospheric model (RCA4 with a horizontal grid spacing of the simulation is 0.44 degrees (about 50 kilometers). The choice of the RCA model for this analysis was based mainly on the availability of the model outputs for the three different scenarios (RCP2.6, RCP4.5, and RCP8.5), as well as recent study (Endris *et al.*, 2015) showing that the RCA model run driven by MPI-ESM-LR better reproduces the large-scale signals, such as the El Niño-Southern Oscillation and the Indian Ocean Dipole, in the historical period over the Eastern Africa region than RCA model runs driven by the other global climate models. The Rossby Centre regional atmospheric model (RCA4) output for the baseline period was evaluated against the CHIRPS datasets. Figure 2 shows the areal average precipitation at monthly interval and the accumulated precipitation for the two datasets. As shown in Figure 2 the two datasets have good agreement over the baseline period

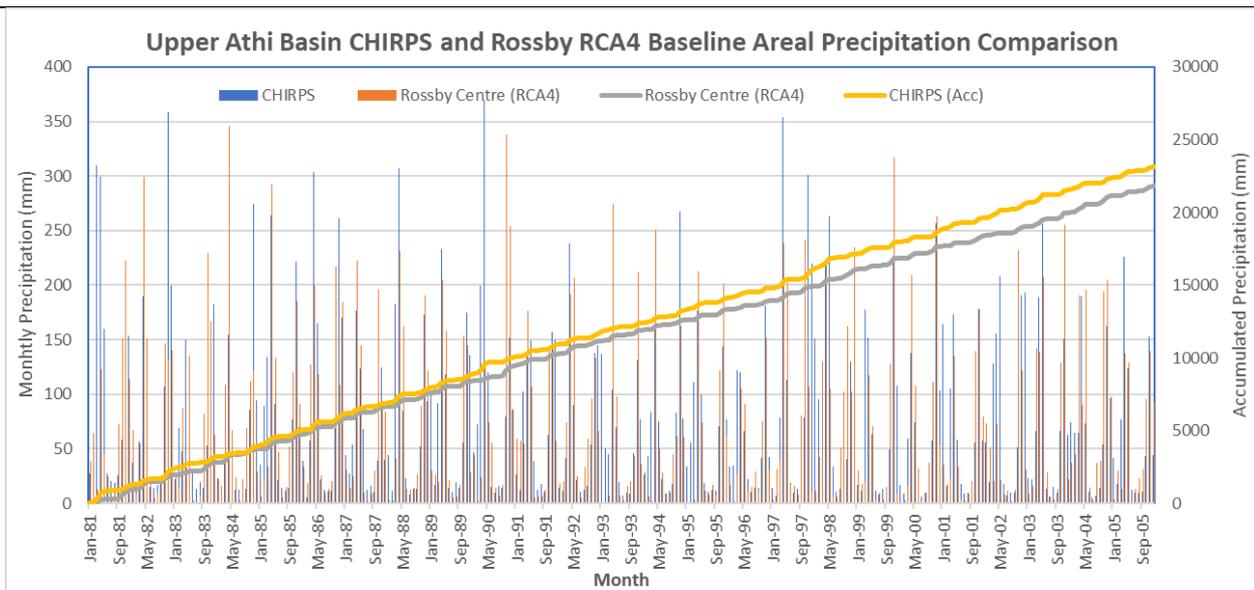


Figure 1 Comparison between Rossby Regional atmospheric Model (RCA4) and CHIRPS datasets

17. **The project is located in Southern Kenya and will cover the Athi River Catchment Area, an area of 68,900 km² with a population of approximately 9.79 million⁴.** Along the Athi River Catchment Area, there are 12 counties such as Nairobi, Makueni, Taita Taveta, Kwale, Mombasa, Kiambu, Machakos, Kajiado, Kilifi, Kitui and Nyandarua. **In order to ensure the effectiveness and efficiency of the proposed project activities within the limited financial resources and according the historical and projected drought and flood risk assessment and water scarcity, this project will be focused on these four counties: Kenya, which are Nairobi, Kiambu, Machakos and Nyandarua.** In addition, these counties have been selected for enhancement of Athi River Catchment Area through consideration, the consultative meetings with relevant government entities for this project, NEMA, WRA, MoWS – Ministry of water and Sanitation, KMD, UoN – University of Nairobi and the respective county governments.

Climate change vulnerability baseline, adaptive capacity and impacts

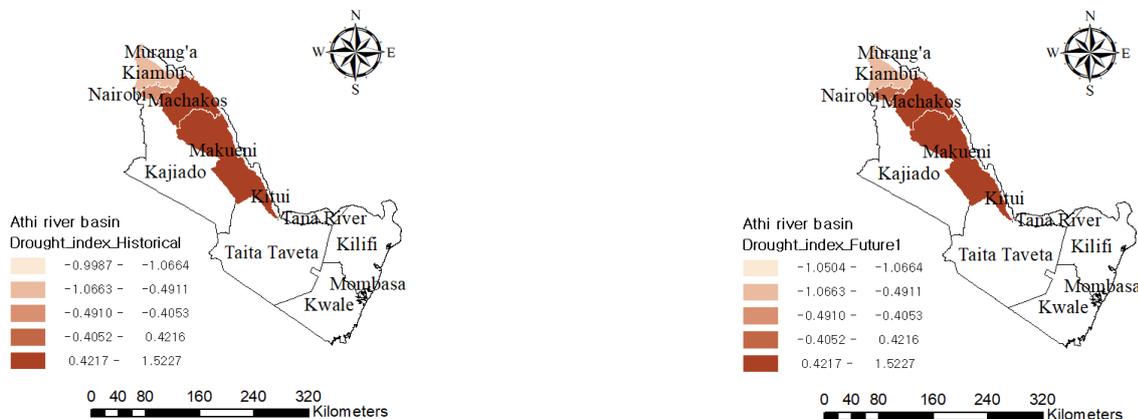
18. **The Upper ACA is classified as one of the most vulnerable area to the impact of climate change such as increasing temperatures and unpredictability of rainfall characterize. Climate change impacts and concerns in Upper Athi include water scarcity (Nairobi, Machakos and Kiambu), droughts (Machakos) urban flooding (Nairobi and Kiambu) and lack of awareness on climate change and its effects.** Additionally, the economy in Upper Athi just like in Kenya is dependent on climate sensitive sectors. Droughts and floods therefore have devastating socio-economic and environmental consequences in Upper Athi. Additionally, small holder farmer communities lack the necessary resources to invest in water harvesting structures such as pans and tanks. Investments into these structures through the project will enable the communities to have alternative water sources for water supply for domestic, agricultural use during the drought periods.
19. **Although the rainfall is observed to decrease annually and seasonally within ARCA, the rainfall fluctuates around a mean value thereby having enhanced rainfall in some seasons while others remaining dry or with depressed rainfall. These scenarios lead some areas especially Kiambu and Nairobi to experience urban flooding while areas like Machakos experience drought due to depressed rainfall. Both the intensity and the frequency of rainfall contribute to the above scenarios.** East Africa's seasonal rainfall is predicted to be strongly influenced by ENSO, which contributes to uncertainty in climate projections, particularly in future inter-annual variability.

⁴ <http://www.wrma.or.ke/index.php/wrma-regional-offices/athi/catchment-status.html>

20. **The population in Athi River Catchment is vulnerable to climate risks due to the high dependency on natural resources for food, fuel and shelter.** According to IISD (2012), climate risk and vulnerability in Kenya indicates that water availability is especially critical as they live in one of the most water scarce countries in Africa⁵. Access to this basic resource is likely to become more difficult due to population growth, economic expansion, unsustainable management of water and forest resources, and changes in rainfall patterns. At the same time water is the core input for most economic activities. The future water demand projections as of 2040 indicate growing water demand. This is shown in the provided sub basin water balance. Areas far away from perennial rivers use pans as a source of water, this water sources will be affected negatively in future due to increased evapotranspiration and therefore less likely to withstand prolonged drought. The net impact in the project area will be reduced water availability with increased irrigation demands. Climate change is thus anticipated to have a negative impact on the Upper Athi Basin from a water resources perspective. Although the frequencies of extreme drought (SPI less than -2.0) occurrences in the baseline climate are much lower than the baseline values for severe drought events, projected changes in extreme droughts have spatially more consistent and widespread signals. The rainfall-runoff/water resources analysis shows that the balance between future projected rainfall and ET to be positive leading to increased runoff. Hydrological modelling (Annex 29) used catchment areal average of future projected precipitation and may differ with past point/station rainfall trend analysis. The increase of stream gauging station measurements may not directly have related to increase of rainfall because other factors may come into play like ground water contribution to stream flow.

A robust analysis based on ensemble mean of the best performing RCMs shows that the frequency and intensity of droughts are projected to increase in future climates under the RCP4.5 and RCP8.5 emission scenarios. Results are detailed Annex 26 -Analysis of projected rainfall changes. And Annex 34 -Basin Level-Analysis of projected rainfall changes

The country's inland areas are largely arid, with two-thirds of the country receiving less than 500 mm of rainfall per year, limiting the potential for agriculture. Increased temperatures and rainfall variability are likely to exacerbate the conditions already experienced and may have a significant impact on water availability and droughts in the future. The prolonged drought of 2008 - 2011 serves to highlight some of the devastating and pervasive socio-economic consequences resulting from such events: crop production losses arising from reduced yields of food crops and cash crops amounted to KSh69 billion and KSh52 billion, respectively; the livestock sector experienced the worst impacts, losing approximately KSh699 billion, with KSh56 billion in damages due to costs from veterinary care, water, feeds and production decline and KSh643 billion in losses due to animal deaths. The risk assessment to drought was conducted by estimating integrated risk index, comprising hazard, exposure and vulnerability. Anthropogenic and environmental indicators were used in this assessment. **As a result, the risk of drought is expected to increase in the future, and Kiambu and Machakos seem to suffer from the more pronounced risk of drought (Figure 2).**



⁵ International Institute for Sustainable Development. 2012. Climate Risks, Vulnerability and Governance in Kenya: A state of the art review. Pre-publication version. Winnipeg: IISD. page 24.

Figure 2. Historical drought risk index (left: 1976 – 2005) and estimated drought risk index (right: 2011-2040)

21. Floods have caused equally devastating consequences in recent years, including loss of lives and livelihoods, personal property damage and damage to infrastructure, with ramifications for the economy. Major events were recorded in 1997-98. The 1997/98 El Niño floods are estimated to have caused damage equivalent to at least 11 per cent of GDP, including KSh62 billion (USD 777 million) in damage to transport infrastructure and KSh3.6 billion (USD 45 million) to water supply infrastructure. **While floods are generally associated with higher damages on public infrastructure assets, the burden of droughts falls more heavily on people, communities and the private sector.** Flood risk assessment was also conducted, which followed a similar approach of the drought risk assessment. **The flood risk seems to increase in the future and a large increase in flood risk is expected in the Kiambu and Machakos areas (Figure3).**

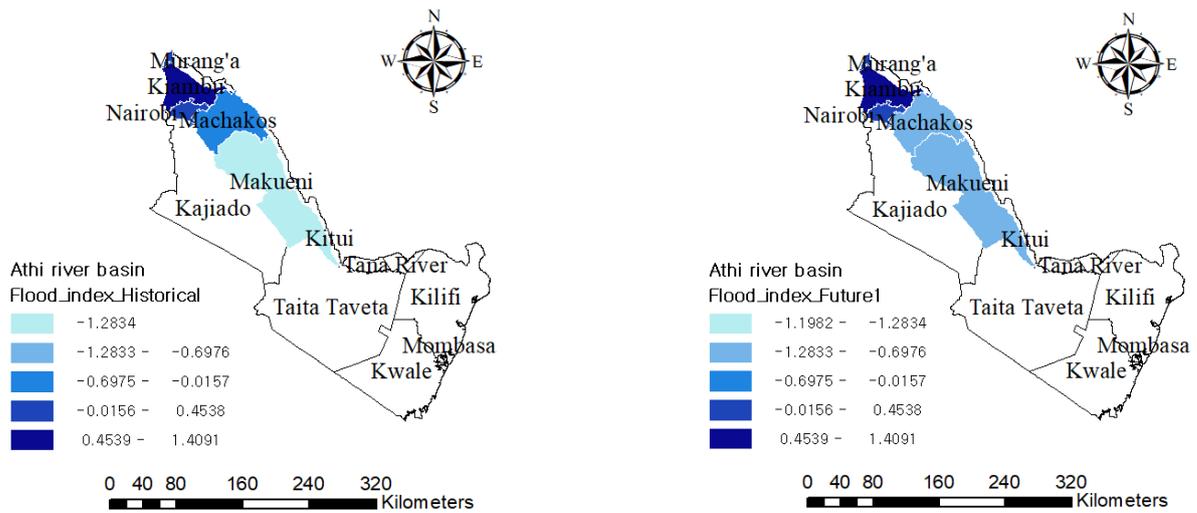
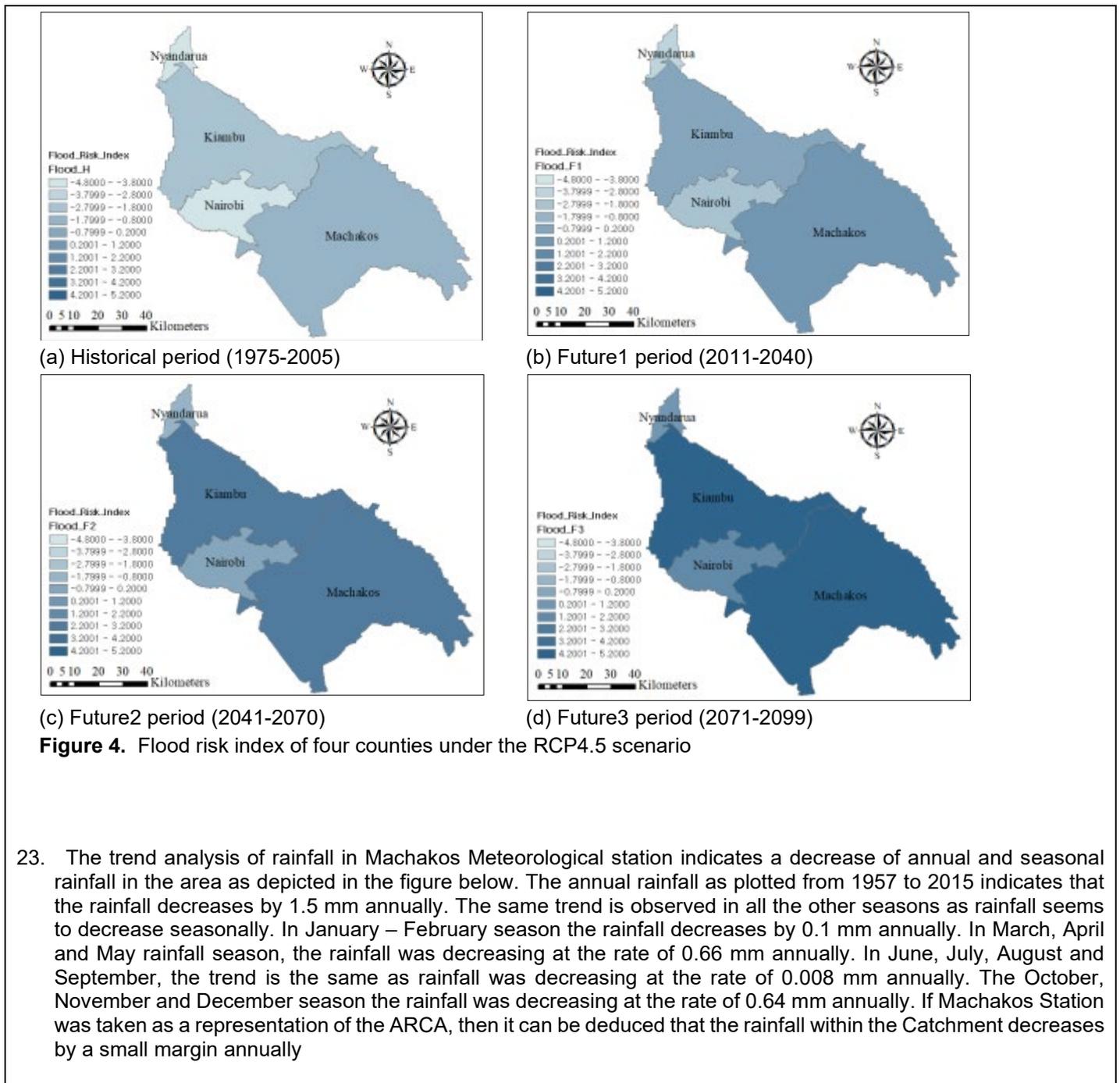


Figure 3. Historical flood risk index (left: 1976 – 2005) and estimated flood risk index (right: 2011-2040)

22. Climate change projections over the Athi River Catchment, modeling, downscaling and bias correction were done during the project preparation using 26 Global Circulation Models from CMIP5. **Results for annual rainfall across the 4 counties show an overall increasing trend, with the highest rainfall in Nyandarua and Kiambu⁶.** The Figures below show increased flood and drought risk in the Upper Athi Catchment Area across different time periods. Despite the projections on the Global Circulation Models, the local data results for annual and seasonal rainfall across the 4 counties show an overall decreasing trend, with the highest decrease in Machakos and JKIA Meteorological stations. The study was carried out from 3 Meteorological station within ARCA (Machakos, JKIA and Dagoretti stations) for a period between 1957 to 2015. The annual and the seasonal (JF, MAM, JJAS and OND) rainfall trends showed a decrease pattern ranging between 0.6 to 1.5 mm annually. The rainfall and temperature historical trend analysis was carried out at the basin level. 3 stations (Machakos, JKIA and Dagoretti stations) within the Athi basin were analyzed and their results presented with the analysis at the country level on Annex 28- Climatology of Kenya. Future projected rainfall changes for different season (MAM, OND) over the Athi River Basin based on ensemble averages on the top models is characterized by high temporal and spatial variations as described in Annex 34 - The basin level analysis of projected rainfall.

⁶ More details on the methodology and model output results can be found in the Feasibility Study.



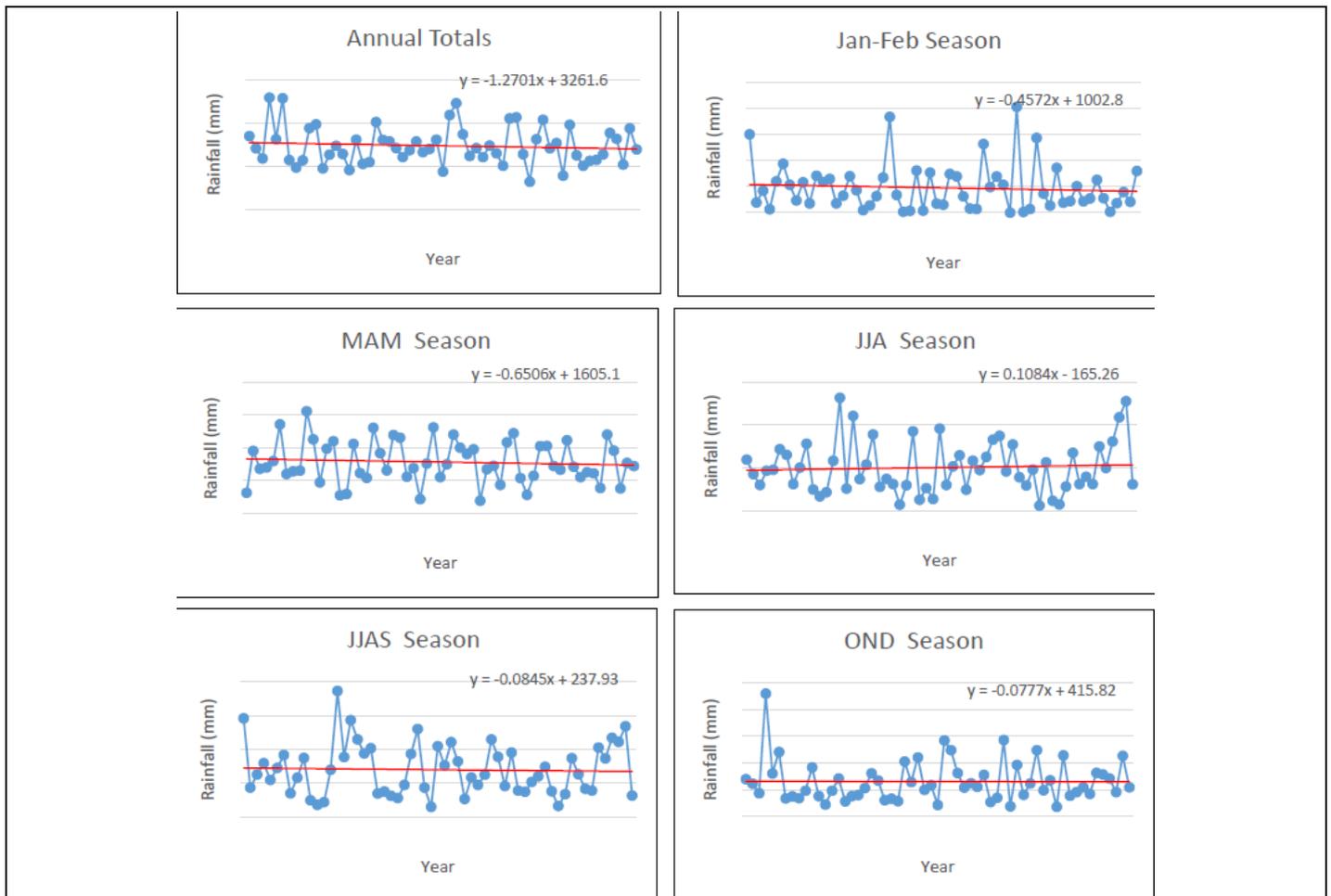
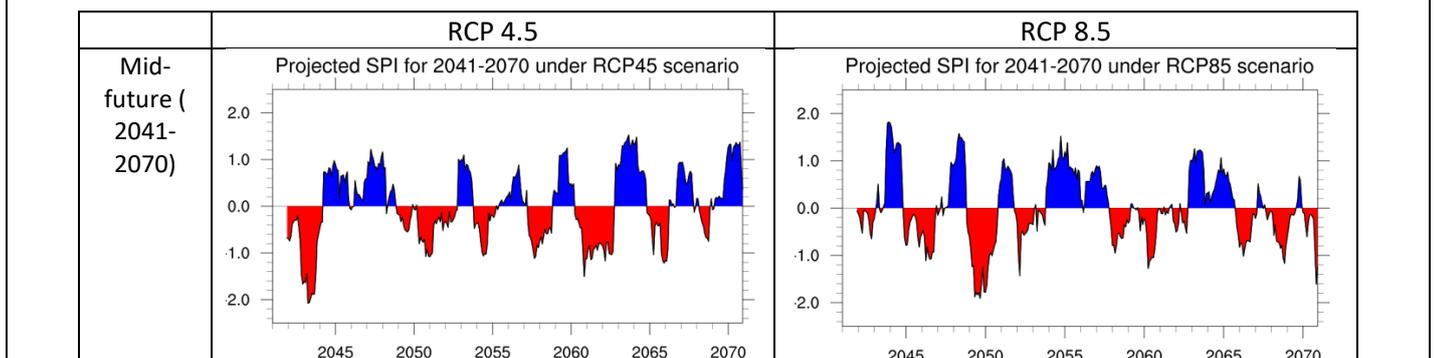


Figure 5 Rainfall Time series for Machakos Meteorological Station

24. The degree of dryness or wetness over Kenya was assessed using the “severe” and “extreme” categories and changes in projected SPI and frequency of dryness and wetness were examined for mid- and far-future climates under the RCP4.5 and RCP8.5 scenarios. Figure 5 provides the SPI over Kenya for different present and future periods and scenarios. Nationally averaged SPIs provide informative summary of precipitation differences between epochs and scenarios. SPI differences between the two scenarios in the present climate analysis are due to differences in the number of models used (three for RCP 4.5 and 4 for RCP 8.5). In addition to the response of climate to scenario forcing, temporal SPI variations for any epochs/periods depict the interannual variability of rainfall across Kenya. Overall, longer and/or more frequent drier events are projected in the far-future climate under the RCP 8.5 scenario.



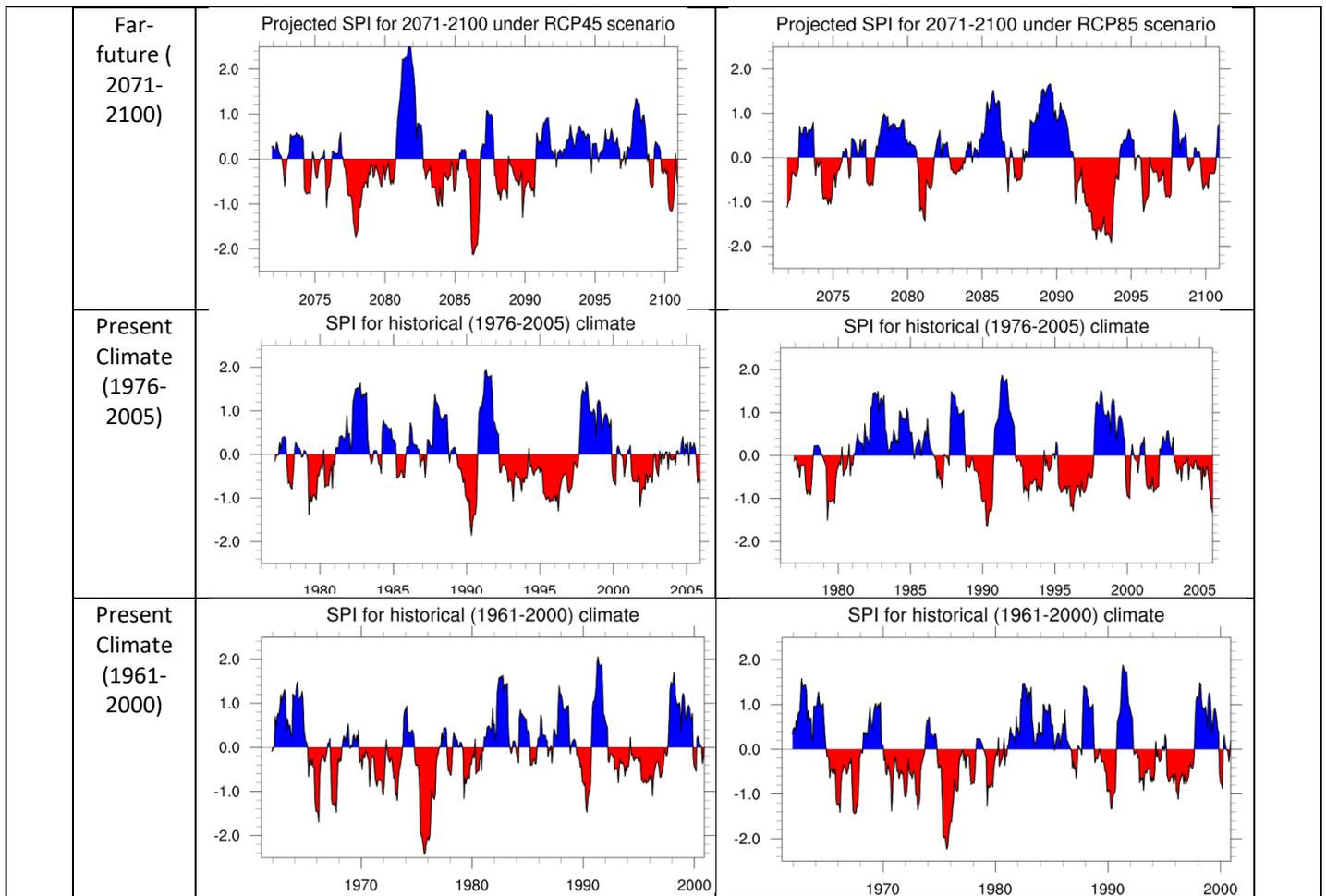


Figure 6. Drought risk index under the RCP4.5 and RCP 8.5 scenario

The analysis of SPI indices is conducted at basin-level. As a standardized unbiased index, the SPI is designed to show departures from a baseline. To show projected changes in frequency and intensity of droughts, the number of cases exceeding two levels of drought severity thresholds in three 30-year projection periods (near, mid and far future climates) were compared with identically identified counterparts in present day climate (1976-2005) for RCP4.5 and RCP8.5 scenarios.

The analysis has demonstrated that;

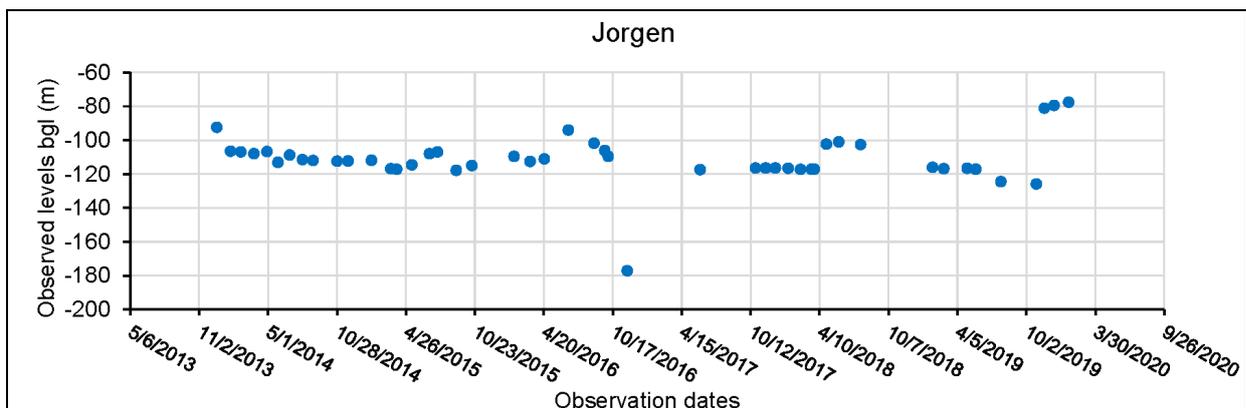
- the frequency of **severe** droughts is projected to increase in mid- to far-future periods under RCP4.5 and RCP8.5 scenarios, especially over the coastal areas;
- the frequency of **extreme** droughts is projected to increase in future periods under RCP4.5 and RCP8.5 scenarios in the Upper Athi River Basin; and
- Projected changes in **extreme** droughts have spatially more consistent, widespread and intense signals over the Upper Athi River Basin compared to projected changes in **severe** droughts.

Results are detailed Annex 26 -Analysis of projected rainfall changes and Annex 34 -Basin Level-Analysis of projected rainfall changes

25. **From the above scenarios, the frequency of the floods and drought occurrence shows an increasing trend and becoming more severe in the upper Athi catchment.** The magnitude of flood risk in the historical period was substantial in order of Machakos, Kiambu, Nairobi, and Nyandarua, and similar trends were projected in the coming decades. Drought risk, on the other hand, was the highest in Machakos, while Nyandarua being the least prone area to both flood and drought events. Although the levels of flood and drought risks vary, all four counties

are projected to be increasingly vulnerable to the negative impacts of climate change, and therefore it is necessary to propose appropriate interventions to make the communities in the target areas more climate change resilient.

26. Kenyan rainfall is highly variable; it has a strong inter-annual and spatial variability, which is associated with extreme events (droughts and floods). Inter-annual variability of rainfall in Kenya is associated with perturbation of global Sea Surface Temperature (SST). In particular, El Niño/La Niña (ENSO) and IOD phenomenon play a critical role in this variability. El Niño and positive IOD are associated with heavy rainfall and La Niña and negative IOD are associated with depressed rainfall over Kenya. Inter-annual rainfall variations in Kenya is highly linked to the El Niño Southern Oscillation (ENSO), with more rain and flooding during El Niño and droughts in La Niña years, both having severe impacts on human habitation and food security. Furthermore, to show projected changes in frequency and intensity of droughts relative to the present-day climate, the number of cases exceeding two levels of drought severity thresholds in three 30-year projection periods (near, mid and far future climates) were compared with identically identified counterparts in present day climate (1976-2005) for RCP4.5 and RCP8.5 scenarios. Results are detailed Annex 26 -Analysis of projected rainfall changes and Annex 34 - Basin Level-Analysis of projected rainfall changes
27. Along with the changes and projections of temperature and precipitation patterns in the study area, and its impacts that are shown as floods, droughts and reduced water availability; consequently, other challenges are expected. **One of the most important impacts of climate change on water systems is its influence on river flow, or discharge. In addition, climate change has affected groundwater levels through its influence on the amount of water available to aquifer recharge. Changes in annual rainfall as well as changes in the patterns of extreme precipitation events will affect availability of water for recharge.** Groundwater resources within the target areas have been significantly affected with some drying up especially in the drier part, a good illustration being Machakos county. **In Kenya climate change has caused higher temperatures thereby increasing evaporation rates, and also affecting recharge and groundwater discharge rates.** Due to decreased availability of surface water, there is increased reliance on groundwater to meet demand. The temperature trends of Machakos Meteorological station (project area) shows an increasing temperature since 1960.
28. The case study of Nairobi aquifer monitoring stations area demonstrate the contribution of rain events to groundwater recharge. The observation is a representative of what happens in other aquifers within the country and how rain periods manipulate aquifer replenishment. Depth to groundwater level from WRA monthly monitoring boreholes within Nairobi Aquifer Suite from 2013 to 2020 are displaying long-term declining trends and minimal influence of short-term pumping schedule. Recharge based recovery are evident as observed during periods of heavy rains around April – June every year and as experienced in late 2019 and January 2020 as shown in the figure below generated from monthly monitoring data. Annex 27 on Piezometric surface trend analysis further details the observations



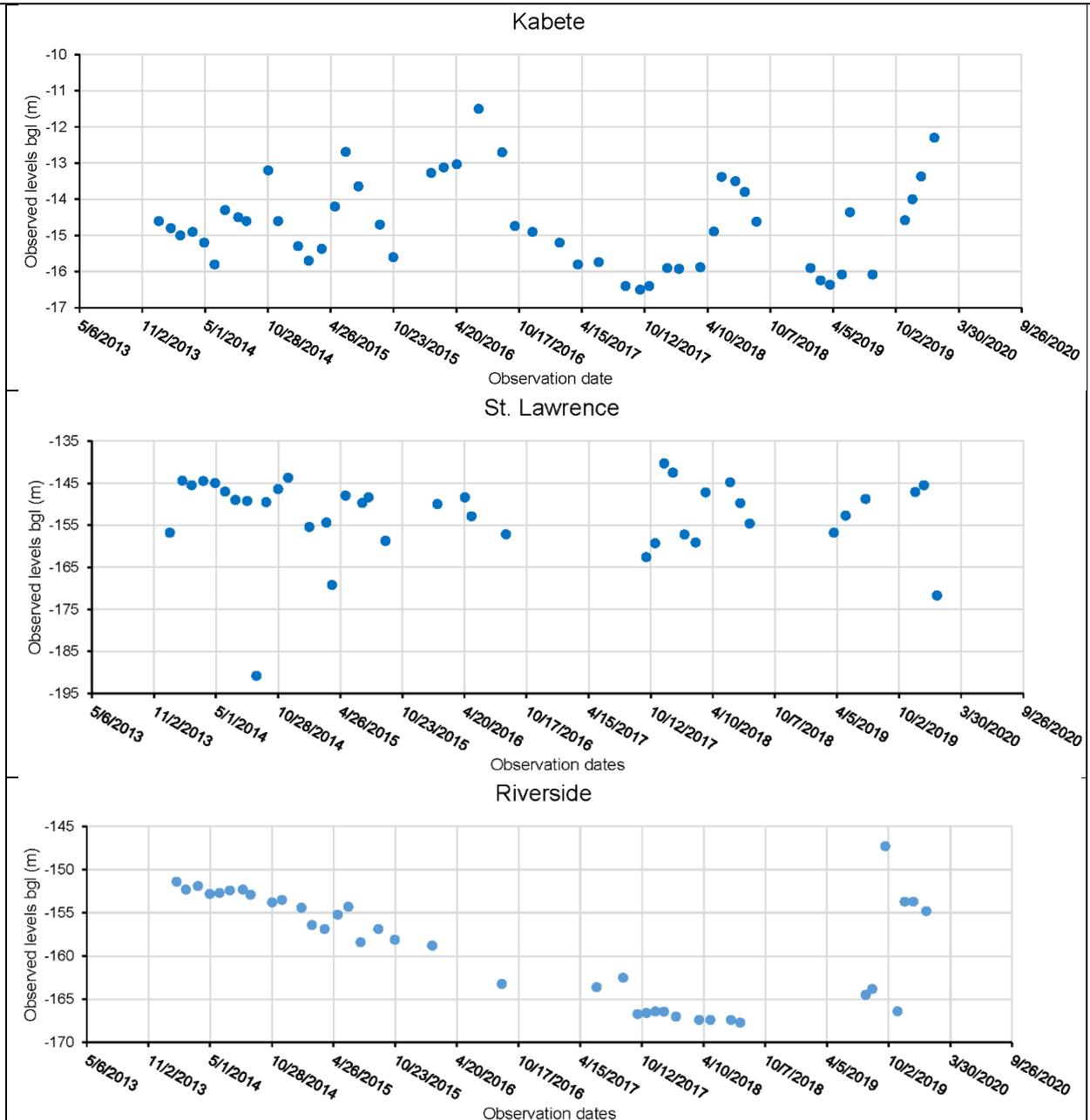


Figure 7: Observed groundwater levels (Nairobi sub-region)

29. **Climate change is also expected to exacerbate the water quality in the study area. Extreme weather events including typhoons, storms, and temperature jumps mainly result in water events, such as floods and droughts which may further affect the water quantity and quality.** Some studies have reported the impacts of droughts on the water quality, which mainly include increased pollutant concentrations, enhanced nitrogen mineralization, and delayed recovery from acidification. During the drought period, lower flows can weaken the dilution effects of some pollutants. Downstream populations depend on water from the river. However, increasing pollution can lead to health and sanitation related problems including waterborne diseases which make the population more vulnerable. There is a need to monitor the quality of the water in the river to ensure that communities without piped water are able to access safe and potable water for domestic use especially during drought conditions. In the Athi River Catchment area, the impacts of climate change on water quality are likely to be significant in several aspects: a) Water quality could suffer in areas experiencing increases in rainfall. Heavy

downpours can increase the amount of runoff into the river, washing sediment, nutrients, pollutants, trash, animal waste, and other materials into water supplies, making them unsafe, unusable and in need of treatment) b) Climate change is making heavy intense downpours, droughts and rising water temperatures more common. This can alter the quality of water. Bacteria and viruses thrive in these new conditions and when they come into contact with humans, can cause illness. Lack of water can also impact human health, especially in drought conditions. c) As water sources decline, the concentration of contaminants increases, making them more likely to affect human health. The monitoring of the water quality will therefore be important to institute measures to protect the water resources in the catchment.

30. Annex 28 - Climatology in Kenya, further details the Kenyan Climate context. The climatic changes are not uniform from one region to another. Future changes that are expected to occur are different from one climatological zone to another. Future rainfall variability is also expected to increase, therefore climate extremes of drought and floods are expected to increase its frequency and intensity toward the end of 21st Century. And these will result in economic losses to communities because of over dependency on rained agriculture. Temperature is also anticipated to increase, which cause might cause frequent heat wave especially in the low lying areas and also increase evapotranspiration and thus affecting agriculture. Crop production and livestock keeping will be greatly negatively impacted by decrease in the rangeland for livestock keeping these will lead to lose of livelihood for many households and will lead to over reliance on government relief food and increase conflict over resources. It was established high heat stress will increase heat related health risks more especially to the vulnerable. Due to projected increase in temperature and the rapid expansion of urban areas, urban heat island will affect the urban dweller, where night time temperature will generally increase.
31. From the climate models analysis, it has been established that temperature is increasing, the frequency of cold day and nights are reducing, while the frequency of hot day and warm nights are increasing. Depending on emission scenarios, the increase in temperature is likely to be between 0.3 and 5.4 0C by the end of the 21st century over Kenya. This is likely to change the hydrological cycle hence affecting precipitation intensity and extreme events and as a result affecting different sectors of the economy. Further, climate models indicate a reduction in precipitation during the long rains (MAM) and an increase in the short rains (OND). The models also show a reduction of annual precipitation. This exacerbates the drought condition within the area
32. **Another challenge related to its adaptive capacity to the impacts of climate change is the state of the water infrastructure, particularly water storage and water supply in the study area.** As a consequence of droughts, less water availability is expected in the 4 counties beneficiaries of the project. Proposed interventions in Nyandarua were primarily, water pans and springs. There are 12 water pans that require rehabilitation. In addition, two springs and boreholes will require rehabilitation. These structures are expected to serve about 65820 individuals with clean water supply. Proposed interventions in Kiambu were protection of springs, sinking of boreholes, rehabilitating existing ones and catchment protection to reduce erosion risks. In Kiambu County there are four springs that are proposed for protections, three water pans that are proposed for rehabilitation and protection and four boreholes are proposed for rehabilitation. These structures are expected to serve about 54000 individuals with clean water supply. Proposed interventions in Machakos County were primarily water pans. There are 9 water pans that were selected for rehabilitation in Machakos County. In addition, a spring and two boreholes were proposed for rehabilitation and establishment, respectively. These structures are expected to serve about 967,800 individuals with clean water supply.
33. **Other determining factors to reduce vulnerability (improve adaptive capacity) in the project area refer to the integral management of the catchment and to mainstream climate change into political instruments and management of water resources in Athi River Catchment Area.** Deforestation and forest degradation are rampant in the all the forested areas that feed the catchment. The National Water Master plan conducted a satellite image analysis with the forest area in ARCA in 2010 being 120,000 ha which corresponded to 2.0% of the forest cover in ARCA. The deforested areas during the last two decades were about 133,000 ha, which meant there was a decrease of 52.5% of the forest areas in 20 years since 1990. The small water sources (e.g., 20 springs and 17 wetlands), vulnerable to external factors, have deteriorated as reported in the interviews with stakeholders in the WRA and KFS in the ARCA. With a consideration of the condition of semi-aridity around the ARCA, the deterioration of these small water sources can negatively affect the water availability. The main environmental conservation activities proposed by the project are mainly reforestation under future climate intervention trees would play various

critical roles. This include increased forest cover, providing alternative source of fuelwood, contribution to biodiversity diversification and carbon.

34. The links between adaptation actions proposed by the project and the key climate change impacts & challenges outlined above are summarized in the table below.

Table 1. Key climate change impacts, associated challenges and immediate response measures needed

Key climate change (CC) impacts identified by the project	Major challenges associated with key CC impacts (Vulnerability/adaptive capacity)	Immediate response measures needed
<p>The Upper ACA is classified as one of the most vulnerable area to the impact of climate change such as increasing temperatures and unpredictability of rainfall characterize.</p> <p>Increased temperatures and variability in rainfall are likely to exacerbate prevailing conditions.</p>	<p>Inadequate data collection, information, generation and analysis on water resources, water scarcity and variability, water pollution, enforcement of water laws, catchment degradation, and the impact of climate change (adaptive capacity)</p> <p>Inadequate maintenance of the hydrological and meteorological stations.</p>	<p>Enhance hydrological and meteorological monitoring system to support decision making, planning and policy development in water and climate change sector</p> <ul style="list-style-type: none"> • Strengthening monitoring networks to enhance data collection and to improve climate and water information management system • Improving the use of water resources management tools for effective water resources planning • Strengthening stakeholder collaboration to enhance water storage and to address the impacts of climate change • Building staff capacity and improving the work environment
<p>Water Scarcity</p>	<p>Difficulty in accessing water resources due to the lack of water supply facilities and maintenance resource</p> <p>Significant impact on the availability of water.</p> <p>Crop and livestock production losses from reduced yields of food and cash crops</p>	<ul style="list-style-type: none"> • Improve climate water resilience by building, enhancing and rehabilitating prioritized water infrastructure and implementing conservation activities in the catchment. • Strengthen water and adaptation planning, institutional and regulatory framework to respond to changing climatic conditions.
<p>Droughts</p>		
<p>Flooding</p> <p>As a result, the risk of drought is expected to increase in the future, and Kiambu and Machakos seem to suffer from the more pronounced risk of drought</p>		
<p>Climate change is also expected to exacerbate the water quality in the study area</p>		

35. The project will support the implementation of the Kenya National Adaptation Plan (2015-2030) whose vision is enhanced climate resilience towards attainment of Vision 2030. Enhanced climate resilience includes strong economic growth, resilient ecosystems, sustainable livelihoods, reduced climate-induced losses and damages. On the other hand, the revised Environmental management and Coordination Act (EMCA) 2015, in the spirit of devolution has devolved environmental planning and governance to the Counties. Counties should develop and to establish County Environment Committees and prepare County Environment Action Plans (CEAPs) and participate in the preparation of State of Environment reports (SoEs). Under the County Government Act, Counties are also required to prepare County Integrated Development Plans (CIDPs) to guide sustainable development. **This project will support the Counties to integrate climate change adaptation and mitigation in their planning**

processes. It will also build the capacity of local level governance structures to address the impacts of climate change.

B.2. Theory of change (max. 1000 words, approximately 2 pages plus diagram)

36. The project targets to **enhance community resilience and water security in the Upper Athi River Catchment Area (ARCA) in Kenya**, particularly in the counties of Machakos, Kiambu, Nairobi, and Nyandarua to address the core problem that climate-induced droughts, floods, water scarcity threatening livelihoods and water infrastructure. The target catchment is key to Kenya's water management and host some of the most vulnerable groups of society. Therefore, this project will address the following challenges and barriers to improve capacity to adapt in ARCA:
37. **Weak technical basis of monitoring and information system on hydrology and meteorology constrains the adaptive capacity against flood and drought within the ARCA.** Insufficient observatory facilities (rainfall and water level) can limit the quantity of monitoring data. In terms of a quality of the collected data by present monitoring systems, the hydrological data are not subject to systemic quality management due to the lack of standards and protocols and budget. Management of meteorological data is also barrier. Transmission of the measured data is compromised by the failure of equipment maintenance and transmission network. Importantly, with adaptation or change comes uncertainty. Decision makers and technical staff lack sufficient information on climate change impacts to make informed decisions on changes in water management.
38. **Limited technical and institutional capacity to cope with climate change in water sector.** In regard to the technical capacity in Kenya, the climate and water-related monitoring system and infrastructure is poor, many observation systems are not functioning, and data collection, analyzing and processing systems are unreliable. Furthermore, information and data sharing/dissemination and communication systems among weather stations, meteorological agency (center) and local communities are not properly linked. Investment in this area will lead to improved adaptation planning, thus building adaptive capacity of the targeted communities in the four Counties. Political and management instruments for water management in the beneficiary counties do not consider climate change as an important aspect for their planning.
39. **Climate change is expected to exacerbate water quality problems in the area.** The water resources and environment have been degraded by human activities such as industrial development, farming, informal settlements, deforestation, solid waste disposal and wetland and riparian encroachment. Pollution of Athi River is on the rise and has negatively impacted the downstream communities for whom the river is a lifeline. The Nyandarua watershed is highly crucial because it is a main water source of Kenya. In particular, the water flows of Athi and Tana Rivers are affected by this area. Unfortunately, the Aberdare forest, providing water resource with high quality, has been destroyed by illegal harvest and deforestation activities. Consequently, the quality and quantity of water from this forest has also deteriorated. Awareness of negative impacts due to these activities needs to be increased to villagers to prevent these damages in the future. In addition, monitoring about water quality and climate change impacts are necessary.
40. **Floods, droughts, and the reduced availability of water in the area have impacted the water infrastructure in the area, in particular the provision of drinking water and domestic use.** Poor drainage infrastructure has caused frequent floods in Nairobi. In particular, the upstream region of Athi River experiences these damages, compared to the downstream region. Irregularity of water supply due to climate change has threatened sustainability of this city, also causing waterborne diseases. With consideration to the dense population in this city (> 3 million), implementation of appropriate measures is urgently required. 7) The major water source of the upper Athi River passes through Kiambu. The geographical location of this region largely affects the quantity and quality of water resources in the upper Athi River. Failure to improve the water quality and quantity of this upper region can deteriorate the quality and quantity of the lower Athi River. Although this town is surrounded by hilly farmlands, rapid urbanization within limited land space is expected to disturb the water system. Furthermore, the risk management on drought and flood also shows the higher vulnerability of Kiambu.
41. **The Theory of change proposed use a results chain of inputs, activities, outputs, outcomes. The main outputs are:**
- Output 1: enhance hydrological and meteorological monitoring system to support decision making, planning and policy development in water and climate change sector.
 - Output 2: improve climate water resilience by building, enhancing and rehabilitating prioritized water infrastructure and implementing conservation activities in the catchment.

- Output 3: Strengthen water and adaptation planning, institutional and regulatory framework to respond to changing climatic conditions.
42. The Fund level impacts of the project are an increased resilience of: i) infrastructure and the built environment to climate change threats; ii) most vulnerable people and communities; and iii) health and well-being, and food and water security. The paradigm shift is to move towards enhance community resilience and water security in the Upper Athi River Catchment Area (ARCA) in Kenya.
43. The first pathway to change (output 1) is development of monitoring networks and databases for change analysis as an adaptation to climate change impacts on freshwater resources in the upper Athi catchment. Hydro-meteorological Monitoring will avail methods for change detection, attribution and prediction of changes and vulnerability of groundwater, floods, low flows and droughts and also prediction of groundwater quality degradation and restoration needs. Further a network for analyzing hydrological data through the exchange of data, knowledge and techniques will be established that will assist on the understanding of hydrological variability in space and time in different counties within the upper Athi catchment which have different hydro-climatic and hydro-geological environments. Increased data, monitoring, knowledge, understanding, and predictive modelling of hydrological variables will be used to improve the management and design of water resource, agro-hydrological and eco-hydrological systems against the influence of global climate variability and change. Improved management will lead to improved adaptation planning, including policy-related interventions for adaptation whose outcome is resilient water systems in the catchment. This resilience will lead to improved access, thereby improving the wellbeing, food and water security of the area.
44. The second change pathway (output 2) premises that since availability of water is impacted by distorted patterns of rainfall, a systematic means of addressing water availability, is to avail infrastructure that collects natural sources of water. Harvesting rainwater directly responds to water scarcity. The infrastructure proposed will avail water to households that are currently struggling daily with their water demands. The increased availability of water will bring the ability to farm, improved health and wellbeing, and increase household social and economic value.
45. The third change pathway (output 3) is strengthening capacity governance on water resources. The government of Kenya has 3 main local level policy tools for water governance namely, sub catchment management Plan, County Environmental Action Plan and the water quality regulations. Sub catchment management plans define the stakeholders, their roles and responsibilities, and also define actual activities to be undertaken to manage the resource. The County Environmental Action plan defines a whole ecosystem approach to managing the environment. Water quality regulations assist in managing pollution levels. Development and implementation of these management tools will lead to improved management of water resources in the target area, thereby leading to increased access to water for better wellbeing, health and food security.
- 46. Assumptions:**
- The county government and the local community will support the project in order to address or reduce climate change impacts.
 - The Global System for Mobile communication will be operating at optimum levels
 - Staffs and personnel of NEMA, WRA, KMD, County governments and communities will use the information for decision making and better planning in climate change and water sector
 - County Governments will implement the recommendation of the planning documents – CEAPs, SCMPs and will mainstream climate change impacts on these public policy and management instruments.
 - The regulated stakeholders will be participating in the meetings and have enhanced compliance to the regulations and area aware of the climate change impacts in the area.
47. Below is the theory of change for the project:

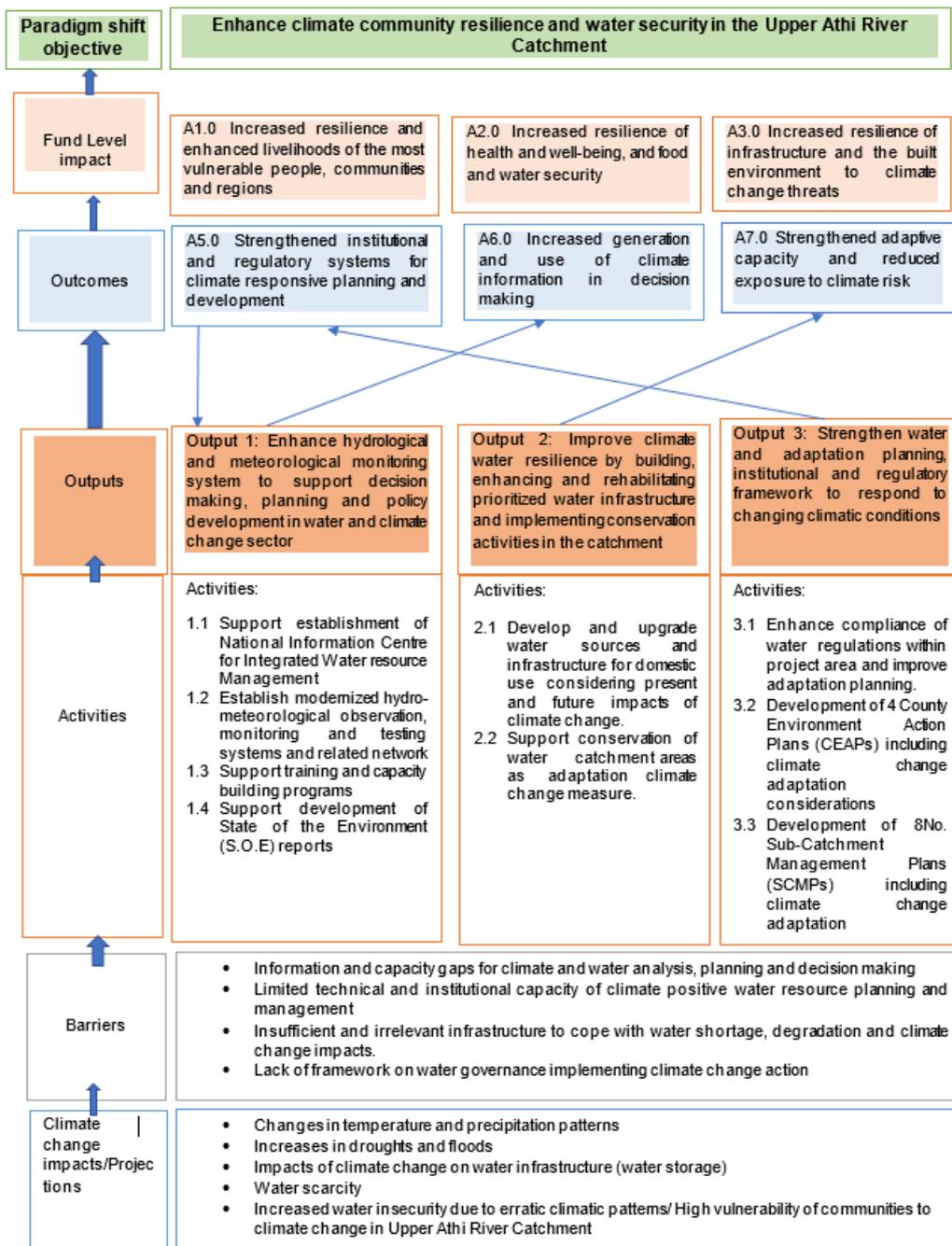


Figure 8: The Theory of Change of the project.

B.3. Project/programme description (max. 2000 words, approximately 4 pages)

Project objective, outcomes and impacts

48. The target of this proposed project is four counties: **Machakos, Kiambu, Nairobi, and Nyandarua** in the Upper Athi River Catchment Area. These counties were selected, given the counties’ high exposure to climate induced floods, droughts and water scarcity.

49. The project objective is to strengthen the resilience to climate change of communities and increase water security in the Upper Athi River Catchment in Kenya (Nairobi, Kiambu, Machakos and Nyandarua). This is expected to be achieved through three outputs:

- Output 1: enhance hydrological and meteorological monitoring system to support decision making, planning and policy development in water and climate change sector.
- Output 2: improve climate water resilience by building, enhancing and rehabilitating prioritized water infrastructure and implementing conservation activities in the catchment.
- Output 3: Strengthen water and adaptation planning, institutional and regulatory framework to respond to changing climatic conditions.

50. Lessons learned from past experiences targeted at strengthening water resource management and enhancing water availability indicate that support has been scattered and somewhat duplicated. Such actions in the past could not cover all of the Athi River Catchment to sustain service, so the required recognition from government and beneficiaries need to be provided systematically. While past projects and programs in Kenya and other developing countries have been infrastructure focused, those investments can only be sustained when the institutional capacity is reinforced, and service delivery has successfully improved.

Component 1: enhance hydrological and meteorological monitoring system to support decision making, planning and policy development in water and climate change sector.

51. **This output seeks to strengthen hydrological and meteorological information services to deliver relevant, accurate and timely climate information to local communities, and also to support decision making and policy development in the water sector.** This will be achieved by investments in optimized hydro-met monitoring networks, more effective management and exchange of hydro-met data; and improving the capacity to forecast future water and weather conditions. Ultimately, this information will be used to strengthen early warning systems.

52. Investing in hydro meteorological information systems will not only enhance protection from weather and climate shocks such as droughts and floods but will also improve our capability for gathering hydro meteorological data which is critical for monitoring and predicting extreme events. National Information Center for Integrated Water Resource Management to be established in WRA offices that will act as a hub of water resources monitoring information and will be equipped with proper ICT system for processing, analysis of information to produce integrated water resources information for informed decision making. Water resource monitoring systems in the catchment area are already established covering the main Athi River and its tributaries. However only 58% of surface water level, 35% of groundwater level and 66% of rainfall are actually being monitored currently by the WRA within the Athi River Basin. Therefore, it is necessary to increase the number of monitoring stations that include telecommunication abilities.

53. Hydro meteorological information is being collected by WRA as well as the Kenya Meteorological Department, but their analysis and dissemination is not coordinated. Also, WRA has signed MOUs with WRUAs in the catchment as required by the Water Act 2002. However, no MOUs have been signed with county governments. The Water Act 2016 has provision for Basin Water Resources Committees and County Governments' are represented in the committees with the role of advisory on water resources management issues within their respective basins; however, the Basin Water Resources Committees are yet to be established. Therefore, there is a clear need for building up coordinated governance for water resources management from the monitoring of water resources, sharing information, making decisions on the water at different levels. This project will aim to bring a coordinated approach to ensure that this information is collected, analyzed and disseminated for the different users including county governments, communities and industry. Necessary support materials and training activities are required to enhance capacity of government institutions as well as stakeholder groups to accomplish their respective role in coordinated water resources management.

54. A complete Hydro Met Station / Automatic Weather Station (AWS) comprises of a continuous monitoring of all meteorological and hydrological parameters at a specific location. These parameters include: Rainfall, Temperature (Max, Min and Actual), Wind direction and Speed, Humidity, Atmospheric pressure, Solar radiation and Soil Moisture. For RGS, water level is measured along the river channels. This information is very vital in the management of water resources by incorporating it in models to determine the future of state of water resources. Using this information some hydrological models will determine the future flood / drought situation. With the output

from the models, decisions on water harvesting and storage / drought risk mitigation will be reached. This will overall improve water security and hence food security

55. A “Radio Internet” – RANET station will be set up to broadcast in local dialect. The RANET Station will serve as learning institution for students on environmental and climate related studies. The radio station focus will mainly be on climate-related issues, market information, agriculture and emerging technologies in the climate change space. The direct beneficiaries will be the community settled within the project area in Machakos County. The station broadcast within a radius of approximately 50-75 km and mainly broadcast in local dialect and therefore will be able to reach all the target communities in the project area.
56. There is a clear need for building up coordinated governance for water resources management from the monitoring of water resources, sharing information, making decisions on the water at different levels. This output will also intend to bring a coordinated approach to ensure that this information is collected, analyzed and disseminated for the different users including county governments, communities and industry. Necessary support materials and training activities are required to enhance capacity of government institutions as well as stakeholder groups to accomplish their respective role in coordinated water resources management. Figure. 7 shows the reporting and monitoring framework that provide for coordinated governance of the WRUAs who are key water resources management stakeholders in Athi River Catchment.

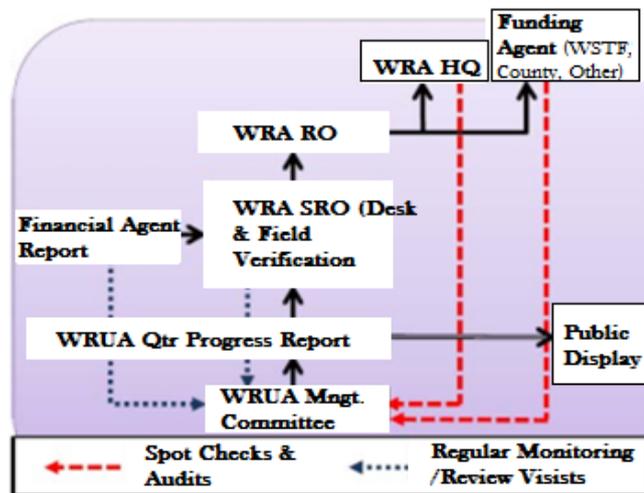


Figure 9: Reporting and Monitoring structure of WRUA Activities

57. This component also includes developing and implementing a capacity building, training and education program including formal training and retraining to build the capacity of NEMA, KMD and WRA staff on integrated water resource management and climate change for provision of accurate and timely information to Communities, County governments and relevant stakeholders in the Athi River Catchment for use in water resources management and adaptation planning.
58. The beneficiaries for output 1 include WRA and KMD for activity 1.1, 1.2 and 1.3, NEMA for activity 1.1, 1.3 and 1.4. KMD will acquire ownership of assets created under activity 1.1.3 and 1.2.4. WRA will acquire ownership of assets created under activity 12.1. and 1.2.3. NEMA will acquire ownership of assets created under activity 1.2.3. Hence WRA, KMD and NEMA will be direct beneficiaries of the mentioned activity lines. The county governments and the relevant water governance structures and communities within the project area are beneficiaries for all activities.
59. The eligibility criteria to apply in selection of beneficiaries under Activity 1.3.1 shall include; Geographical criteria: staff working within the project's geographical coverage; Job criteria: staff/members responsible for providing water/climate information to communities regardless of the institution; Project involvement: staff/members directly involved in implementing Project Activities either at the county or headquarters of the institutions and Equity criteria: priority should be given to gender balance, and consideration for staff with special needs e.g. disability.

60. The eligibility criteria to apply in the selection of beneficiaries under Activity 1.3.2 shall include; Geographical criteria: relevant organizations/committees must have mandates related to the project's objectives, and working within the geographical space of the project; Relevance: Organizations/committees/CBOs etc. should be involved in project-relevant work (i.e. work aligned with at least one of the project's activities) within Athi River catchment area; Equity: Selection of individual trainees should consider gender balance, persons with disabilities, and minorities and Priority given to WRUA members.

61. Table 2 explains in detail activities and sub-activities of output 1:

Table 2. Outputs and activities under Component 1

Component 1: enhance hydrological and meteorological monitoring system to support decision making, planning and policy development in water and climate change sector.	
Outputs	Activities
Output 1.1: Support the establishment of a National Information Center for Integrated Water Resource Management.	<p>1.1.1 Set up an institutional mechanism for sharing information and getting feedback (data sharing protocols among players in the water sector e.g. through MOUs).</p> <ul style="list-style-type: none"> • Policy dialogue Meetings aimed at developing data sharing protocols (between NEMA, WRA, KMD) and strategy for continuous communication between the user communities and county governments.
	<p>1.1.2 Support the development of a National Information Centre for integrated water resource management (under the WRA HQ) by equipping it with necessary hardware and software facilities.</p> <ul style="list-style-type: none"> • Acquire and install the centralized integrated water resource management information system (server, HDD 1TB, monitors, network facilities, UPS with additional batteries) with necessary software (operating systems, database, visualization, web server and other utilities).
	<p>1.1.3 Support information analysis, forecasting and knowledge sharing platforms through an integrated database for weather and water resources-related information;</p> <ul style="list-style-type: none"> • Develop an integrated analysis tools with visualization from monitoring information. The Decision Support System will assist in data entry, storage, analysis and reporting of collected data. The DSS is an information system that supports an organizations decision-making and facilitate its processes. • Develop a shared system of weather forecast information for development of early warning and install a flood and drought warning system in flood prone areas in Kiambu and Machakos counties • Develop web services for sharing information with stakeholders
Output 1.2: Establish modernized hydro-meteorological observation, monitoring, and testing systems and related networks	<p>1.2.1 Installation of surface hydro-meteorological monitoring and network systems and rehabilitate existing monitoring systems (Nyandarua, Nairobi, Kiambu, Machakos county).</p> <ul style="list-style-type: none"> • Install 25 Automatic Weather stations within the upper Athi catchment. all the stations will be equipped with Remote Terminal Units (RTUs), GSM/GPRS Modems, and the solar PV systems with solar battery, data protection equipment such as noise filters, surge protective devices. • Install 23 surface water level monitoring stations with multi-parameter water quality sensors for 20 stations. 5 rainfall monitoring stations. All the stations will be equipped with Remote Terminal Units (RTUs), GSM/GPRS Modems, and the solar PV systems with solar battery, data protection equipment such as noise filters, surge protective devices. 3 Water Level Stations will be manual hence will not require the sensors. The 5 rainfall monitoring stations will be distributed in specific sites in the project area and located within the Automatic Water Level Station (AWLs) compound.

	<p>(Installation includes procurement of equipment and procurement of services for physical installation of that equipment)</p> <p>1.2.2 Upgrade water quality testing laboratory for WRA and NEMA</p> <ul style="list-style-type: none"> Acquire and calibrate devices for water quality test such as atomic absorption spectrophotometer, oxitops, Chemical Oxygen Demand (COD) digester, incubators, sediment analysis kit, High-performance liquid chromatography, Procure operational materials such as laboratory chemicals, reagents, and glassware. Both NEMA and WRA will be allocated funds for upgrading their water quality test laboratories <p>1.2.3 Establish 10 groundwater monitoring stations</p> <ul style="list-style-type: none"> Develop 10 new monitoring wells in Nairobi, Kiambu and Machakos counties and Install necessary sensors to measure water level, conductivity, temperature, RTUs and other equipment for automated data transfer
	<p>1.2.4 Setting up of a RANET broad casting station in Machakos County.</p> <ul style="list-style-type: none"> Installation of a RANET - "RAdio InterNET" broadcasting in approximately 50 – 75 Kilometers radius in the local dialect, Kiswahili and English for 24 hours, with an estimated audience of 1,000,000 listeners
Output 1.3 Support training and capacity building programs	<p>1.3.1 Support capacity building and training for government institutions with water and climate change mandates within the project area.</p> <p>The executing entities will identify capacity building and trainings for their relevant institutions with water and climate change mandates within the project area and NEMA will approve and disburse fund accordingly</p> <p>1.3.2 Support capacity building and training for relevant water governance structures and communities within the project area (Water Resource Users Associations -WRUAs, County Environment Committees - CECs, County Adaptation Committees, Community Based Organizations -CBOs among others)</p> <p>The executing entities will identify capacity building and training for relevant water governance structures and communities within the project area, develop training plan and manuals and NEMA will approve training plans and disburse fund accordingly</p>
Output 1.4 Development of State of the Environment (S.O.E) reports	<p>1.4.1 Support development of State of the Environment (S.O.E) reports</p> <ul style="list-style-type: none"> Consultative workshops to develop the S.O.Es.

Component 2: improve climate water resilience by building, enhancing and rehabilitating prioritized water infrastructure and implementing conservation activities in the catchment.

62. The second output seeks to invest on improving and rehabilitating prioritized water infrastructure in the target counties considering climate change impacts and consequently increase access to potable water for domestic and improved livelihood. The component also covers catchment protection. Activities under this component will promote development of water harnessing and storage facilities for communities and local institutions in the counties considering historical and future climate change impacts. Athi catchment area has a number of degraded water storage facilities including water pans, sand dams and rock catchments that should provide critical access to water for communities. The project intends to rehabilitate these facilities to enhance water access for communities in close proximity to the structures. The water infrastructure assessed in Nyandarua, Kiambu and Machakos counties is ageing partly due to weather elements and effects of climate change. Water sources are affected by climate change through changes in annual rainfall and increased runoff resulting in decreased raw water quality. This causes poor water quality and scarcity and exerts stress on the water infra-structure affecting how communities can reliably access clean water. Through the consultation meetings and site assessments, rehabilitation and

construction of boreholes, water pans, springs, tanks, and sand dam in three counties (Kiambu, Nyandarua and Machakos) are proposed. Detailed list of intervention is available in Feasibility Study and the Technical study report.

63. Water storage and conservation allows communities to have water for a longer period of time especially during drought periods. Women and children particularly will benefit from increased access to water. In communities in the area, the roles of fetching water are left to women and children which in some cases can be quite difficult due to long distances covered to fetch water. Gender considerations will be considered when implementing the project to ensure that the benefits of access to water focus on the most vulnerable including women and children. It is expected that there will be a reduction in distances travelled to fetch water subsequently reducing the amount of time spent to fetch water. Reduction of costs of treatment for waterborne diseases and condition will also be one of the expected benefits of increasing access and availability of water.
64. The restoration of degraded water catchment areas will be done through engagement of communities through existing water resources governance structures in the counties in rehabilitation/renewal/conservation and protection of degraded water catchment areas. Rehabilitation and reforestation activities within the selected counties will be carried out by WRA in collaboration with WRUA who will be engaged as service providers and eventually acquire the ownership of the established tree nurseries. Major water catchment degradation issues in Kiambu and Machakos counties are Sand harvesting, poor agricultural practices, wetland and forest area encroachment, untreated effluent discharges and vegetation clearing. The proposed safeguards for the structures to be constructed among other are as follows; Monitoring through the established integrated Water Quality & Pollution Control networks, Enforcement through waste disposal control plans, Issuance of effluent discharge permits / licenses, Enforcement of the set waste disposal standards and effluent discharge control plans. There exists no exclusion list, all entities shall benefit from the Funded Activity. The project will underscore on the successes of ongoing county led Climate Smart Agriculture- CSA practices. Additionally, the project will seek to network and build on the achievements with the ongoing Kenya Climate Smart Agriculture Project by World bank under implementation in 24 counties in Kenya; with the objective of increasing agricultural productivity and building resilience to climate change risks in targeted smallholder farming and pastoral communities in Machakos County.
65. Moreover, the project will liaise with a recent initiative launched by CIGAR and World Bank titled “Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA).” This initiative aims to enhance access to knowledge, technologies, and practices to build the resilience of agriculture and food systems in Sub-Saharan Africa countries. The East Africa component is implemented in Ethiopia and Kenya through CGIAR Research Program on Climate Change, Agriculture and Food Security - CCAFS and Igad Climate Prediction & Applications Centre - ICPAC partnership. This project will partner with ICPAC and CCAFS EA to enhance use of agro-advisories and agricultural support decision support tools developed under the AICCRA and will promote climate-smart agriculture practices in the upper ARCA. The project will also participate in regular national and regional climate outlook forums (NCOF, GHACOF) for the co-development of tailored climate information services for targeted users thereby contributing to increased resilience of communities in the project area
66. The selection criteria of the infrastructure that will be rehabilitated (activity 2.2.1) was carried out through a stakeholder consultative process during the feasibility report development. The construction and technical standards that will be applied to the rehabilitation work will be in accordance to the guidelines provided for by the ministry of Water Sanitation and Irrigation in Kenya. For all the rehabilitated water structures, the management committees will ensure sustainability by actioning measures that ensure steady flow of funds for O&M.
67. The O&M post project implementation for those structures under water service providers in Kiambu, Nyandarua and Machakos will be done by the water companies. The structures under management by committees will require to register as water users’ associations under Water Sector Trust Fund - WSTF Community Project Cycle framework for community water supply and will entail development/review of by-laws to incorporate an aspect of water tariff to take care of O&M costs. During planning meetings at the point of project implementation, respective county governments and WSTF will be involved in order to incorporate their ‘pro-poor model’ for financing water structures.
68. The beneficiaries for output 2 are the relevant county governments, the relevant water governance structures and communities within the project area.
69. Table 3 explains in detail activities and sub-activities of output 2.

Table 3. Outputs and activities under Component 2

Component 2: improve climate water resilience by building, enhancing and rehabilitating prioritized water infrastructure and implementing conservation activities in the catchment.	
Outputs	Activities
Output 2.1 Develop and upgrade water sources and infrastructure for domestic use considering present and future impacts of climate change.	<p>2.1.1 Construct water storage and supply infrastructure</p> <ul style="list-style-type: none"> rehabilitate two boreholes, twelve water pans, two springs in Nyandarua county build a new borehole, water pan, two springs and rehabilitate three boreholes, two water pans, two springs in Kiambu county build two new boreholes, rainwater harvesting tanks and rehabilitate nine water pans, one spring and one sand dam in Machakos county
Output 2.2 Support conservation of water catchment areas as climate change adaption measure .	<p>2.2.1 Rehabilitation and reforestation activities within the 4 target counties in collaboration with WRUAs</p> <ul style="list-style-type: none"> Establish tree nurseries for tree planting at new and rehabilitated water structures within the selected counties Undertake planting of indigenous trees in two catchment areas with high risk of erosion in the target counties Riparian marking and pegging (using indigenous tree) of 20km along Riara and Ndarugu Rivers Construction of terraces (1000m) and 1500m gabions (gully healing by planting vetiver grass and or installation of gabion boxes) in selected sites in Kiambu and Nairobi counties).

Component 3: Strengthen water and adaptation planning, institutional and regulatory framework to respond to changing climatic conditions.

70. Regulations can constitute barriers or facilitate effective adaptation and therefore have a significant role on society and in driving the climate change adaptation agenda in Kenya. Ensuring compliance with the Water Act 2016 and Climate Change Act 2016 among regulated communities and enforcing the law is a critical means of contributing towards the realization of climate change adaptation agenda in the country. The Constitution of Kenya (COK) 2010 and the Climate Change Act No. 11 of 2016 require the public to be engaged in Climate change discourse in education, capacity building and awareness creation on actions to be undertaken relating to climate change.

71. This component seeks to strengthen institutional and regulatory framework by investing in capacities for enforcing the water regulations, supporting the four counties to develop their County Environment Action Plan (CEAPs) and Sub-Catchment Management Plans (SCMPs) for improved adaptation planning by incorporating climate change considerations into the plans. The Gazetted Water Quality regulation provides for protection of water resources, pollution control and has prohibition clauses for effluent discharge into the environment. These regulations apply to domestic industrial agricultural, recreational and any other purpose. In enforcing these regulations, the strategies used include water quality monitoring, restrictions and licensing.

72. Activities of this output will build the capacity of by supporting the review and implementation of sub-catchment plans with a focus on climate risk management in water sector. This is crucial to ensure that their catchment plans incorporate climate risk management approaches and activities. WRUAs will be supported in the implementation of sub-catchment plans in implementing climate smart activities.

73. The Activity 3.1.1 “Provide water quality monitoring systems to support enforcement of the water quality regulations” entails investing in capacities for enforcing the water regulations by providing equipment’s that will enable real time testing of water quality and enforcements of the regulations. Activity 3.1.2 “Sensitize the regulated communities to enhance compliance” entails having consultative forums with the regulated communities i.e. factories, filling stations, among others; whose industries emit effluents to the environment to inform and promote compliance to the existing good practices and regulations. Activity 3.1.3 “Conduct water quality pollution survey for point and non-

point sources of pollution” is a regulatory safeguard measure for sustainable protection of both surface and ground water resources. It aims at generating water quality and pollution information for planning, policy formulation and implementation; providing technological guidance for the waste emitters to develop and implement waste disposal control plans and enforcement of the prescribed regulatory waste disposal guidelines/standards and effluent discharge control plans.

74. The beneficiaries for output 3 are WRA, NEMA and the relevant county governments. The eligibility criteria to apply in selection of beneficiaries under Sub-activity 3.1.2 will include; Geographical criteria: The beneficiary individuals/institutions must be working within the geographical space of the project, Relevance: The beneficiary individuals/institutions" work must be directly related to the water sector, Equity: Selection of individual and institutions should consider gender balance, persons with disabilities, and minorities and Regulation Thresholds: The beneficiary institutions must be subject to or have a role enforcing water sector compliance requirements.
75. The project will create awareness and provide trainings to the beneficiaries drawing water directly form the water assets to be rehabilitated on proper hygiene / sanitation measures. All water assets will have draw pipes and disinfection dispenser will be availed on site as a hygiene measure. The disinfection dispensers are installed at the water draw off points to aid in the disinfection of remote potable water supplies (e.g. hand pump, springs etc.) 30% chlorine solution is contained in the dispensers. The measure is 1 drop per 20-liter container of water. The chlorine is allowed to mix for 15 to 30 min to allow for disinfection of the water making it potable. The disinfection dispensers are installed and refilled by the specific county public health office to all remote water access point i.e. access points not connected to central water supply system. Under Kenya’s devolved governance system, County Governments are in charge of the provision of sanitation services as per Schedule 4 of the Constitution. All beneficiary counties in this proposal are implementing Community Lead Total Sanitation (CLTS) initiatives that seek to ensure all Kenyan communities are Open Defecation free among other Water and sanitation initiatives. The WASH strategies planned for implementation by the targeted counties are as reflected in the County Integrated Development Plan – CIDPs. There are adequate interventions on water and sanitation at the county level that will build synergy with the project. The project sits at the core of the respective county governments that have the legal mandate over water and sanitation issues in the county. This will ensure that developed water assets are protected from pollution that may arise from lack of water and sanitation interventions in the project areas. The USAID funded Kenya Integrated Water, Sanitation, and Hygiene Project (KIWASH) which seeks to improve access to improved water, sanitation, and hygiene covers Nairobi among 8 other counties. The Athi River project will seek to network and build on the achievements under this project in Nairobi County. The project will also work with other local level community based organizations that are engaged in WASH activities in the respective counties. Additionally, the project will work with partners implementing WASH activities in the targeted counties targeting schools, dispensaries and health centers for public awareness and behavior change, including borrowing lessons and building partnerships with UNICEF sponsored initiatives on hand washing and SATO pans toilet promotion activities in neighboring Kitui County that borders Machakos where the bulk of water assets are to be rehabilitated.
76. Table 4 explains in detail activities and sub-activities of output 3.

Table 4. Outputs and activities under Component 3

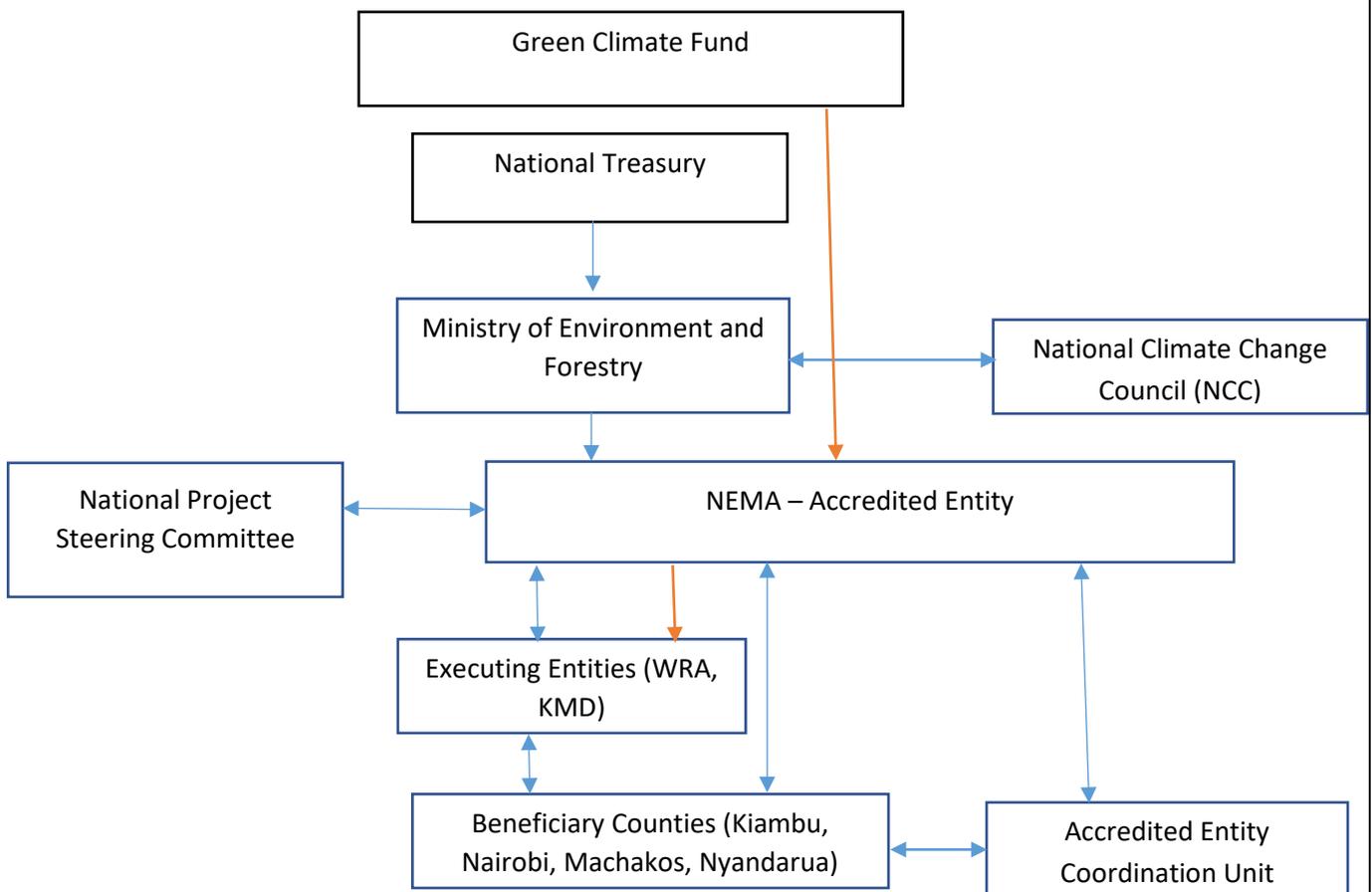
Component 3: Strengthen water and adaptation planning, institutional and regulatory framework to respond to changing climatic conditions	
Outputs	Activities
Output 3.1 Enhance compliance of water regulations within the project area and improve adaptation planning	3.1.1 Provide water quality monitoring systems to support enforcement of the water quality regulations. These include; 8 (eight) Multi parameter sonde (new hydrolab HL7) and ICT with ability to measure pH, temperature, nutrients (nitrates and phosphates), dissolved oxygen, total dissolved oxygen, salinity (conductivity), depth, chlorophyll, Rhodamine, blue-green algae, Ammonia, Chloride, etc. basically parameters that show effect of climate change on water quality; and its accessories; a Water testing kit for Microbiology analysis (POTALAB) with ability to detect Ecoli (Faecal contamination), Coliform (bacterial contamination), Salmonella (Typhoid), Pseudomonas (ENT

	<p>infections); 3 (three) Potable Heavy metal detection meters (Portable Metalyser for Heavy Metals) with the ability to measure Arsenic (III and Total), Antimony, Cadmium, Chromium, Cobalt, Gold, Mercury, Lead, Magnesium, Nickel, Selenium, Thallium, Tin, Zinc</p> <p>3.1.2 Sensitize the regulated communities to enhance compliance:</p> <p>i) Promote WASH practices through hygiene awareness campaigns aimed at promoting water disinfection methods and hygiene practices in collaboration with the beneficiary county governments</p> <p>ii) Carry out Compliance Management Action Plan trainings / workshops to ensure compliance with the water sector laws and standards in Kenya (Both NEMA and WRA will identify stakeholder among the regulated communities to be sensitized, develop workshop schedules / plans and implement the activity. NEMA and WRA are government agencies with clear mandates in the water sector that require a coordinated approach to ensure compliance)</p> <p>Activity 3.1.3 Conduct water quality pollution survey for point and non-point sources of pollution</p>
<p>Output 3.2: Development of 4 County Environment Action Plans (CEAPs) including climate change adaptation considerations</p>	<p>3.2.1 Support development of 4 County Environment Action Plans (CEAPs)</p>
<p>Output 3.3: Development of 8 (eight) Sub-Catchment Management Plans (SCMPs) including climate change adaptation considerations</p>	<p>3.3 Facilitate development review and implementation of 8 Sub-Catchment Management Plans (SCMPs).</p> <p>i. Capacity building and SCMP development workshops</p>

B.4. Implementation arrangements (max. 1500 words, approximately 3 pages plus diagrams)

Project implementation structure

77. The development of this project has been sponsored by several entities, the main one being NEMA, then Water Resources Authority - WRA, Kenya Meteorological Department - KMD and University of Nairobi -UoN. NEMA shall play the role of an Accredited Entity and partly in the implementation of some of the proposed activities in line with its accreditation credentials. NEMA has identified WRA and KMD as the executing entities for some proposed activities in line with their mandates. UoN has been identified as a service provider to develop decision support tool and formulate relevant training modules in the water and climate sector
78. The Figure 8 below illustrates the institutional arrangements to deliver the project. The institutions that will operate as the Executing Entities exist, however the committees will require to be formalized with guidance from the National Designated Authority - NDA before project implementation. The implementation will be conducted by the Executing Entities -EEs but will be guided by the National Project Steering Committee through quarterly meetings. The National GCF Steering committee will ensure that project implementation is conducted according to the country's priorities.



Key:
 Funds flow →
 Reporting relationships →

Figure 10: Project Implementation Arrangements

Roles and Responsibilities

79. National Treasury (NT)

The National Treasury (NT) is the National Designated Authority (NDA), the focal point for GCF in Kenya. The NT will ensure the Programme conformity with the national priorities. In addition, it shall ensure that PSC meets quarterly to review the progress and provide necessary guidance and direction to NEMA as the AE.

80. Project Steering Committee (PSC)

There will be an established PSC required to provide coordinated oversight to the project implementation. It shall be chaired by the Director General NEMA and will include representatives from the National Treasury, the Ministry of Water and Sanitation, and Ministry of Devolution and Planning, the Council of Governors and representatives of recipients' county governments. The PSC can appoint committee member from other relevant ministries based on necessity.

81. National Environment Management Authority (NEMA) as the Accredited Entity -A.E.

NEMA, will take the greatest responsibility for successful implementation of the project. As the Accredited Entity, NEMA shall submit requests for disbursement to GCF. NEMA will perform the following other roles:

- Project Management: NEMA shall be responsible for overall project planning, execution, coordination, monitoring, and evaluation and reporting.
- Reporting: NEMA shall prepare all necessary reports required by GCF.
- Budget and Auditing: NEMA shall be responsible for the overall project budgeting based on the agreed work plans prepared by the executing entities. NEMA will ensure project performance audits by the NEMA internal auditors and Kenya National Audit office.

82. National Environment Management Authority (NEMA) as the Executing Entity – EE

NEMA will be implementing the following project activities.

Output 1	Output 2	Output 3
Activity 1.4.1 Activity 1.2.2 Activity 1.3.1	Activity 1.3.2 Activity 2.1.1 Activity 2.1.2	Activity 3.1.1 Activity 3.1.2 Activity 3.1.3 Activity 3.2

The proposed activities will be integrated within the NEMA Work Programme and approvals to undertake the activities will be granted as per the existing institutional arrangements, approval and reporting requirements.

83. WRA as the Executing Entity – EE

WRA has demonstrated a strong framework on preparedness for project implementation. WRA will dedicate operational capacities for the implementation of the following project activities

Output 1	Output 2	Output 3
Activity 1.1.1 Activity 1.1.2 Activity 1.1.3	Activity 2.2.1 Activity 1.2.1 Activity 1.2.2 Activity 1.2.3	Activity 1.3.1 Activity 3.1.2 Activity 3.3

84. University of Nairobi (UoN) as a Service Provider

UoN is a training institution in Kenya and will be a Service Provider in the project that will work closely with WRA to develop decision support tool and formulate relevant training modules in the water and climate sector in the following project activities.

Activity 1.3.1 and Activity 1.3.2

85. Kenya Meteorological Department (KMD) as the Executing Entity – EE

The KMD is responsible for implementation of some of the activities; KMD will dedicate operational capacities for the Project execution of the following project activities

Activity 1.2.1, 1.2.4 and Activity 1.3.1

86. County Governments: The county government has two-fold mandates in the county, to provide leadership / coordination and to implement activities / service delivery. These roles are based on legal and institutional framework at national and county level mainly anchored on the EMCA 1999 and Water Act 2016. Water Resources Users Associations provided for in the Water Act has representation in the county both to implement project activities and operate them even after the project period. Among the devolved functions of the county government include implementation of specific national government policies on natural resources and environmental conservation, County planning and development. and Ensuring and coordinating the participation of communities and locations in governance at the local level and assisting communities and locations to develop the administrative

capacity for the effective exercise of the functions, powers and participation in governance level which are key to the successful implementation of the Programme. The county government will be the entry point in the initiation of the planned activities and collaborative working relations will be established. For this project, the County Governments are project beneficiaries and will perform operation and maintenance of the rehabilitated adaptation assets

87. The reporting line between GCF, National Treasury and MoEF are as follows: The Ministry of Environment and Forestry (MoEF) is in charge of the climate change policy framework in the country including NCCAP, NAP among others and reports to the UNFCCC on the climate change initiatives and achievement of the NDC in the country. National Treasury (NT) is the National Designated Authority- NDA providing broad oversight of GCF activities in the country, NT provide reports relating to the financing of climate change activities in the country to MoEF and other government institutions. NT organizes stakeholders' consultations and provides a for No Objection letters for funding proposals to the GCF.

88. Funds Flow arrangements

The GCF will disburse funds to NEMA as per the approved funding proposal budget. NEMA will disburse funds to the Executing Entities (WRA, KMD) based on the approved work plans and requisite reports. NEMA will be implementing some of the Programme activities that will be integrated within the NEMA work Programme and approvals to undertake the activities granted as per the existing institutional arrangements, approval and reporting requirements.

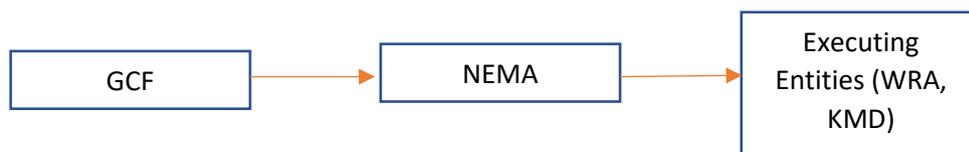


Figure 11: Funds Flow Diagram

Experience and track record of the AE and EEs

89. Accredited Entity (AE) - National Environment Management Authority (NEMA)

NEMA was established in 2004 as the principal government agency mandated to implement environmental policies, exert supervision and coordination on all matters environment. NEMA as the Accredited Entity (AE), takes the greatest responsibility for successful implementation of the project and will perform the roles of Project management, Reporting Project supervision and project budgeting. NEMA has robust technical team in the 8 core departments in NEMA, namely, Directorate, Environment Education, Information and Public Participation Department, Legal Services Department, Environmental Planning and Research Coordination Department (EPRC), Compliance and Enforcement department (C&E), Finance and Administration Department and Coastal, Marine and Fresh Waters Sub-Department. Hence a complementary relationship that allows for efficiency and effectiveness. NEMA has operational county offices in all the 47 counties in Kenya. NEMA is also the National Implementing Entity with the Adaptation Fund Programme and is currently implementing a USD 10,000,000 Programme aimed at building resilience to climate change and adaptive capacity of vulnerable communities in Kenya, undertaken in 14 counties in Kenya. NEMA will implement some project activities under this project in line with its accreditation credentials. NEMA will be implementing activity The Construction of the water infrastructures will be executed by NEMA under a civil works contract. The O&M will be undertaken by the respective county governments and the management committees of the water structures established

90. Water Resources Authority - WRA

Water Resources Authority (WRA) is a state corporation under the Ministry of Water and Irrigation. The organization has been in existence for the past 12 years following its establishment under the Water Act (2002) that has now been replaced by the new Water Act 2016. WRA's mandate is to regulate, monitor, assess and allocate the water resources; and to collaborate with other institutions as required for better water resource management.

WRA has established six regional offices and 26 sub-regional offices across the country that report to the national office based in Nairobi. WRA is a technical institution and has competent staff to implement its various roles and mandates.

WRA has a capacity of over 750 staff. The Authority is governed by a Board of Directors consisting of 10 members and a senior management staff composed of 3 staff that include the Chief Executive Officer, the Technical Coordination Manager and the Finance and Administration Manager.

WRA uses a basin-based approach in accordance with the National Water Management Strategy in management of water resources countrywide. Accordingly, WRA has developed six Catchment Management Strategies (CMS) for the Country's five drainage basins namely: Lake Victoria Basin which is divided into North and South, Rift Valley, Athi, Tana and Ewaso Ng'iro North. The CMS are implemented at community level through development of Sub Catchment Management Plans by WRUAs. The Senior Management is supported by various component heads based at the head office under the Technical and Support Services. Since 2013 WRA's is currently managing an average of USD 20 Million per year and sufficiently equipped to manage other projects. The projects that WRA conducted are listed in section E5.2

	Kshs Budget	USD equivalent	Kshs Expenditure	USD equivalent
2013/2014	1,732,153,992	17,321,539.22	2,022,508,375	20,225,083.75
2014/2015	1,489,602,657	20,225,083.75	1,748,749,975	17,487,499.75

91. WRA Budget 2013/14 & 2014/15.

Section 69 of the Water Act, 2016 provides for handover of completed waterworks to the county government jointly with the Water Service Provider for use. The County owned water service provider is established as a public institution and will manage public water services assets on behalf of the public. WRUAs can serve as agents of WRA to monitor and ensure rational water use and allocation. Section of the Water Act 83 provides for a County owned water service provider established as a public institution and operating and providing water services to hold the county or national public water services assets on behalf of the public. WRUAs can serve as agents of WRA to monitor and ensure rational water use and allocation.

The water quality monitoring systems will be received by both WRA and NEMA county offices

The University of Nairobi (UoN) as a service provider will work closely with WRA to provide specialized training as part of the capacity building efforts proposed in this project. UoN is a premier training institution with a track record of excellence. Established in 1956 as the only institution of higher learning in Kenya for a long time, the University is credited for training regional and Africa's high-level manpower. The University has diversified academic programmes and specializations in basic sciences, applied sciences, technology, humanities, social sciences and the arts.

92. Kenya Meteorological Department (KMD)

The Kenya Meteorological Department (KMD) is a department under the Ministry of Environment and Forestry with the overall function of provision of meteorological and climatological services to various development sectors for better utilization of natural resources for national development. The KMD as the National Meteorological and Hydrological Service (NMHS) is the authoritative source of weather and hydrological warnings and also responsible for climate, air quality, and tsunami warnings. The KMD continuously monitors the earth's environment, develops predictions on potential changes related to weather, climate and water, and issue as timely and accurate warnings as possible of most hydro meteorological hazards. The Department has been operating on Presidential Executive Order No. 1 of 5th June 2018 which places the Department under the Ministry of Environment and Forestry.

KMD is a department within the Ministry of Environment and Forestry and therefore it doesn't have a legal personality as an independent entity. Kenya Meteorological Department as an executing entity will be representing the Ministry of Environment and Forestry.

Kenya Meteorological Department is headed by the Director of Meteorological services supported by 6 Deputy Directors. Other senior staffs are 15 Senior Assistant Directors and 35 Assistant Directors who are in charge of various divisions in the Department. KMD has decentralized its services according to the devolved government in Kenya. It has a County Director of Meteorological Services (CDMS) in each county who reports to the Director of Meteorological services. Further, KMD has 39 manual synoptic stations which are manned by trained KMD staff. Other stations are Automatic Weather Stations (AWS) distributed in the whole country that collect weather information and send to the headquarter automatically. KMD has a capacity of over 500 staff based in Nairobi, all county headquarters and in 39

manual synoptic stations. KMD hosts the National Flood Forecasting and Early Warning Centre (NFFEWC) based at the headquarters in Nairobi which is charged with collection of data, analysis, modelling and forecasting of flood. The projects that KMD has conducted are as listed below:

	Kshs Budget	USD equivalent	Kshs Expenditure	USD equivalent
2013/2014	102,298,345	1,022,983.45	90,345,456	903,454.56
2014/2015	435,398,098	4,353,980.98	401,764,915	4,017,649.15
2015/2016	1,286,762,629	12,867,626.29	1,124,275,197	11,242,751.97

93. Table 4 summarizes the activities for each executing entities:

Table 4. Summary of project activities and executing entities

Executing Entities	Activities to be implemented	
Water Resources Authority - WRA has demonstrated a strong framework on preparedness for project implementation. WRA will dedicate operational capacities for Project execution of their proposed activities	Activity 1.1.1 Activity 1.1.2 Activity 1.1.3 Activity 2.2.1 Activity 1.2.1	Activity 1.2.2 Activity 1.2.3 Activity 1.3.1 Activity 1.3.2 Activity 3.1.2 Activity 3.3
Kenya Meteorological Department (KMD) is responsible for implementation of some of the activities; KMD will dedicate operational capacities for the Project execution of their proposed activities.	Activity 1.2.1 Activity 1.3.1 Activity 1.2.4	
NEMA NEMA will act in its role as an Accredited Entity that allows for implementation of the proposed activities in line with its accreditation credentials and work in close collaboration with the Executing Entity and the County governments that are key stakeholders in project activities implemented within their jurisdiction. In this project, the beneficiary county governments will be as outlined: Nyandarua, Kiambu, Nairobi and Machakos.	Activity 1.4.1 Activity 1.2.2 Activity 1.3.1 Activity 1.3.2 Activity 2.1.1	Activity 2.1.2 Activity 3.1.1 Activity 3.1.2 Activity 3.1.3 Activity 3.2

B.5. Justification for GCF funding request (max. 1000 words, approximately 2 pages)

94. Grant financing is requested from the GCF to enhance adaptive capacity of the communities in the upper Athi catchment, an area with high risk on water resources due to climate change. Although Government of Kenya develops and implement climate change adaptation measures based on National Water Master Plan, it is not enough to resolve the issues associated with frequent water deficit and floods, the limited technical and institutional capacity to cope with climate change, limited range of products, services for climate resilient development, low awareness and inadequate regulatory framework for water resource management are key barriers to overcome.

95. The proposed project purpose is to create a best practice of climate change adaptation practice of the water sector in Kenya to overcome those barriers by developing climate-informed decision support capability of institutions and communities with ICT based information products based on modernized hydro-meteorological monitoring systems. Upgraded water infrastructure and strengthened regulatory framework with updated county-based action plans will enhance awareness and its impact on community level. The County Environment Action Plan (CEAP) is futuristic and helps in better planning of both relevant interventions and available resources to combat the effects of climate change. GCF funding is sought to fill the gap that exists in the developing the statutory document that is key in planning the measures to address climate change impacts and allocating available resources to the same cause.

96. The project aims to enhance institutional capacity by building up systems and infrastructures that directly contribute to national adaptive capability; it is not a readiness project which concerns preparatory capacity of institutions for full project. Stakeholder engagement in this project is has been extensive during the planning stage and public participation is embedded in the Kenyan constitution and hence will be upheld during the implementation of the project.

Without GCF Funding.

97. The National Water Master Plan (NWMP) was launched in 2014 to enhance a capacity of water sector in Kenya. However, a lack of financing has limited the efficiency of this Plan. ⁷The costs of adapting existing urban water infrastructure in Africa have been estimated at between US\$ 1,050 million and US\$ 2,650 million annually, implying this budget might be not affordable to developing countries in Africa.

98. Information system, comprising from monitoring climatic and hydrological data to distributing useful information to local communities, has not been working properly due to the lack of equipment and facilities. Furthermore, the capacity of water supply and storage service systems is still not enough to respond to variability in precipitation. However, a substantial investment is essential to improve these systems.

99. The institutional capacity cannot be improved. Furthermore, unawareness of local communities on the issues on the water sector limits a success of NWMP at local scales. Appropriate financing for capacity-building of institutions and raising awareness is required.

100. Low compliance to water quality regulations due to inadequate capacity to enforce and consistent monitoring. Inadequate information system and lack of institutional capacity might constrain adaptive measures to disasters. As risks of disasters (drought and flood) are expected to increase in the future, according to the feasibility study report, solutions on these circumstances are urgently required.

With GCF Funding:

101. The measures proposed in this project will increase to water security, resilience to people, ecosystems and economies in the four target counties

102. GCF funding will strengthen hydrological and meteorological information services to deliver relevant, accurate and timely climate information to local communities, and also to support decision making and policy development in the water sector. This will be achieved by investments in optimized hydro-met monitoring networks, more effective management and exchange of hydro-met data; and improving the capacity to forecast future water and weather conditions. Ultimately, this information will be used to strengthen early warning systems. Requisite training programmes will run along the proposed investments

103. GCF Funding will support investment improving and rehabilitating prioritized water infrastructure in the target counties so as to increase water security.

104. GCF funding will improve compliance to water quality regulations through strengthened capacity and consistent monitoring.

105. Capacity-enhancement of the water related governmental institutions becomes possible by GCF funding. This will increase effective management of water resources, thus decreasing the impacts of climate change. Training and Raising awareness of local communities derives change in behavior against disasters.

106. Furthermore, once this project is implemented successfully with GCF funding, it can play as an exemplary case with which the Kenyan government can leverage other funding sources from a variety of other funding providers such as MDBs and bilateral aid agencies. The success of the project that focuses on water catchment will be replicated in other catchments in Kenya and it will serve a point of reference and the documentation. The lessons learnt will be informative to the future processes hence ensuring high success of future implementation of a similar project.

107. The project activities are subject to the VAT as the proposed activity items are not zero-rated products in Kenya.

B.6. Exit strategy and sustainability (max. 500 words, approximately 1 page)

⁷ Adapting to climate change: water management for urban resilience, Mike Muller

108. The project will be led and implemented by local institutions including the Water Resource Authority and the Kenya Meteorological Department to ensure ownership from existing relevant institutions and for capacity building. It is expected that the project will further the work that NEMA, WRA and KMD are currently executing and are mandated to do. This will ensure that project activities continue beyond the lifetime of the project. The institutional mandates of the executing entities and the involvement of the county governments coupled with the public participation involving the community members which is a mandatory requirement in the Kenyan Constitution will ensure that the sense of ownership of the proposed interventions are inculcated early in the project development and planned implementation. This will ensure sustainability of the project assets and processes. The management committees established that will constitute of the representation of the WRUA members as part of the Operation and Maintenance will provide for sustainability of the project interventions.
109. KMD and WRA have put across appropriate structures to ensure sustainability beyond the project period. The institutions have decentralized its services to the county government in line with the devolved government. Therefore, the budget for Operation and Maintenance is going to be factored in when funding County offices after the project closure.
110. Additionally, Water Resource Users Associations -WRUAs has established by WRA are a vehicle for community participation to enhance ownership and sustainability of interventions on the ground. They are an association of water users, riparian landowners, or other stakeholders who have formally and voluntarily associated for the purposes of co-operatively sharing, managing and conserving a common water resource. With WRUAs in place as an organized group sustainability is also assured.

Close engagement with local governance structures at community level

111. Implementation will also involve local/community level water resource governance structures, in this case WRUAs, CECs among others. Engagement and collaboration will lead to enhanced participation from communities in water resource management and planning. It will also allow communities to address their present needs with regards to water resources.

Strengthened institutional capacity and awareness

112. The institutional capacity of NEMA, WRA and KMD will be strengthened to ensure appropriate water resource management for climate change adaptation planning. Capacity building will be a key activity with regards to use of climate data for resource planning and will also be supported by participation in training for a for expert courses in the areas of integrated water resource management and climate change. This will further enable for transfer of knowledge and expertise to communities and other stakeholders.

Establish feedback mechanism systems

113. To ensure that the climate information coming into the catchment area meets the users demands it will be important to create a feedback mechanism. This feedback mechanism will contribute to long-term sustainability through keeping the relevance of hydromet services.

Operation and Maintenance

114. During the installation and initial operation for the first half of the project period, comprehensive operation and maintenance work will be assessed. Through legislation process of such community plans, the assessed roles and responsibility on the operation and maintenance will be included and distributed to the different stakeholders and government institution. Contribution from government of Kenya during the project implementation will be in-kind support through commitment of staff time, office space and part of travel expenses.
115. To ensure sustainability of the new stations and structures beyond the project period, WRA and KMD will request the government to allocate more O&M funds for their sustainability beyond the project period and the county government will carry out the O&M of the rehabilitated / established structures after project hand over. WRA has an average annual budget for ground water and surface water O&M as 300,000 USD and 500,000 USD respectively. Additionally, the beneficiary County Governments have confirmed and committed to conduct O&M of the project adaptation investments through the project life span and beyond as they have an annual allocation for the O&M of water works. The average annual allocation for O&M in the counties is 830,000 USD, 480,000 USD and 400,000 USD for Machakos, Kiambu and Nyandarua county respectively. Annex 21 (O&M plan) has annexed the commitment letters from the respective beneficiary County Government

C. FINANCING INFORMATION

C.1. Total financing

(a) Requested GCF funding (i + ii + iii + iv + v + vi + vii)		Total amount			Currency		
		9,526,603.26			million USD (\$)million USD (\$) million USD (\$)million USD (\$) million USD (\$)million USD (\$)		
GCF financial instrument		Amount	Tenor	Grace period	Pricing		
(i)	Senior loans	Enter amount	Enter years	Enter years	Enter %		
(ii)	Subordinated loans	Enter amount	Enter years	Enter years	Enter %		
(iii)	Equity	Enter amount	Enter years		Enter % equity return		
(iv)	Guarantees	Enter amount					
(v)	Reimbursable grants	Enter amount					
(vi)	Grants	9,526,603.26 Million					
(vii)	Results-based payments	Enter amount					
(b) Co-financing information		Total amount			Currency		
		473,380			million USD (\$)million USD (\$) million USD (\$)million USD (\$) million USD (\$)million USD (\$)		
Name of institution		Financial instrument	Amount	Currency	Tenor & grace	Pricing	Seniority
National Environment Management Authority (NEMA)		In kind	242,560.00 Gov. of Kenya	Options USD (\$)	Enter years	Enter%	Options
Water Resources Authority (WRA)		<u>In kind</u>	220,820.00	Options USD (\$)	Enter years	Enter%	Options
Kenya Meteorological Department (KMD)		<u>In kind</u>	10,000.00	Options USD (\$)	Enter years	Enter%	Options
Click here to enter text.		Options	Enter amount	Options	Enter years	Enter%	Options
(c) Total financing (c) = (a)+(b)		Amount			Currency		
		9,999,983.26			million USD (\$)		
(d) Other financing arrangements and contributions (max. 250		<i>Please explain if any of the financing parties including the AE would benefit from any type of guarantee (e.g. sovereign guarantee, MIGA guarantee).</i>					

words, approximately 0.5 page)	<i>Please also explain other contributions such as in-kind contributions including tax exemptions and contributions of assets. Please also include parallel financing associated with this project or programme. N/A</i>
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C.2. Financing by component

*Please provide an estimate of the total cost per component and output as outlined in section B.3. above and disaggregate by source of financing. More than one co-financing institution can fund a single component or output. Provide the summarised cost estimates in the table below and the detailed budget plan as annex 4.
This table should match the one presented in the term sheet and be consistent with information presented in other annexes including the detailed budget plan and implementation timetable.*

In case of a multi-country/region programme, specify indicative requested GCF funding amount for each country in annex 17, if available.

Component	Output	Indicative cost OptionsUSD(\$)	GCF financing		Co-financing		
			Amount Options	Financial Instrument	Amount OptionsUSD(\$)	Financial Instrument	Name of Institutions
Component 1. Enhance hydrological and meteorological monitoring system to support decision making, planning and policy development in water and climate change sector	1.1 Support establishment of National Information Centre for Integrated Water Resource Management	349,310.00	179,050.00	Grants	170,260.00	In Kind	WRA
	1.2 Establish modernized hydro-meteorological observation, monitoring, and testing systems and related networks	2,026,113	2000113.00	Grants	10,000.00 12,000.00 4,000.00	In Kind	KMD WRA NEMA
	1.3 Support training and capacity building programs	200,000.00	200,000.00	Grants	0		
	1.4 Support development of State of the Environment (S.O.E) reports from the information developed	169,325.00	149,325.00	Grants	20,000.00	In Kind	NEMA
Component 2. Improve climate water resilience by building, enhancing and rehabilitating prioritized water infrastructure and implementing conservation	2.1 Develop and upgrade water sources and infrastructure for domestic use considering present and future impacts of climate change.	4,866,540.26	4,770,540.26	Grants	96,000.00	In Kind	NEMA WRA

activities in the catchment							
	2.2 Support conservation of water catchment areas as climate change adaptation measure.	128,411.00	128,411.00	Grants			
Component 3. Strengthen water and adaptation planning, institutional and regulatory framework to respond to changing climatic conditions	3.1 Enhance compliance of water regulations within project area and improve adaptation planning.	813,229.00	808,829.00	Grants	22,000.00 22,000.00	In Kind	WRA NEMA
	3.2 Development of 4 County Environment Action Plans (CEAPs) including climate change adaptation considerations	226,950.00	178,950.00	Grants	48,000.00	In Kind	NEMA
	3.3 Development of 8 (eight) Sub-Catchment Management Plans (SCMPs) including climate change adaptation considerations	166,135.00	166,135.00	Grants	0		
Support to Programmes activities	Monitoring and Evaluation	414,000.00	414,000.00	Grants	0		
	Development of Knowledge products	150,000	150,000	Grants			
Project Management Unit	Programme operational costs	439,970.00	370,850.00	Grants	34560.00 34,560.00	In Kind	NEMA WRA
Contingency		50,000.00	50,000.00				
Indicative total cost (USD)		9,999,983.26	9,526,603.26		473,380.00		

C.3 Capacity building and technology development/transfer (max. 250 words, approximately 0.5 page)

C.3.1 Does GCF funding finance capacity building activities? Yes No

C.3.2. Does GCF funding finance technology development/transfer? Yes No

116. The project aims at developing and implementing a capacity building, training and education program including formal training and retraining to build the capacity of NEMA, KMD and WRA staff on integrated water resource management and climate change for provision of accurate and timely information to Communities, County

governments and relevant stakeholders in the Athi River Catchment for use in water resources management and adaptation planning

D. EXPECTED PERFORMANCE AGAINST INVESTMENT CRITERIA

This section refers to the performance of the project/programme against the investment criteria as set out in the GCF's [Initial Investment Framework](#).

D.1. Impact potential (max. 500 words, approximately 1 page)

Expected increased resilience of health and well-being, and food and water security

117. Water security contributes to job creation, increased gross domestic product (GDP) and enhanced development across most sectors – health, energy, agriculture, environment, mining, industry and social protection. It also improves the adaptive capacity of communities to climate change effects. The project expects to target 1,156,620 beneficiaries directly (49% male and 51% female) through increased access to water sources i.e. water storage, rainwater harvesting and rehabilitation of degraded structures. This increased access to water will also ensure that water for agricultural production is available. In addition, it will reduce time taken to fetch water among communities. The project will ensure that water is accessible in good quality by enforcing existing water regulations thus reducing incidences of water borne diseases and overall increasing the community's wellbeing.

Expected strengthening of institutional and regulatory systems for climate-responsive planning and development (PMF- A 5.0 and related indicator(s)):

118. The project will aim to strengthen the capacity of NEMA, WRA and KMD in data collection, synthesis and dissemination to a larger audience. The project will help provide the necessary equipment and training to WRA and KMD to set up telemetric hydromet stations that will offer timely data for decision making. At the grass-root level the project will work at equipping WRUAs to incorporate and implement climate change issues within their SCMPs and enforce policies related to water use.

Expected increase in generation and use of climate information in decision-making (PMF- A 6.0 and related indicator(s)):

119. The project aims to boost quality hydromet data collection in the selected catchment areas and ensure timely relaying of the data. The project will further expand the system to have a decision support system that is aimed at supporting key decision making with regards to water resource management at catchment level. The data shall be analyzed to provide useful information for all stakeholders. It is envisaged that the information will be utilized for decision making.

Expected strengthening of adaptive capacity and reduced exposure to climate risks (PMF- A 7.0 and related indicator(s)), focusing particularly on the most vulnerable population groups and applying a gender-sensitive approach:

120. The use of climate information in planning for water resources will allow development planners to consider climate risks with an aim to reduce exposure for communities. Additionally, the provision of warnings of flooding events will reduce the risk of disasters, loss of lives and economic losses leading to reduced exposure to climate risks for vulnerable communities.

Expected strengthening of awareness of climate threats and risk-reduction processes (PMF- A 8.0 and related indicator(s)):

121. A key aspect of the project is building the capacity of local institutions including NEMA, WRA, KMD and County Governments on climate change impacts and the potential risks that come with it. This approach will allow these institutions to strengthen their awareness of climate risk while understanding the options and interventions required for risk reduction. The information generated from the DSS will be relayed to the communities in order to create awareness on climate threats and risks and the requisite risk reduction mechanisms.

122. Direct beneficiaries are calculated as the number of persons who will directly participate in the project and draw direct benefits from improved access to water as determined during feasibility study. Indirect beneficiaries: Total number of persons in the 4 counties within the catchment who derive indirect benefits from the project – reduced flooding, water resource conflicts, information, ecological function of the ARC, agricultural and livestock value chains, among others.

D.2. Paradigm shift potential (max. 500 words, approximately 1 page)

123. The proposed project aims to enhance the resilience of communities and ecosystems in the ARCA through provision of hydromet information, mainstreaming climate change adaptation into sub catchment management

planning, development of a decision support tool and rehabilitation of riparian areas and degraded water structures. Short term benefits will include reduced travel time to water points, improved health/reduction of waterborne disease cases and increased access to water whilst the long term benefits will include reduced economic losses from flooding events, improved water resource management and strengthened decision making and development planning.

124. The proposed project's approach on use of hydromet information has been established globally as best adaptation practice to reduce and manage climate risk. In Kenya it is yet untested, and the implementation of this project will be the first of its kind. The paradigm shift in this case will be local government involvement in use of climate information for development planning and resource management through the integration of meteorological, hydrological, hydrogeological and water quality data for improved water resources management at national and county levels. The country has yet to adequately mainstream climate change adaptation into its development planning to reduce climate risk. County governments working with WRA and KMD will establish mechanisms for sharing hydromet information to determine current and future climate risks and plan development interventions especially in the water sector with this information in mind. It is anticipated that the approach will be successful, and lessons learnt from implementation may influence scaling up to the other catchment areas in the country.
125. Lessons learnt from the implementation will also establish best practice and build the capacity of county governments in adaptation planning at local levels which will also assist them in enhancing climate risk management measures. The project will emphasize lesson and knowledge sharing between the EEs and other counties along the Athi river, to enhance sustainability and capacity of the regional and national offices and create awareness at the county level.
126. The executing entities (both KMD and WRA) are National Government Agencies hence implementing policies formulated at the National Government level. However, these agencies have decentralized their functions at the county government level. Therefore, the national policy and planning will be implemented at the county / local government through the decentralized functions and therefore easier to replicate these projects to other five catchments

D.2.2. Potential for knowledge and learning

127. All EEs, shall be required to institute a protocol on how to capture knowledge, aggregate it per audience and disseminate it. All project specific activities that relates to training on the proposed acquisition of modern hydromet equipment, shall be documented for future referencing. Knowledge products will be developed for the programme to document and disseminate the lessons learnt and the successes during project implementation. They will constitute of brochures, magazine, bi annual programme status reports, banners and information posters. Knowledge sharing workshops will be conducted.
128. The project presents several opportunities for learning ensuring that the knowledge and lessons generated through this project will be captured and disseminate through direct (RANET broadcasting) and indirect measures (knowledge products and adaptation planning tools). Knowledge sharing platforms will be employed and will include impact stories, videos, journal articles and others.
129. The proposed activities will entail hiring of a consultant to undertake content creation and development for the programmes knowledge products, data collection and validation workshops. The expected topics for sharing include; building climate change resilience for water resources, creating awareness of climate change and water resource management, women as drivers of change in managing climate-resilient water resources among others

D.2.3. Contribution to the creation of an enabling environment

130. During the project period, government entities, private sector, researchers and local communities will be involved. In order to ensure effectiveness and sustained participation, the project shall strongly focus on institutional strengthening and capacity building, communication enhancement as well as improvement in service provision. The activities will also include coordinated dissemination of hydromet information, development of county policies and incentives for innovative water conservation solutions. This will allow for participation of the county governments, private sector, water resource management institutions and communities to create an enabling environment for participatory water resource management. The project will also enable coordination between public and private institutions to ensure benefits reach the most vulnerable and are sustained.
131. The project activities are meant to catalyze private sector involvement for sustainability of the adaptation interventions that ensure their businesses adjust well to consequences of climate change. Stakeholder engagement

through compliance inspections, trainings, awareness creation, audits, and adherence to license conditions among other actions will encourage industries to promote integrated water resource management and climate change adaptation. These engagements are expected to contribute significantly to a paradigm shift in the attitudes and behavior of the various stakeholders towards better awareness on climate change and sustainable water use.

D.2.4. Contribution to regulatory framework and policies

132. The Project supports the implementation and operationalization of several key national policies strategies and plan, including the National Climate Change Response Strategy (NCCRS), National Climate Change Action Plan (NCCAP), National Adaptation Plan (NAP), the Intended Nationally Determined Contribution (INDC) and the National Water Master Plan (NWMP) 2030.
133. The NCCRS and NCCAP prioritize water resource management as a key strategy to address drought. The NCCAP expounds that water resource management is linked to Kenya's expected economic and social transformation and is directly linked to food security, health and GDP growth especially in the ASALs. The project will support the implementation of listed water sector priority adaptation actions to improve water management specifically increased domestic water supply and participatory water resource management.
134. The NWMP 2030 seeks to implement water policy to meet social water demand up to 81% % through 2030–2050, which only 14% was attained in 2010. The project will also support the implementation of the NWMP 2030 specifically with the actions focused on the Athi River Catchment area. The project components are anchored on the recommended actions in the plan for the catchment area. The project is expected to strengthen mainstream climate change adaptation into the water sector and allow for adaptation planning.

D.3. Sustainable Development Potential

Wider benefits and priorities

Environmental, social and economic co-benefits, including gender-sensitive development impact

135. Kenya is highly endangered by serious natural disasters; the country is extremely exposed to droughts and floods. Naturally the country is highly vulnerable to climate condition caused by movement of the Intertropical Convergence Zone (ITCZ) and the El Niño Southern Oscillation (ENSO). The problem faced in Kenya is that this rainfall pattern, duration of dipole rainy season, and the amount of precipitation has been changed due to global climate change. Since the 1960s, precipitation has also been changed; greater rainfall has been observed during the short rains, and the long rains have become increasingly unreliable in locations.
136. Kenya has been determined to be one of the highly vulnerable countries in the world and the country need practical supports to survive under this unpredictable condition. In terms of water sector, even though Kenya recently graduated from the list of Least Developed countries (LDCs) ranking by the UN, its water coverage as at 2015 (63% in the Joint Monitoring Programme report by the United Nations) was lower than both the LDC's average of 69%, and Sub-Saharan Africa average of 68%. According to the water supply statistics data presented by JMP for 2015, the Kenyan portion of people without safe drinking water is close to 3% of the global figure.
137. It is clear that challenges facing the water sector, range from water scarcity, water quality, population pressure, climate change and others. Traditionally, women bear the primary responsibility for providing water and ensuring its quality in developing countries like Africa region and women in Kenya are regularly confronted with violence during their chores, especially gathering water. Close to half of Kenya's population (45.9% in 2006) is considered poor and more than three-quarters of them (79% in 2006) live in rural areas. In Kenya, rural areas are characterized by dispersed settlements thus making it costly to invest in piped water systems. Thus, majority of the water sources are point sources. It is estimated that 40% of the households in rural areas of Kenya use more than 30 minutes for round trip to obtain drinking water from the source.
138. The improved hydromet services and decisions on the water resources management together with improved water infrastructure will enhance the access of the water resources in more sustainable manner. Community based planning and implementation of the management plan will increase ownership of climate-informed water resources management leading to better perception of project outcomes.

139. The projects would have co-benefits of Improved sanitation and hygiene from improved access to water as reflected in the decreased prevalence of water-borne diseases and Catchment rehabilitation of the riparian areas will improve biodiversity and air quality.
140. The project would have the following co-benefits: a) Improved sanitation and hygiene from improved access to water as reflected in the decreased prevalence of water-borne diseases and b) Catchment rehabilitation of the riparian areas will improve biodiversity and air quality. One of the beneficial impact of the project is on people's health. This is because the project will eliminate the currently high dependence of communities on contaminated water supplies for drinking and basic hygiene, and therefore the significant negative impact this has on people's health and wellbeing.

D.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

D.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

141. The table below illustrates the vulnerability of the counties within the Athi River Catchment Area with a focus on poverty, access to water and education rates. The counties are included as the focus area for the project. The project will focus on the most vulnerable areas and impact of the project.

County	Climate Change Related Impacts	Poverty ⁸	Access to improved sources of water ⁹	¹⁰ Percentage of population with no education
Nairobi	<ul style="list-style-type: none"> • High temperature. • Resource based Conflict • Damage from floods, • Waterborne diseases 	22.5	84%	11%
Kiambu	<ul style="list-style-type: none"> • Flooding and soil erosion • Extinction of some crops like plums • Drying of small streams and wells • Drying of wetlands e.g. Manguo in Limuru, Ng'arua in Ngesha • Mosquitoes have found new habitats due to increase in temperature, e.g. even in Limuru, consequently a rise in malaria and other vector-borne diseases • A rise in the incidences of water-borne diseases such as typhoid during floods • Landslides are a common occurrence e.g. in Gatundu South, Mundara • Recent: frost that affected tea in most parts of the country including Limuru • Low agricultural production-both livestock and crops leading to loss of livelihoods, and increase in poverty levels • Water rationing • Destruction of infrastructure, e.g. submergence of waste water treatment facility in Kiambu Town, roads, the power line with the Juja sub-station blowing up recently in April 2012 	27.2	74.9%	12%

⁸ County Fact Sheets, Kenya Integrated Household Budget Survey

⁹ Exploring Kenya's Inequality, Pulling Apart or Pooling Together, National Report, Society for International Development, Kenya National Bureau of Statistics

¹⁰ ibid

	<ul style="list-style-type: none"> Displacement and deaths of people by floods, e.g. Thindigwa in Kiambu and Gatwanyaga in Thika Loss of human and animal life, e.g. recently in Kabete, from floods 			
Machakos	<ul style="list-style-type: none"> Poorly performing crops/wilting, low crop yields and livestock deaths Drying up of rivers, earth dams due to increased evaporation rates Human-wildlife conflicts Flooding, water logging during flash floods Delayed onset of short rains Soil erosion Displacement of people Reduced livelihood options, poverty increase and increase in crime rates Scarcity of water for domestic consumption and watering of animals Inter-clan and inter-community conflicts over diminishing resources Electric power shortages, reduced industrial output, leading to unemployment Water-borne diseases-malaria, asthma, etc Outbreak of pests and parasites associated with changes in climatic conditions-caterpillars, army worms and coffee thrips 	59.6	38.6%	15%
Nyandarua	<ul style="list-style-type: none"> Destruction and degradation of infrastructure like roads with negative economic consequences, e.g. milk spoilage as it takes too long to get to the markets Receding water bodies, e.g. Lake Olbolosat, Milangine dam, and Karia Ka Ndagi dam Decline in biodiversity, e.g. the endangered Sharpes Long Claw of the Kinangop plateau and Maccoa duck of L. Olbolosat Perennial rivers turning into seasonal ones, e.g. Rivers Kinja, Turasha, Mukungi and Olkaria Crop failure due to droughts (and recently also due to frost), food insecurity Human wildlife conflicts 	46.3	68%	16%

142. The percentage of the population with no education in relation to climate is high and hence the exposure to climate risk. This is due to lack of climate change information and awareness.

D.4.2. Financial, economic, social and institutional needs

Economic and social development level of the country and the affected population

143. The proposed project if financed will be contributing towards implementation of the National Water Master plan and the National Climate Change plan as well as the Vision 2030. The project will enhance the resilience of the Athi River Catchment area and water resources within it that supports economic development and livelihood improvement. Populations in the area will have increased access to water which will enhance their resilience and support their livelihoods. Absence of alternative sources of financing (e.g. fiscal or balance of payment gap that prevents from addressing the needs of the country, and lack of depth and history in the local capital market)

144. GCF contribution to the project is critical to ensuring the resilience of the communities to climate change. Without GCF support, this project as designed cannot proceed. The cost of ensuring the climate resilience of the water systems and communities among the target counties is significant. GCF support is essential due to Kenya's climate vulnerability and the severe economic and fiscal constraints it faces in addressing these climate change challenges.

145. Kenya has mainly been receiving funding for mitigation. However, there has been a huge gap in adaptation financing. This project will be contributing to increasing the amount of financing for climate change adaptation efforts in the country. Furthermore, investments in the water sector have been limited and this project will be providing financing for water sector interventions in the country. Additionally, Kenya is a third world country and climate change adaptation funds are scarce and inadequate, thereby the request for a grant from GCF.
146. The project's approach is to work with water governance structures, especially at local levels, who have limited capacity in climate change adaptation interventions. The project will work to enhance the capacity of these institutions as well as strengthen their coordination efforts across local and national levels. There is Need for strengthening institutions and implementation capacity.

D5. COUNTRY OWNERSHIP

Beneficiary country's ownership of, and capacity to implement, a funded project or programme

D.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

147. Kenya is a party to the UNFCCC and has committed to implementation of policies to adapt to climate change and effectively develop climate risk management measures. The country has also submitted its Intended Nationally Determined Contribution (INDC) to the UNFCCC that included both adaptation and mitigation measures. However, the country has placed a significant focus on adaptation. Kenya in these documents recognizes that participatory water resource management will strengthen the country's economic growth and address poverty reduction through improving food security and health.
148. The project is well aligned with national priorities and measures identified in the NCCAP, NAP and NDC. The prioritized water sector actions in these documents are being operationalized through the proposed project. The project is also linked with the NDC action on the water sector i.e. "Mainstream climate change adaptation in the water sector by implementing the National Water Master Plan (2014)". The project components are strongly linked to the National Water Master plan but additionally promote the mainstreaming of climate change adaptation into the water sector at the catchment area level.

DE.5.2. Capacity of accredited entities and executing entities to deliver

Accredited Entity (AE) - National Environment Management Authority (NEMA)

149. NEMA was established in 2004 as the principal government agency mandated to implement environmental policies, exert supervision and coordination on all matters environment. NEMA as the Accredited Entity (AE), takes the greatest responsibility for successful implementation of the project and will perform the roles of Project management, Reporting and project budgeting. NEMA has a robust technical team in the 8 core departments in NEMA, namely, Directorate, Environment Education, Information and Public Participation Department, Legal Services Department, Environmental Planning and Research Coordination Department (EPRC), Compliance and Enforcement department (C&E), Finance and Administration Department and Coastal, Marine and Fresh Waters Sub-Department. Hence a complementary relationship that allows for efficiency and effectiveness. NEMA has operational county offices in all the 47 counties in Kenya.
150. NEMA is also the National Implementing Entity with the Adaptation Fund Programme and is currently implementing a USD 10,000,000 Programme aimed at building resilience to climate change and adaptive capacity of vulnerable communities in Kenya, undertaken in 14 counties in Kenya.
151. NEMA will implement some project activities under this project in line with its accreditation credentials.

Capacities of the Executing Entities (EEs)

Water Resources Authority (WRA)

152. Water Resources Authority (WRA) is a state corporation under the Ministry of Water and Sanitation, established as a corporate body under the new Water Act (2016) that was operationalized on the 21st of April 2017 vide Special Issue Kenya Gazette Notice No. 60. The organization has been in existence for the past 12 years following its establishment as Water Resources Management Authority (WRMA) under the Water Act (2002) that has now been replaced by the new Water Act 2016. WRA's mandate is to regulate, monitor, assess and allocate the water resources; and to collaborate with other institutions as required for better water resource management. WRA has adopted Integrated Water Resources Management (IWRM) approach in its operations as a means ensure stakeholder participation and to adopt a holistic view of management of the water resources incorporating the environmental, social and economic context of the water resources. WRA is a technical institution with the Headquarters is in Nairobi, 6 Regional offices and 26 Sub Regional offices with a total of 750 staff of different cadres (technical, legal, finance, accounts, supply chain & procurement, administration, communication, ICT, and

records) distributed across the country. WRA has governance structures at local level through the WRUAs, with capacity to implement local activities at county level, in collaboration with other stakeholders. WRA has in the past implemented various projects geared towards securing water resources and is currently implementing projects across the country with funding support from both GOK and development partners. WRA's combined project implementation portfolio for both past and current projects is approximated at Ksh. 6 Billion.

Kenya Meteorological Department - KMD

153. Kenya Meteorological Department hosts the National Flood Forecasting and Early Warning Centre (NFFEWC) based at the headquarter Nairobi which is charged with collection of data, analysis, modelling and forecasting of flood. KMD has the required facilities for monitoring and forecasting flood and drought hazards, such as real-time rainfall data, evaporation, and storm monitoring tools (satellite imagery, lightning and thunderstorm detectors), and quantitative rainfall forecasts (numerical weather prediction products) are available at KMD. The department also has high capital investment facilities connecting it to regional and Global Telecommunication System (GTS) hydro meteorological information sources necessary for forecasting of flood and drought hazards.

154. The department is charged with provision of meteorological information and early warning services for the safety of life, protection of property and conservation of the natural environment as a contribution to sustainable development of the nation and has a clear mandate as defined by the WMO Convention (1947 and revised in 2007), and Conventions of the World Hydromet. Observing Stations. It has trained manpower in various fields of Meteorology, Operational Hydrology, Numerical Weather Prediction and related services with requisite expertise to undertake data analysis, forecasting and delivery of services to the specific users. Staff in KMD have been trained on climate change modelling

D.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

155. The NDA has been widely consulted and engaged in the development of this proposal. The NDA was the chair of the Kenyan GCF Project Steering Committee whose membership comprised of, various government institutions, AE, and readiness service providers. The NDA also had representation in the Project Development Teams (PDT) that developed this proposal. The PDTs comprised of institutions with water related mandates, University of Nairobi, Observers from Pan African Climate Justice Alliance and Transparency International also were part of the process. The NDA also convened some of the meetings and consultations that were held for this proposal.

Steps taken in the development of this proposal are detailed in the following Table.

Table 4: Steps undertaken during proposal development

Date	Activity
February 2016	Establishment of the GCF Steering Committee (SC) by the NDA. Composition includes NIE, MENR, UNEP and CDKN. Terms of reference for the SC approved by the NDA. NDA convened an inception workshop to begin the process of writing GCF proposals. Over 50 stakeholders from ministries, agencies, departments, civil society, observers and private sector attended Work-plan to develop GCF proposals developed and approved by stakeholders.
March 2016	NIE convened a GCF training on prioritization of adaptation actions. The training was attended by: the NDA, members of the SC, and representatives from government entities, including Ministry of water, Ministries of Devolution and Planning; Agriculture, Livestock and Fisheries; Industry, Communications, Technology and Innovation; Environment and natural resources; Industrialisation and Enterprise; Kenya Association of Manufacturing; civil society actors.
April 2016	The NDA convened a training workshop on GCF proposal development and cost benefit analysis. Workshop was attended by over 20 people. Representation was from Ministries of Devolution and Planning; Agriculture, Livestock and Fisheries; Environment and natural resources; Industrialisation and Enterprise and civil society actors
April 2016	NDA convened a meeting Technical Working Group meeting to prioritise potential GCF concepts. Prioritisation is based on NCCAP, INDC and NAP priorities. NDA and NIE appoint 25 individuals (Project Development Teams) from various ministries, civil society and private sector to assist in the development of 3 GCF proposals
May 2016	NDA and the NIE conducted the induction of PDTs GCF proposal writing begun

June 2016	NDA convened planning meetings for the PSC GCF proposal writing continued
July 2016	GCF proposal writing continued NIE trained PDTs on environmental and social safeguards
August 2016	GCF proposal writing continued
September 2016	Letter of no objection
2017	NEMA secures technical support from Korea Environmental Industry and Technology Institute (KEITI) to undertake feasibility studies
2017/2018	County/Community level stakeholder consultations
2018	ESMF, Feasibility studies, Gender action plan
2018	Validation workshops for ESIA at the County level
November 2018	Finalization and submission of revised FP
22nd April 2019	1st Feedback on the Completeness check on the Water proposal submitted
30th May 2019	2nd Feedback on the Funding Proposal Review
August 2019	3rd Feedback on the Funding Proposal Review
December 2019	4th Feedback on the Funding Proposal Review
January 2020	GCF review team call with the AE to discuss the 5th review comments
February 2020	AE responds to the 5th review comments
March 2020	GCF introduces a consultant to the AE to assist in the finalization of the F.P in preparation for B.26
May 2020	AE receives ITAP Assessment findings of the submitted proposal
June 2020	AE has a call with ITAP to discuss the assessment findings
October 2020 to date	AE updates the FP and Annexes , GCF task team guides the process

156. The process of developing this proposal began with a high level tripartite meeting with the Director General of Budget, Fiscal and Economic Affairs from the National Treasury, the National Climate Change Secretariat (NCCS) and the National Environment Management Authority (NEMA) which approved the project activities, work-plan, roles and responsibilities of different project structures. Thereafter agreements were reached with United Nations Environment Program (UNEP), CARE, World Resources Institute (WRI) and the United Nations Development Program (UNDP) on how to offer complementary capacity building activities as opposed to duplication as they are all involved in assisting the government in GCF proposal development. The first Project Steering Committee (PSC) meeting endorsed the roles and responsibilities of the different project structures and the inception meeting endorsed the project work-plan. A stakeholder analysis was conducted, and various stakeholders were mapped against their power and influence and classified according to their level of interest in the project. In addition, a multi-stakeholder plan which includes negotiation, partnerships and participation procedure, grievance resolution mechanism and stakeholder involvement in project monitoring was developed. As detailed in section E 5.3 more than 50 institutions have been involved in the process of developing this process in various stages as shown in E 5.3. They have assisted in data collection, formulation of text and peer review of the project's content.

D.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project/programme

D.6.1. Cost-effectiveness and efficiency

157. The net economic benefits and costs in the analysis of the overall project were derived by comparing the 'with' and 'without' project scenarios. The project aims to strengthen the resilience to climate change of communities and increase water security in the Athi River Catchment Area in Kenya, which will lead to the resulting benefits: (i) reduction in flood related losses; (ii) reduction in water sanitation and supply related diseases incidents and costs thereof; and (iii) time savings by households in accessing water. The desired interventions and outcomes are purely public in nature and they will not be displacing any existing mechanisms present in the targeted areas to cope with the challenges.

158. The results of economic analysis are all positive despite the analysis having used conservative estimates with regards to the benefits expected and attributable to the project. The economic analysis was done over 30 years, over which the project assets will likely yield benefits assuming that operations and maintenance activities described in the proposal and feasibility study are undertaken.

159. The project uses a discount rate of 12% as base case scenario and accounts for flood protection, health, and avoidance of social costs (e.g. time for water collection). The economic analysis was done at 30, 20 and 15 years and the results are presented as below;

	30 years, 12% discount rate	20 years 12% discount rate	15 years 12% discount rate
NPV (USD)	9,747,248.48	7,585,142.92	5,551,275.52
IRR	13%	12%	11%
Discounted payback period	7.22	7.22	7.22
AEV (USD)	1,210,059.08	1,015,489.68	815,061.81
Benefits/Costs Ratio	1.78	1.63	1.48

A detailed economic analysis and financial analysis for the project are included as an annex 3 and 3ii to the funding proposal.

D.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

160. The Government of Kenya (GOK) is expected to offer support to the project from Year 1 and throughout the project in terms of office space, staff time, vehicles, and utilities. These figures have been estimated as at Year 0 and grown over time with the average inflation rate. The figures for Year 0 are presented in the table below. The analysis has also assumed that the Gok will support the project from Year 5 to a tune of USD 531,784 and this figure has been assumed will remain constant for a lack of a better estimate. This operations and maintenance (O&M) estimate supported by an O&M plan (attached)

Item	USD	Description
Office Space	27,000.00	USD 45,000million per month * 12 months * 5% of office space
Staff time	30,000.00	50 staff * Average salary of USD 1,000 per month * 12 months * 5% of staff time.
Gok Vehicles	1,500.00	3 vehicles, worth USD 50,000 each, depreciated over 5 years (20% pa), and used for the project only 5% of the time.
Utilities	2,400.00	Utilities estimated at USD 200 per month for 12 months.
Totals	60,900.00	

Gok support to the project in year 0

Please make a reference to [E.6.5 \(core indicator for the expected volume of finance to be leveraged\)](#).

D.6.3. Financial viability

161. An economic feasibility analysis is conducted to estimate the economic feasibility of a project by comparing and analyzing the costs and benefits of the projects in monetary terms. The economic feasibility of a project depends on the sustainability of the project and its impact. Unlike an economic feasibility analysis, the main purpose of financial validity analysis is to figure out whether the return on investment from the project achieves the expected profit. If not, the analysis makes basic data available to set up plans to make the project feasible.

162. Beyond the Fund intervention, the project is will still be viable as indicated by the positive at year 14. Results indicate that the benefits will be realized after the project period and hence the proposed investment of GCF resources can be seen to be a cost-effective investment which will create net economic benefits that are about two times greater than the initial GCF investment. The project assets handed over for operation and management to the county governments. The management committees of the established assets shall be trained on sustainability measures that will ensure project benefits are up scaled and sustained beyond the Programme cycle.

D.6.4. Application of best practices

163. KMD successfully implemented the Nzoia Flood Early Warning System (NFEWS) under Western Kenya Community Driven Development and Flood Mitigation Project (WKCDD&FMP) in Western Kenya funded by the World Bank and the Kenya Government. The broad objective of flood management within the project was to reduce vulnerability of the community to adverse outcomes associated with recurrent flooding. This was addressed through; Preparation of multi-purpose long term flood management, Enhanced flood plain management in the Budalang'i plains and Development and institutionalization of proactive mechanism for a community-based flood early warning system.

164. The project will take forward lessons from similar projects across the world including the Integrated Study Project on Hydro-Meteorological Prediction and Adaptation to Climate Change in Thailand (IMPAC-T) which has been operating in Thailand since 2009. IMPAC-T involved enhancing Thailand's decision-making support system for adaptation strategies that address water-related issues, specifically those caused or exacerbated by climate change in Thailand.

D.6.5. Key efficiency and effectiveness indicators

GCF core indicator s	Estimated cost per t CO ₂ eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)
	<p>(a) Total project financing US\$ _____</p> <p>(b) Requested GCF amount US\$ _____</p> <p>(c) Expected lifetime emission reductions overtime _____ tCO₂eq</p> <p>(d) Estimated cost per tCO₂eq (d = a / c) US\$ _____ / tCO₂eq</p> <p>(e) Estimated GCF cost per tCO₂eq removed (e = b / c) US\$ _____ / tCO₂eq</p>
	<i>Describe the detailed methodology used for calculating the indicators (d) and (e) above. Please describe how the indicator values compare to the appropriate benchmarks established in a comparable context.</i>
	Expected volume of finance to be leveraged by the proposed project/programme and as a result of the Fund's financing, disaggregated by public and private sources (mitigation only)
	<i>Describe the detailed methodology used for calculating the indicators above. Please describe how the indicator values compare to the appropriate benchmarks established in a comparable context.</i>
Other relevant indicators (e.g. estimated cost per co-benefit generated as a result of the project/programme)	N/A

* **The information can be drawn from the project/programme appraisal document.**

E. LOGICAL FRAMEWORK

This section refers to the project/programme's logical framework in accordance with the GCF's Performance Measurement Frameworks under the Results Management Framework to which the project/programme contributes as a whole, including in respect of any co-financing.

E.1. Paradigm shift objectives

LOGICAL FRAMEWORK

This section refers to the project/programmes logical framework in accordance with the GCF's Performance Measurement Frameworks under the Results Management Framework to which the project/programme contributes as a whole, including in respect of any co-financing.

E.2. Core indicator targets

Provide specific numerical values for the GCF core indicators to be achieved by the project/programme. Methodologies for the calculations should be provided. This should be consistent with the information provided in section A.

E.2.1. Expected tonnes of carbon dioxide equivalent (t CO ₂ eq) to be reduced or avoided (mitigation and cross-cutting only)	Annual	Click here to enter text. t CO ₂ eq
	Lifetime	Click here to enter text. t CO ₂ eq
E.2.2. Estimated cost per t CO ₂ eq, defined as total investment cost / expected lifetime emission reductions (mitigation and cross-cutting only)	(a) Total project financing	_____ Chc
	(b) Requested GCF amount	_____ Choc
	(c) Expected lifetime emission reductions	_____ t CO ₂ eq
	(d) Estimated cost per t CO₂eq (d = a / c)	_____ C CO ₂ eq
	(e) Estimated GCF cost per t CO₂eq removed (e = b / c)	_____ C CO ₂ eq
E.2.3. Expected volume of finance to be leveraged by the proposed project/programme as a result of the Fund's financing, disaggregated by public and private sources (mitigation and cross-cutting only)	(f) Total finance leveraged	_____ Chc
	(g) Public source co-financed	_____ Choc
	(h) Private source finance leveraged	_____ Chc
	(i) Total Leverage ratio (i = f / b)	_____
	(j) Public source co-financing ratio (j = g / b)	_____
	(k) Private source leverage ratio (k = h / b)	_____

E.2.4. Expected total number of direct and indirect beneficiaries, (disaggregated by sex)	Direct	1,156,620 51% of female
	Indirect	3,693,380 51% of female
<i>For a multi-country proposal, indicate the aggregate amount here and provide the data per country in annex 17.</i>		
E.2.5. Number of beneficiaries relative to total population (disaggregated by sex)	Direct	0.4 (Expressed as %) of country(ies)
	Indirect	10.32 (Expressed as %) of country(ies)
<i>For a multi-country proposal, leave blank and provide the data per country in annex 17.</i>		

E.3. Fund-level impacts

Select the appropriate impact(s) to be reported for the project/programme. Select key result areas and corresponding indicators from GCF RMF and PMFs as appropriate. Note that more than one indicator may be selected per expected impact result. The result areas indicated in this section should match those selected in section A.4 above. Add rows as needed.

Expected Results	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term	Final	
A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions	A1.1 Change in expected losses of lives and economic assets (US\$) due to the impact of extreme climate-related disasters	Third party monitoring	0US\$	US\$ 1,751,647 flood related benefits at end of year 2	US\$ 1,836,018 flood related benefits at end of year 4	<ul style="list-style-type: none"> a) 10% of the population in the targeted counties will utilize the EWS to move property b) Per capita cost of floods at USD 2,276.85 in real terms will remain fixed over the years c) 5% of the total property that families could save from floods in responding to EWS d) Only 5% of the total cost saved could be attributable to the project
A2.0 Increased resilience of health and well-being, and food and water security	A2.3 Number of males and females with yearround access to reliable and safe water supply despite climate shocks and stresses	Annual Project M&E Progress reports	Male: 0 Female: 0	Total: 90,000 Male: 44,100 Female: 45,900	Total: 1,156,620 Male: 566,744	<ul style="list-style-type: none"> a) Water supply from springs sources is more than adequate to benefit up to 1.6M

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					Female: 589,876	individuals over 40-year period assuming a 2.65% population growth rate b) Only 36,500 individuals will benefit from boreholes c) Only 10% of the total population of the catchment will significantly reduce the time to the water source
A3.0 Increased resilience of infrastructure and the built environment to climate change	A3.1 Number and value of physical assets made more resilient to climate variability and change, considering human benefits	Installation report Monitoring reports	Number: 0 Value: 0	Number:26 16 water pans 7 springs 2 Boreholes 1 catchment rehabilitated Value: USD 27,497,475.63	Number: 40 22 water pans 7 Springs 8 Boreholes 1 Sand dam 2 catchment rehabilitated Value: USD 54,994,951.26	Project activities will be on schedule and there will be no or insignificant cost overruns

E.4. Fund-level outcomes						
<i>Select the appropriate outcome(s) to be reported for the project/programme. Select key expected outcomes and corresponding indicators from GCF RMF and PMFs as appropriate. Note that more than one indicator may be selected per expected outcome. Add rows as needed.</i>						
Expected Outcomes	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term)	Final	
A5.0 Strengthened institutional and regulatory systems for climate-responsive planning and development	A5.1 Institutional and regulatory systems that improve incentives for	Expert review using Score Card approach will be used to	0	2 County governments have climate	4 County governments have climate	Institutional collaboration will be adequate.

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	<i>climate resilience and their effective implementation</i>	<p>measure improvement of the Institutional and regulatory systems (From level 0 (Non-existent), 1 Prepared/approved, 2 partially implemented, 3 substantially implemented, 4 (Fully Implemented)</p> <p>County Environment Action Plans (CEAPS)</p> <p>Sub Catchment Management Plans (SCMPs)</p> <p>County State of Environment Reports (SOEs)</p>		responsive policies/plans and at level 1	responsive policies/plans and at level 3	Existing regulatory system will provide an enabling environment
A6.0 Increased generation and use of climate information in decision-making	<i>A6.2 Use of climate information products/services in decision making in climate sensitive sectors</i>	<p>Assessment reports on use of Climate information products/service available at market - (Daily / monthly/ seasonal weather forecast, Water situation reports, Air quality data, Flood forecast report,)</p> <p>Installation report</p>	Low use of climate information in decision making (due to lack of information products, capacity, and framework)	Moderate use (some information products are produced and used in some decision making)	Substantial use (majority of information products are produced and used in most decision-making)	Capacity to generate and use climate information will be developed and sustained beyond project period
A7.0 Strengthened adaptive capacity and reduced exposure to climate risks	<i>A7.1 Use by vulnerable households, communities, businesses and public-sector services of Fund-supported tools</i>	Midterm and end of project Survey of project	0	5% of the population in the targeted	10% of the population in the targeted	The county government s will support the Programme implementation and

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	<i>instruments, strategies and activities to respond to climate change and variability</i>			counties will utilize the EWS information to avoid flood risks	counties will utilize the EWS information to avoid flood risks 3% of the diarrheal incidents could be averted due project interventions 10% as the time savings attributed to the project interventions	communities will have Strengthened adaptive capacity and reduced exposure to climate risks There will be Increased access to portable water Sufficient awareness to the communities on EWS will be created, and the system will be easily accessible
A8.0 Strengthened awareness of climate threats and risk-reduction processes	<i>A8.1 Number of males and females made aware of climate threats and related appropriate responses</i>	Assessment report	Male: 0 Female: 0	Total: 14,000 Male: 6,860 Female: 7,140	Total: 27,539 Male: 13,494 Female: 14,045	Community members are receptive to awareness raising activities and have Improved compliance to relevant climate related regulations

E.5. Project/programme performance indicators

The performance indicators for progress reporting during implementation should seek to measure pre-existing conditions, progress and results at the most relevant level for ease of GCF monitoring and AE reporting. Add rows as needed.

Expected Results	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term	Final	
1. Water resources monitoring systems enhanced for improved adaptation planning to support	No. of installed and operational water resources monitoring equipment/stations/laboratories	Report	10	69	70	The county government and the local community will support the project

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<p>decision making and policy development in water and climate change sector</p>	<p>(Operational means the equipment are maintained and in use)</p>					<p>Adequate resources for O&M will be available. The security of the installed gadgets will be assured The Global System for Mobile communication will be operating at optimum levels The system will be an Integrated water resources information with Decision support capability There will be no turnover of trained laboratories staff</p>
<p>2. Improved decision making in water and climate change sector</p>	<p>Operational IWR monitoring and Information system and Decision Support System (DSS)</p>	<p>IWR monitoring and Information system Reports</p>	<p>0</p>	<p>2</p>	<p>2</p>	<p>The system will be fully operational. Impact to be measured through survey on number of institutions and households using the DSS to reduce potential climate threats and risks.</p>
	<p>Operational Decision Support System customized to ACA - Athi Catchment Area</p>	<p>Installation report Data Analysis reports</p>	<p>0</p>	<p>1</p>	<p>1</p>	<p>Completely installed and functional system in place Data sharing protocols effected</p>
	<p>No. of developed State of the Environment (S.O.E.) reports</p>	<p>S.O.E reports Meeting reports</p>	<p>0</p>	<p>4</p>	<p>4</p>	<p>The County Environment Committees - CECs will support the process</p>
<p>3. Strengthened institutions in water and climate change sector</p>	<p>Number of staff trained to operate and apply IWR information and DSS</p>	<p>Training, reports</p>	<p>0</p>	<p>40</p>	<p>80</p>	<p>Staffs and personnel of NEMA, WRA, KMD, County governments and communities will use the information for decision making</p>
<p>4. Increased access to potable water for domestic use considering present and future impacts of climate change.</p>	<p>Access to potable water for domestic use all year round for project beneficiaries</p>	<p>Assessment report</p>	<p>14%</p>	<p>30% of direct project beneficiaries have access to portable water all year round</p>	<p>60% of direct project beneficiaries have access to portable water all year round</p>	<p>The county government and the local community will support the project Rain water harvesting policy and guidelines on rain water harvesting put in place.</p>

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5. Conservation of water catchment areas as climate change adaptation measure.	Km of riparian land rehabilitated	Reports, Trees/vegetative options grown on targeted riparian land	50km	100km	150km	The trees planted in the water catchment areas will survive The weather will be favorable The WRUAs will support the initiative
6. Strengthened institutional and regulatory framework for climate change adaptation	Increased enforcement actions to improve water quality	Enforcement and water quality reports	20%	40%	60%	Operational water quality monitoring systems Community compliance to regulations Water quality data available for decision making The regulated stakeholders will participate in the meetings and have enhanced compliance to the regulations
	No. of CEAPs developed and Sub-Catchment Management Plans (SCMP) updated	CEAP reports developed Meeting reports Sub-Catchment Management Plans (SCMP) updated	0	6	12	The County Assemblies will endorse the developed CEAPS WRUAs supported to implement relevant parts of SCMPs. County Governments will implement the recommendation of the planning documents – CEAPs, SCMPs
	No. of workshops Conducted with regulated stakeholders to enhance compliance Improved compliance among regulated stakeholders	Attendance list on workshops / meetings Workshops / meetings reports	-	6	12	measurement of the uptake of the trainings will be done to determine their effectiveness

E.6. Activities

All project activities should be listed here with a description and sub-activities. Significant deliverables should be reflected in the implementation timetable. Add rows as needed.

Activity	Description	Sub-activities	Deliverables
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<p>Activity 1.1.1 Set up an institutional mechanism for sharing information and getting feedback (data sharing protocol among players in the water sector e.g. through MOUs)</p>	<p>A National Information Centre for IWRM at WRA headquarters will act as a hub of water resources monitoring information and will be equipped with proper ICT system for processing, analysis of information to produce integrated water resources information for informed decision making</p>	<ul style="list-style-type: none"> • Policy dialogue Meetings aimed at developing data sharing protocols (between NEMA, WRA, KMD) and strategy for continuous communication between the user communities and county governments. 	<p>Data sharing protocols and MoUs among the executing entities Functional water resource management information system Water Resource Information products</p>
<p>1.1.2 Support the development of a National Information Centre for integrated water resource management (under the WRA HQ) by equipping it with necessary hardware and software facilities.</p>		<ul style="list-style-type: none"> • Acquire and install the centralized integrated water resource management information system (server, HDD 1TB, monitors, network facilities, UPS with additional batteries) with necessary software (operating systems, database, visualization, web server and other utilities). 	
<p>Activity 1.1.3 Support information analysis, forecasting and knowledge sharing platforms through an integrated database for weather and water resources-related information</p>	<p>In order to have sustainability for project inputs, capacity building and training programs will be provided.</p>	<ul style="list-style-type: none"> • Develop an integrated analysis tools with visualization from monitoring information. The Decision Support System will assist in data entry, storage, analysis and reporting of collected data • Develop a shared system of weather forecast information for development of early warning and install a flood and drought warning system in flood prone areas in Kiambu and Machakos counties • Develop web services for sharing information with stakeholders 	<p>Enhanced staff capacity on integrated water resource management and climate change Enhanced staff capacity on use of data generation and modeling software</p>
<p>Activity 1.2.1 Install and rehabilitate surface hydro-meteorological monitoring and network systems and rehabilitate existing monitoring systems (Nyandarua, Nairobi, Kiambu, Machakos county)</p>	<p>Hydro meteorological infrastructure will enhance protection from weather and climate shocks such as droughts and floods and improve the capability for gathering hydro meteorological data which is critical for monitoring and predicting extreme events.</p>	<ul style="list-style-type: none"> • Installation of surface hydro-meteorological monitoring and network systems and rehabilitate existing monitoring systems (Nyandarua, Nairobi, Kiambu, Machakos county). • Install 25 Automatic Weather stations within the upper Athi catchment. all the stations will be equipped with Remote Terminal Units (RTUs), GSM/GPRS Modems, and the solar PV systems with solar battery, data protection equipment such as noise filters, surge protective devices. • Install 23 surface water level monitoring stations with multi-parameter water quality 	<p>Necessary equipment procured and installed at designated sites. Operators of the network trained on use of new equipment</p>

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		sensors for 20 stations. 5 rainfall monitoring stations. All the stations will be equipped with Remote Terminal Units (RTUs), GSM/GPRS Modems, and the solar PV systems with solar battery, data protection equipment such as noise filters, surge protective devices. 3 Water Level Stations will be manual hence will not require the sensors. The 5 rainfall monitoring stations will be distributed in specific sites in the project area and located within the Automatic Water Level Station (AWLs) compound.	
Activity 1.2.2 Upgrade water quality test laboratory at WRA and NEMA (purchase, install, calibrate, test laboratory equipment /stations)	Acquire and calibrate devices for water quality test such as atomic absorption spectrophotometer, oxi tops, Chemical Oxygen Demand (COD) digester, incubators, sediment analysis kit, High-performance liquid chromatography, Procure operational materials such as laboratory chemicals, reagents, and glassware	<ul style="list-style-type: none"> Acquire and calibrate devices for water quality test such as atomic absorption spectrophotometer, oxi tops, Chemical Oxygen Demand (COD) digester, incubators, sediment analysis kit, High-performance liquid chromatography, Procure operational materials such as laboratory chemicals, reagents, and glassware. Both NEMA and WRA will be allocated funds for upgrading their water quality test laboratories 	
Activity 1.2.3 Establish 10 groundwater monitoring stations	Develop 8 new monitoring wells in Nairobi, Kiambu and Machakos counties and Install necessary sensors to measure water level, conductivity, temperature, RTUs and other equipment for automated data transfer	<ul style="list-style-type: none"> Develop 10 new monitoring wells in Nairobi, Kiambu and Machakos counties and Install necessary sensors to measure water level, conductivity, temperature, RTUs and other equipment for automated data transfer 	Ground water monitoring stations established
Activity 1.2.4 Setting up of a RANET broad casting station in Machakos County	Establish a RANET station	<ul style="list-style-type: none"> Installation of a "RADIO InterNET" broadcasting in approximately 50 – 75 Kilometers radius in the local dialect, Kiswahili and English for 24 hours, with an estimated audience of 1,000,000 listeners 	Necessary equipment procured and installed
Activity 1.3.1 Support capacity building and training for government institutions with water and climate change mandates within the project area	In order to have sustainability for project inputs, capacity building and training programs will be provided.	<ul style="list-style-type: none"> The executing entities will identify capacity building and trainings for their relevant institutions with water and climate change mandates within the project area and NEMA will approve and disburse fund accordingly 	

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<p>Activity 1.3.2 Support capacity building and training for relevant water governance structures and communities within the project area (Water Resource Users Associations -WRUAs, County Environment Committees - CECs, County Adaptation Committees, Community Based Organizations -CBOs among others)</p>	<p>In order to have sustainability for project inputs, capacity building and training programs will be provided.</p>	<p>i. The executing entities will identify capacity building and training for relevant water governance structures and communities within the project area, develop training plan and manuals and NEMA will approve training plans and disburse fund accordingly</p>	
<p>Activity 1.4.1 Support development of State of the Environment (S.O.E) reports from the information developed</p>	<p>Availability of data and documentation of environment is critical in projecting future scenarios, thereby reducing susceptibility and improving disaster preparedness. Through the SOE process, baseline data, trends of drivers and pressures impacting on the environment will be established, future scenarios will be projected, and appropriate policy interventions recommended.</p>	<p>Consultative workshops to develop the S.O.Es.</p>	<p>County State of the Environment (S.O.E) reports developed</p>
<p>Activity 2.1.1: Construct water storage and supply infrastructure</p>	<p>In selected counties within the ARCA, appropriate water storage infrastructure will be constructed</p>	<ul style="list-style-type: none"> • rehabilitate two boreholes, twelve water pans, two springs in Nyandarua county • build a new borehole, water pan, two springs and rehabilitate three boreholes, two water pans, two springs in Kiambu county • build two new boreholes, rainwater harvesting tanks and rehabilitate nine water pans, one spring and one sand dam in Machakos county 	<p>Appropriate water storage infrastructure constructed Improved access to water for domestic use</p>
<p>Activity 2.2.1: Rehabilitation and reforestation activities within the selected counties in collaboration with WRUAs</p>	<p>The restoration of degraded water catchment areas will be done through engagement of communities through existing water resources governance structures (WRUAs)in the counties in rehabilitation/renewal/conservation and protection of degraded water catchment areas. The activities will include Establishing tree nurseries for rehabilitation and reforestation within the selected counties, perform catchment protection through tree planting in two</p>	<p>Rehabilitation and reforestation activities within the 4 target counties in collaboration with WRUAs</p> <ul style="list-style-type: none"> • Establish tree nurseries for tree planting at new and rehabilitated water structures within the selected counties • Undertake planting of indigenous trees in two catchment areas with high risk of erosion in the target counties • Riparian marking and pegging (using indigenous tree) of 20km along Riara and Ndarugu Rivers 	<p>Awareness on catchment conservation Improved Catchment areas rehabilitated and conserved</p>

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	<p>catchment areas with high risk of erosion in the target counties,</p>	<ul style="list-style-type: none"> • Construction of terraces (1000m) and 1500m gabions (gully healing by planting vetiver grass and or installation of gabion boxes) in selected sites in Kiambu and Nairobi counties). 	
<p>Activity 3.1.1: Provide water quality monitoring systems to support enforcement of the water quality regulations</p> <p>Activity 3.1.2: Sensitize the regulated communities to enhance compliance</p>	<p>Implementation of the provisions of existing legislations through compliance and environment management tool s will enhance climate change adaptation. Degraded water and water quality treatment systems, if not monitored emit gases such as NH3 and CO2 which are greenhouse gases. In addition, water of poor quality could be a source of waterborne diseases that will compromise human health and their resilience to climate change.</p>	<p>3.1.1 Provide water quality monitoring systems to support enforcement of the water quality regulations. The tools will include; 8 (eight) Multi parameter sonde (new hydrolab HL7) and ICT with ability to measure pH, temperature, nutrients (nitrates and phosphates), dissolved oxygen, total dissolved oxygen, salinity (conductivity), depth, chlorophyll, Rhodamine, blue-green algae, Ammonia, Chloride, etc. basically parameters that show effect of climate change on water quality; and its accessories; a Water testing kit for Microbiology analysis (POTALAB) with ability to detect Ecoli (Faecal contamination), Coliform (bacterial contamination), Salmonella (Typhoid), Pseudomonas (ENT infections); 3 (three) Potable Heavy metal detection meters (Portable Metalyser for Heavy Metals) with the ability to measure Arsenic (III and Total), Antimony, Cadmium, Chromium, Cobalt, Gold, Mercury, Lead, Magnesium, Nickel, Selenium, Thallium, Tin, Zinc</p> <p>3.1.2 Sensitize the regulated communities to enhance compliance:</p> <p>i) Promote WASH practices through hygiene awareness campaigns aimed at promoting water disinfection methods and hygiene practices in collaboration with the beneficiary county governments</p> <p>ii) Carry out Compliance Management Action Plan trainings / workshops to ensure compliance with the water sector laws and standards in Kenya (Both NEMA and WRA will identify stakeholder among the regulated communities to</p>	<p>Improved compliance to existing legislations on water quality Compliance licenses issued</p>

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		be sensitized, develop workshop schedules / plans and implement the activity. NEMA and WRA are government agencies with clear mandates in the water sector that require a coordinated approach to ensure compliance)	
Activity 3.1.3 Conduct water quality pollution survey for point and non-point sources of pollution	The survey is a regulatory safeguard measure for sustainable protection of both surface and ground water resources.	i. Field survey and Consultant meetings	Water quality pollution survey for point and non-point sources of pollution report
Activity 3.2: Support development of 4 County Environment Action Plans (CEAPs) as an adaptive action	Environmental Action planning at the county level is critical in prioritizing environmental issues including adaptation and mitigation measures to be adopted in addressing county environmental challenges including those associated with climate change.	Workshops and meetings	County Environment Action Plans (CEAPs) developed County Prioritized adaptation activities identified for action Enhanced awareness on environmental action planning at the county level
Activity 3.3 Development of 8 (eight) Sub-Catchment Management Plans (SCMPs) including climate change adaptation considerations	Water resources are at risk from the adverse impacts of climate change hence it's important to mainstream climate change related interventions in Sub-catchment management plans. Development, review and implementation of sub-catchment plans and climate risk management with regards to water resource management is crucial to ensure that catchment plans incorporate climate risk management approaches and activities. WRUAs will be supported in the implementation of activities in the sub-catchment management plans.	i. Capacity building and SCMP development workshop	Sub-catchment management plans reviewed / developed and implemented

E.7. Monitoring, reporting and evaluation arrangements (max. 500 words, approximately 1 page)

Monitoring and evaluation (M&E) is one of implementing measures that support successful delivery of this proposed project. Monitoring, evaluation, and reporting for the project will follow NEMA's Monitoring and Evaluation Policy. A key aspect of the project will be learning and documenting of lessons as well as developing capacities of players of Executing Entities (EE. The M&E function will be carried out by the accredited entity. NEMA as the AE has a Monitoring and Evaluation section that conducts post project monitoring over the life span of the Authority's projects. The project results monitoring process after final evaluation will be collaborative activity together with the county governments that will be the custodians of the adaptation assets rehabilitated / constructed. The EE that have specific mandates in the

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hydrological and meteorological monitoring systems will undertake the monitoring of the established assets and carry out routine operation and maintenance to ensure the investments are in proper working conditions throughout the predicted lifespan.

M&E process will be undertaken using participatory methods/process, especially with the EEs to enhance continuous learning and promoting iterative project implementation. In addition, M&E system of this project will be gender sensitive and will follow guidance from the GCF and comply with GCF M&E policy, ensuring that the project maintains a simple and interactive monitoring system allowing for regular collecting data for ensuring progress, reporting and evaluating at all levels. The responsibility for day-to-day project monitoring and implementation will rest with the Executing Entities - EEs. The EEs will develop quarterly and annual work plans to ensure the efficient implementation of the project. The EEs will inform the AE of any delays or difficulties during implementation, including the implementation of the M&E plan, so that the appropriate support and corrective measures can be adopted. The EEs will also ensure that all project staff maintain a high level of transparency, responsibility and accountability in monitoring and reporting project results. It is expected that it will be based on the following core activities:

- **Activity Recording/Process Documentation:** Progress monitoring and reporting will provide evidence on accomplishment of the planned activities under each Output and Activity, by assigning milestones and implementation timelines. This will help the strategic and operational managers to identify which activities are properly taking place or not. The accredited entity of Kenya, NEMA, and executing entities will be responsible for ensuring routine monitoring on the use of inputs (including finances) and implementation of activities.
- **Annual Progress report/Annual Performance Assessment:** The annual project report/Annual Performance Assessment will be included but are not limited to; quarterly project reports, Annual reports, Project Outputs delivered per project Outcome, financial report, lessons learnt/good practice, and annual Work Plan (for the following year).
- **A mid-term review:** A Formative Evaluation process will be carried out Year 2 in order to analyze the progress of the proposed project and to suggest possible adjustments and improvement for the sake of efficiency, effectiveness, and sustainability before the end of the project period.
- **End of project review and final evaluation:** A summative evaluation will take place no later than 6 months prior to operational closure of the project. The terms of reference, the review process and the final terminal evaluation report will follow the standard templates of the Government of Kenya.

F. RISK ASSESSMENT AND MANAGEMENT

F.1. Risk factors and mitigations measures (max. 3 pages)

Selected Risk Factor 1

Category	Probability	Impact
Forex	High	Medium
Description		

Inflation and dollar fluctuation. Kenya shilling has not been stable against the dollar and due to inflation in the country most prices for services and products change.		
Mitigation Measure(s)		
The project has factored in 5% inflation change.		
Selected Risk Factor 2		
Category	Probability	Impact
Governance	Medium	Medium
Description		
Resistance from the riparian adjacent landowners to have some of the riparian areas marked and protected		
Mitigation Measure(s)		
The project will ensure proper sensitization of the community is done to have all stakeholders on board at the beginning of the project. Additionally, the community members will be made aware of benefits from riparian rehabilitation and protection at a community level.		
Selected Risk Factor 3		
Category	Probability	Impact
Technical and operational	Low	Medium
Description		
Lack of County Government goodwill of the planned activities		
Mitigation Measure(s)		
To mitigate against this risk, the project implementation will involve a wide range of stakeholders including local political and administrative leadership to allow for participation and decision making. The county governments participated in the county stakeholder's forum during the feasibility hence are well informed of the programme.		
Selected Risk Factor 4		

Category	Probability	Impact
Technical and operational	Low	High
Description		
There is possibility of vandalism and/or theft of installed equipment.		
Mitigation Measure(s)		
To avoid against this risk, the water monitoring equipment and other installations will be set up within institutions that have adequate security. Where this is not possible, the equipment will be put within reinforced burglar proof structures with arrangements for emergency security response and ensures regular checks on the equipment. An incident reporting mechanism will be developed to ensure community members can report to the relevant authorities.		
Selected Risk Factor 5		
Category	Probability	Impact
Technical and operational	Medium	High
Description		
Poor maintenance of equipment		
Mitigation Measure(s)		
The feasibility study includes details on operations and maintenance plans including training of staff, inclusion of after sales service in procurement contracts, and preventive maintenance practices such as calibration and regular checks. Operations and maintenance costs are included in the project budget for the duration of the project. Relevant government agencies will cover O&M costs beyond the project lifetime. The mitigation measures lower the level of impact to medium.		
Selected Risk Factor 6		
Category	Probability	Impact
Other	Low	High
Description		

Installation of equipment on private land and potential for expropriation		
Mitigation Measure(s)		
Whenever possible, the project will install equipment in public or government-owned land. In cases where observation or monitoring equipment will be installed in private land, relevant formal agreements will be signed to govern the protection of the equipment. The mitigation measures lower the impact to medium.		
Selected Risk Factor 7		
Category	Probability	Impact
Other	Medium	High
Description		
Extreme events such as heavy rains prevent timely implementation of activities, particularly infrastructure rehabilitation		
Mitigation Measure(s)		
Annual work plans will be carefully drafted to avoid construction activities during heavy rains. In case of damage during construction, any damages and reconstruction costs will be covered by contractors' insurance. The mitigation measures lower the risk impact and probability to low.		

G. GCF POLICIES AND STANDARDS

G.1. Environmental and social risk assessment (max. 750 words, approximately 1.5 pages)

165. The project seeks to strengthen environmental management through activities such as protection of riparian areas and strengthening water governance structures. The other activities revolve around rehabilitation of existing water infrastructure i.e. degraded water pans, sand dams and boreholes. However, an Environment Social Management Framework (ESMF) for the activities proposed under this project has been undertaken as part of Kenya's larger GCF project implementation strategy. Recommendations have been provided for in the report to ensure proper due diligence procedures are adhered to during project implementation. The project placed under risk category B. The project activities vis a vis the GCF environment and social safeguards are discussed below:

Performance Standards	Risk Level (A,B &C) ¹¹	Mitigation measures
Labor and Working Conditions The project will adhere to existing Kenyan laws on labour (Cap 226) in engagement of staff and consultants, which are also in tandem with GCF ESS standards. The project will source unskilled labour locally and will tap any skilled labour within the community, thereby providing locals with an opportunity to earn income.	C	In sourcing for any skill and unskilled labor, the project will seek to hire locals from the area of implementation. This will ensure buy in and provide opportunities for incomes to local people
Resource Efficiency and Pollution Prevention The project activities that will involve rehabilitation of water storage structures e.g. water pans and sand dams may include some aspects of construction and use of cement and building material.	B	The project will work to ensure resource efficiency such as efficient water utilization through promotion of water efficient technologies (eg drip irrigation, piping rather than furrows, flooding or canal use) as provided in the water act of 2002. In any construction of water storage structures, the use of local materials will be promoted as much as possible
Community Health, Safety, and Security It is expected that local community members may be used during WRUA activities as well as used as unskilled labour for some of the construction activities.	B	The project will ensure adequate safety and security precautions in line with the Occupational health and safety act of 2007. During the construction and operational phases of the project, workers, project managers and all visiting the project site will be provided with relevant personal protective equipment. Adequate signage will be put in place to warn, inform and alert all on potential dangers and what is required of them. The rehabilitated water pans will be fenced as a security measure to ensure public safety and water security
Land Acquisition and Involuntary Resettlement To install monitoring stations and equipment, land may be required. It is not expected that any acquisition or resettlement will be required.	C	The projects will be implemented on public land and there will be no need for land acquisition
Biodiversity Conservation and Sustainable Management of Living Natural Resources A number of activities will be implemented by the WRUAs focusing that may be dealing directly with biodiversity and natural resources including riparian restoration.	C	Protection of riparian areas within the catchment will have a positive impact on biodiversity as it will enable rejuvenation of fauna and flora within the buffer zone thus established. The WRUAs under the project will be involved in tree nursery establishment under which indigenous tree species will be propagated, some of which have medicinal and cultural value to the community.
Cultural Heritage During implementation of WRUA activities there may be close contact with community members and cultural heritage sites.	C	The project will not have any negative impacts on the cultural heritage of the target beneficiaries. The implementation approach will seek to understand the cultural heritage of communities in the target counties and seek to gain guidance. The nomadic lifestyle of the Maasai will be enhanced through availability of water from rehabilitated springs.

¹¹ Risk Level has been categorized into three level: (A) Significant adverse risks that are irreversible, (B) Mild adverse risks that could be reversible, and (C) Minimal or no adverse risks

Table 6 Environmental and Social Management plan

G.2. Gender assessment and action plan (max. 500 words, approximately 1 page)

166. The gender assessment identifies and proposes remedies to gender based inequalities that could exacerbate existing or generate new forms of disparities in the way the project impacts on men, women and other vulnerable populations within the catchment areas. A cross-sectional gender analysis using qualitative methods was employed and emphasis was on making the process participatory through focus group discussions, key informant interviews, observation and workshops in Nyandarua, Kiambu, Machakos and Nairobi counties.
167. The stakeholder consultations were conducted among community participants, service delivery officers and policy makers in the water and environment management sectors, and gender mainstreaming oversight institutions. The assessment focus was on various elements of gender equality and equity that include: Access to resources, Level of knowledge acquisition and skills, Cultural beliefs and perceptions, Participation and decision making, Legal rights and status, and Time availability and space concerning location of water points.
168. The planning and design of the program adhered to the constitutional principle of public participation that requires consultation with stakeholders affected by public policy/project. Consultation Meetings were held at inception with project beneficiaries in Nyandarua, Kiambu, Nairobi and Machakos. 35% of the participants during these stakeholder forums were women hence in line with the constitutional two thirds gender representation requirement. Further, the project technical design team comprising technical teams key lead agencies was gender balanced. The project has also carried out a gender analysis and further developed a gender action plan that will ensure 51% participation of women in project activities and decision making. The gender action plan will ensure a gender-sensitive approach during project implementation. Further, the gender action plan has integrated gender sensitive indicators that will be tracked during project implementation. The accredited entity (NEMA) through GCF readiness support is developing a Gender Mainstreaming action plan to enhance gender integration in projects and programs. The project will also be cognizant of the Access to Government Procurement Opportunities (AGPO) which focuses on the fair, equitable, transparent and cost effective procurement of goods and services (Article 55 of COK 2010 which focusses on affirmative action in public procurement). The contractors will also be compelled to have 51% women involvement in works by introducing a clause in the contract
169. The gender analysis established that women and girls are the vulnerable gender majorly because they are responsible for finding water resource that their families need to survive - for drinking, cooking, sanitation, and hygiene and by extension they are also responsible for watering the livestock. They walk long distances to collect water, they also brave long queues in water collection points and in drought seasons they are forced to pay exorbitant amounts of money to secure water which is often very time consuming and arduous. The impacts of climate change that results in water shortage exacerbates the vulnerability of women and girls leading to exploitation and abuse.
170. Based on the gender assessment, a gender action plan was developed highlighting gender responsive actions that will be implemented against each project activity such as Constitution of a gender inclusive committee to gather and disseminate relevant climate information from local water catchment communities and county governments, development of an integrated database for weather and water resources-related information by ensuring that men and women receive seasonal forecast in a timely manner, promotion of gender balanced staffing during the technical training on operation of monitoring and information systems, ensuring public awareness and inclusiveness in the participation of men and women in the water catchment protection and management processes among others.
171. Key outcomes to be achieved from implementation of the gender action plan is reduced gender inequality and beneficial contribution of men and women in the project leading to reduced vulnerability, especially of women and girls.

G.3. Financial management and procurement (max. 500 words, approximately 1 page)

172. NEMA as the accredited entity has the responsibility of financial management, accounting and reporting. NEMA may appoint the EEs to undertake procurement of any goods and services for this project in line with the activities executed and based in the government procurement procedures.
173. Procurement of goods and services shall be guided by the public procurement and disposal Act 2015. NEMA shall be responsible for preparation of a disbursements schedule and shall prepare financial requests to the GCF.

174. NEMA shall also coordinate with the national auditing framework to ensure the Programme is audited in accordance with the Kenya National Laws. The funds shall be provided in advance to the Executing Entities on a quarterly basis and against a criterion that will ensure prudent use of resources. The expenditure shall be audited by NEMA internal audit section as well as the Kenya National Audit Office – KENAO to ensure compliance with the Kenya National Laws
175. Additionally, NEMA as a fast-track accredited entity under the Adaptation Fund has the basic fiduciary standards concerning transparency and accountability. The application of these standards will reduce any risks of money laundering (ML) or terrorism financing (TF) in the project.
176. NEMA has the following basic fiduciary standards concerning transparency and accountability:
- The NEMA draft Corruption Prevention policy is anchored in Chapter six of the Kenyan Constitution 2010, Article 232 of the Kenyan Constitution 2010, Leadership and Integrity Act 2012, Public Officer Ethic Act 2016, Anti-Corruption and Economic Crimes 2016
 - NEMA Code of Conduct and Ethics
 - NEMA has an established mechanism of receiving complaints and the procedure requires that NEMA reports third party complaints to the Ethics and Anti-Corruption Commission - EACC that provides for a platform to address fraud issues with the third parties
 - Kenya has a draft whistle blowing Act that allows another avenue for reporting fraud. Additionally, NEMA has draft Whistle Blowing Policy, 2017, that provides for recourse on NEMA dealing with third parties on corruption issues
 - NEMA has a Corruption Risk and Mitigation Plan that is under implementation
 - Draft NEMA Corruption Prevention Policy is implemented through the appointment of Corruption Prevention committee –CPC and Integrity Assurance Officers committee IAO
 - NEMA as the NIE has draft Anti – Corruption Policy and Finance and Procurement Manual
 - NEMA also has a police unit seconded from the National Police Service, who largely investigate environmental crime, but also play an advisories role in all investigative functions.

G.4. Disclosure of funding proposal

Indicate below whether or not the funding proposal includes confidential information.

- No confidential information:** The accredited entity confirms that the funding proposal, including its annexes, may be disclosed in full by the GCF, as no information is being provided in confidence.
- With confidential information:** The accredited entity declares that the funding proposal, including its annexes, may not be disclosed in full by the GCF, as certain information is being provided in confidence. Accordingly, the accredited entity is providing to the Secretariat the following two copies of the funding proposal, including all annexes:
- full copy for internal use of the GCF in which the confidential portions are marked accordingly, together with an explanatory note regarding the said portions and the corresponding reason for confidentiality under the accredited entity's disclosure policy, and
 - redacted copy for disclosure on the GCF website.
- The funding proposal can only be processed upon receipt of the two copies above, if containing confidential information.

H. ANNEXES		
H.1. Mandatory annexes		
<input checked="" type="checkbox"/>	ANNEX 1	NDA no-objection letter(s) (template provided)
<input checked="" type="checkbox"/>	ANNEX 2	Feasibility study - and a market study, if applicable
<input checked="" type="checkbox"/>	ANNEX 3	Economic and/or financial analyses in spreadsheet format
<input checked="" type="checkbox"/>	ANNEX 4	Detailed budget plan (template provided)
<input checked="" type="checkbox"/>	ANNEX 5	Implementation timetable including key project/programme milestones (template provided)
<input checked="" type="checkbox"/>	ANNEX 6	E&S document corresponding to the E&S category (A, B or C; or I1, I2 or I3): (ESS disclosure form provided) <input type="checkbox"/> Environmental and Social Impact Assessment (ESIA) or <input type="checkbox"/> Environmental and Social Management Plan (ESMP) or <input type="checkbox"/> Environmental and Social Management System (ESMS) <input type="checkbox"/> OTHERS (PLEASE SPECIFY – E.G. RESETTLEMENT ACTION PLAN, RESETTLEMENT POLICY FRAMEWORK, INDIGENOUS PEOPLE’S PLAN, LAND ACQUISITION PLAN, ETC.)
<input checked="" type="checkbox"/>	ANNEX 7	Summary of consultations and stakeholder engagement plan
<input checked="" type="checkbox"/>	ANNEX 8	Gender assessment and project/Programme-level action plan (template provided)
<input checked="" type="checkbox"/>	ANNEX 9	LEGAL DUE DILIGENCE (REGULATION, TAXATION AND INSURANCE)
<input checked="" type="checkbox"/>	ANNEX 10	Procurement plan (template provided)
<input checked="" type="checkbox"/>	ANNEX 11	Monitoring and evaluation plan (template provided)
<input checked="" type="checkbox"/>	ANNEX 12	AE fee request (template provided) template
<input checked="" type="checkbox"/>	ANNEX 13	Co-financing commitment letter, if applicable (template provided)
<input checked="" type="checkbox"/>	ANNEX 14	Term sheet including a detailed disbursement schedule and, if applicable, repayment schedule
H.2. Other annexes as applicable		
<input checked="" type="checkbox"/>	ANNEX 15	EVIDENCE OF INTERNAL APPROVAL (template provided)
<input type="checkbox"/>	Annex 16	Map(s) indicating the location of proposed interventions
<input type="checkbox"/>	Annex 17	Multi-country project/Programme information (template provided)
<input type="checkbox"/>	Annex 18	Appraisal, due diligence or evaluation report for proposals based on up-scaling or replicating a pilot project
<input type="checkbox"/>	Annex 19	Procedures for controlling procurement by third parties or executing entities undertaking projects financed by the entity
<input type="checkbox"/>	Annex 20	First level AML/CFT (KYC) assessment
<input checked="" type="checkbox"/>	Annex 21	Operations manual (Operations and maintenance)
<input checked="" type="checkbox"/>	Annex 22	Indigenous People and Chance Find Procedure
<input checked="" type="checkbox"/>	Annex 23	Updated ARCA Technical report
<input checked="" type="checkbox"/>	Annex 24	BoQ of proposed water structures
<input checked="" type="checkbox"/>	Annex 25	Peizometric surface trend analysis
<input checked="" type="checkbox"/>	Annex 26	Climatology of Kenya
<input checked="" type="checkbox"/>	Annex 27	WASH in Athi River Catchment project Area
<input checked="" type="checkbox"/>	Annex 28	No. of beneficiaries breakdown - ARCA funding proposal
<input checked="" type="checkbox"/>	Annex 29	Impact of Future projected Climate on the Upper Athi River basin Water Resources Report
<input checked="" type="checkbox"/>	Annex 30	ARCA Basin Level - Rainfall and temperature trend analysis
<input checked="" type="checkbox"/>	Annex 31	Basin Level-Analysis of projected rainfall changes
<input checked="" type="checkbox"/>	Annex 32	Potential evapotranspiration (PET) for the baseline (1981-2010) and for the 2011-2040 for the three emission pathway projections