

Guidelines:

- This Request Submission Form should be completed by the organisation requesting technical assistance from the Climate Technology Centre & Network (CTCN) in collaboration with the National Designated Entity (NDE) of the country in question
- The Form must be signed by the NDE. Please see updated contact list of NDEs here: <http://unfccc.int/ttclear/support/national-designated-entity.html>
- The Form can be submitted as a Word file containing a digital signature or as a signed and scanned PDF file in combination with an un-signed Word file
- For requests submitted by multiple countries, all the NDEs of the respective countries shall sign identical Forms before official submission to the CTCN
- NDEs can submit CTCN requests in collaboration with National Designated Authorities (NDAs) for the Green Climate Fund (GCF) if targeting the GCF Readiness Programme.

Requesting country or countries:	The Republic of Kenya
Request title:	Please reflect the objective of the technical assistance in the title (maximum 200 characters). <i>Building Sustainable Climate Resilience for Kenya: Nature-based Solutions Master Plan for Kisumu County</i>
NDE	Please add name of organization, name of individual, position, email address. Ms. Carolyne Njuguna, Research Scientist Environment, Sustainability, and Climate Change Research Centre Kenya Industrial Research and Development Institute (KIRDI) carolynekol@gmail.com
Request Applicant:	Please add the name of the organization, contact person, position, email address, and address of the organization requesting assistance from the CTCN. Ms. Carolyne Njuguna, Research Scientist Environment, Sustainability, and Climate Change Research Centre Kenya Industrial Research and Development Institute (KIRDI) carolynekol@gmail.com

<p>Climate objective:</p> <p><input type="checkbox"/> Adaptation to climate change</p> <p><input type="checkbox"/> Mitigation of climate change</p> <p><input checked="" type="checkbox"/> Combination of adaptation and mitigation of climate change</p>
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Geographical scope:

- Community level
- Sub-national
- National
- Multi-country

If the request is at a sub-national or multi-country level, please describe specific geographical areas (provinces, states, countries, regions, etc.).

This project will focus geographically on Kisumu County, Kenya.

Problem statement related to climate change (up to one page):

This section should answer the question “what is the problem?” Please summarize the problem related to climate change and/or the negative impacts of climate change in the country that the request aims to address.

What is the problem?

Global warming is expected to be faster in Africa than in other areas ([IPCC 2014](#)). Depending on the region, extreme weather events such as heat waves, droughts, heavy rains, and floods are expected to become more frequent and intense ([Christiansen et al. 2007](#)). In the case of Kisumu, a city situated along the shores of Lake Victoria, several factors directly influence climate risk issues in Kisumu County and urban areas. Some of the main factors include heavy rains during seasonal floods that increase the water level of Lake Victoria, leading to shoreline and urban flooding, as well as runoff from Nandi Hills into Kano Plains, affecting the river floodplain and other areas.

In addition, such changes have negative effects on agricultural production, such as requiring over use of water resources, excessive use of pesticides, etc., which are expected to increase in the future. (IPCC 2014). This results in Unsustainable agricultural production processes that accelerate biodiversity loss and are responsible for the bulk of greenhouse gas emissions from land-use change, land degradation, and the unsustainable use of freshwater resources ([IPCC, 2019](#)). All of that summarizes well the climatic context we are immersed in, and the relationships and interconnectivity between urban and rural.

Another problem is urbanization, including in Kisumu City, which has profoundly affected the environment and climate of the World and is a significant contributor to climate change. According to recent studies from the OECD, Africa has the [fastest urban growth in the world](#), with a population projected to double by 2050. The same report also mentions the African Union's goals of transitioning towards a mainly urban Africa, as part of the African Union Agenda 2063. Specifically in Kenya, according to the [World Bank studies](#), damages associated with climate risks will account for up to 7% of Kenya’s GDP, mainly due to flood and drought damages, unless adaptation measures are taken before 2050.

At the same time, cities and urban populations, particularly in developing countries, are vulnerable to the adverse impacts of climate change. Hydro-meteorological hazards are responsible for severe socio-economic disruptions and damages, including loss of lives, services, livelihoods, properties, and the environment (UNISDR, 2015). For example, more than 80% of the total economic damages in the world are due to natural hazards (Kumar et al, 2020). Hundreds of millions of people in the urban areas of Africa, especially the poor, will be affected by rising sea levels, increased and more intense

precipitation, inland floods, overall water quality decline, more frequent storms and cyclones, and more extreme periods of hot and cold.

Finally, until recently, most international organizations have focused on helping communities adapt to climate risks by building capacity among communities and stakeholders to help protect themselves against climate threats. While this is a necessary part of a comprehensive risk mitigation strategy, it is not sufficient; real action is essential, and this requires thorough assessments that lead to tangible measures and projects. The global response to these urgent crises has remained sectoral and disconnected from nature. The complexity of local adaptation needs, coupled with the need to address the resilience of food systems, means that no single initiative can address all challenges comprehensively (Weigelt et al. 2020).

Past and on-going efforts to address the problem (up to half a page):

This section should answer the question “what has been done or is currently being done to address the problem?” Please describe past and on-going processes, projects or initiatives implemented in the country or region to tackle the climate problem as described above.

Short-term climate risk plans and actions have been in place for Kisumu, developed by the government and international agencies, such as handing out aid, cash transfers, evacuation orders, child protection, support for displaced people, and general measures to build community protection and awareness, including safety warnings to move to higher ground. The focus of the government has been on planning for conventional-type (grey) infrastructure, such as dykes.

This project will focus on the integration of innovative nature-based solutions with urban/regional ecological planning, sustainable agriculture, and environmental systems underpinned by robust science, engineering, and economic fundamentals; all while aligning with Kenya’s sustainable UN goals. It will demonstrate the potential for nature-based solutions working *side-by-side* with sustainable agriculture to alleviate water hazards (floods and drought) and simultaneously enhance the quality of the environment, including water quality for the city and country, as well as to create new avenues for economic growth in multiple sectors.

The use of nature-based solutions like green infrastructure in both urban and rural areas across Africa represents an innovative, holistic approach to sustainable economic and environmental development. It includes not only the scientific and technical elements necessary for flood and drought mitigation but also the role of nature-based solutions as a catalyst for economic and social change, by creating new economic opportunities and improving the quality of life for individuals and communities. Integrating sustainable agriculture strategies, such as agroecology, into urban, periurban, and rural areas as part of an overall nature-based solutions development strategy will be a central part of this project. Sustainable agriculture involves transdisciplinary sciences, sustainable farming practices, and social movements that drive behavioral change.

This project will focus on developing the foundation studies and project structure. With the goal to develop a replicable model-type project to be used on future sustainable development projects in Africa, covering social, environmental, and economic key components of a comprehensive feasibility study project.

Developing feasibility studies for sustainable infrastructure should rely on scientific principles and experience, working at the landscape watershed scale to study and root causes of climate risks in urban, periurban, and rural areas— a necessary step for understanding root causes and providing

sustainable solutions for climate risks such as floods and droughts. These studies should incorporate strong ecological landscape planning, urban planning and design, and rigorous economic analysis, including cost-benefit assessments of all proposed measures, always following an evidence-based, transparent methodological approach. Working with project stakeholders, the goal is to identify specific nature-based solutions that can be implemented to mitigate climate risks. To progress to subsequent phases, such as implementing these solutions, we need comprehensive studies that support and justify these sustainable projects for future funding from international sources like the World Bank, African Development Bank, Green Climate Fund, etc. If funding is limited, it should still be required to establish a robust framework for future projects. Ultimately, the aim is to create a strong foundation for the successful implementation of all identified sustainable initiatives in a feasibility or pre-feasibility study project like this.

A good example to illustrate this question could be the estudioOCA UCRISP experiences in Kenya, in other ongoing proposals. Around 2 years ago, the estudioOCA–UCRISP team collaborated with the C40 organization in Nairobi, with the support of the Nairobi City and County Environmental Department. Together, they worked on developing a proposal for a nature-based solutions master plan project for urban and periurban areas in Nairobi. Currently, in the periurban area of Nairobi, there are several initiatives by several organizations tackling different issues focused on low-income communities in the periurban area of Nairobi. In general terms, a general overview and assessment of the climate risk issues at both urban and periurban levels and beyond at the watershed level is missing. Risk issues in Nairobi are closely related to problems upstream at the watershed level; recent flash floods provide clues to issues potentially occurring upstream. For example, high water velocity from flash floods downstream in Nairobi City could be due to deforestation upstream of the Nairobi River.

Working at all scales from urban, periurban, and rural, a watershed-scale ecological landscape analysis is key for any climate risk analysis. Following a science-based methodological approach is also essential to adequately assess urban, periurban, and rural areas for the development of sustainable infrastructure, such as nature-based solutions. The methodology to work on the analysis, development, and identification of nature-based solutions infrastructure type projects is scale-specific. Working at different scales requires diverse approaches and infrastructure typologies; working at the urban level as well as at periurban or rural levels will require different methodologies. Watershed-scale ecological landscape analysis should be part of any methodology for all projects. The team that works on this project should have this type of experience, together with a science-based methodology.

Specific technology¹ barriers (up to one page):

This section should answer the questions “what are the technology barriers that hinder national efforts described above” and “how will the CTCN technical assistance complement these efforts?” Building upon the problem statement and taking into consideration the existing efforts described above, please describe the specific technology barriers encountered by the requesting applicant to identify, assess or deploy climate technology(is) to address the problem statement. The barriers described should be within the scope of the requested CTCN technical assistance (described in the section below).

This project's technological needs are closely linked to the definition of the ‘Special Report on Technology Transfer, IPCC, 2000’ mentioned as a part of this question title and statement, namely, “Any equipment, techniques, practical knowledge, and skills”.

¹ **“Any equipment, techniques, practical knowledge and skills needed for reducing greenhouse gas emissions and adapting to climate change”** (Special Report on Technology Transfer, IPCC, 2000)

We would also like to note that one of the key objectives identified in the ‘Special Report on Technology, 2000 IPCC’, is to “address the technology transfer problem in the context of climate change while emphasizing the sustainable development perspective.” Overall, we adhere to those goals through several components, first, the technological needs, using open-source software, including hydrological modeling, GIS, and remote sensing, which are readily available to anyone. These are the tools that, when applied to the same project, can help develop techniques and strategies to develop environmental assessments in urban, periurban, and rural areas to help develop an evidence-based analysis process that leads to specific nature-based solutions-type projects and strategies to help mitigate climate risks, such as flood and drought.

A key component, linked to the technologies previously described for this project, is the capacity-building component. We mentioned earlier that the 2000 IPCC report supported technologies that could be applied to help mitigate climate change.

[One of the biggest barriers to using technology is the failure to have an adequate planning process in place, without which those technologies do not perform as they should. That is the case in advanced and developed countries. As part of this project, we will provide capacity on the technology and how it combines with ecological urban/regional planning and design. The knowledge used in this project will be applied at different levels, namely, municipal, county, and national governmental institutions. Our proposed project in Kisumu County will be a good case study-type practical project, regarding the use of hydrological modeling analysis, GIS, and remote sensing, together with ecological urban/regional planning and design to help mitigate climate risks.

Having previously had at least 10 years of experience on these types of technologies, hydrological software together with GIS, and at least 20 years of experience on ecological urban and regional planning and design, should be a minimum requirement to work on these types of projects to produce adequate results. The methodology used is also part of the technology applied to the development of the nature-based solutions project and is an important component of the analysis and evaluation process.

Regarding the methodology question, it is important to mention a key component that connects the work at UCRISP - estudioOCA with the CTCN project objectives: a UNESCO initiative called Climate Risk Informed Decision Analysis ([CRIDA](#)). CRIDA is an important part of the project methodology we have used for the last 10 years or so. It is a bottom-up risk analysis approach that focuses on understanding failure rather than predicting deeply uncertain futures. CRIDA focuses on understanding chronic unacceptable failure, stress testing the system, and, through science, assessing its plausibility to implement adequate planning and design project measures.

CRIDA has been rated with an [A+ by the World Bank](#) as part of their Resilience Rating System as a means of planning and designing resilient infrastructure, such as using nature-based solutions for Disaster Risk Reduction (DRR). Both UCRISP- estudioOCA have been selected by [GFDRR, a team from the World Bank specializing in Disaster Risk Reduction and Nature-based Solutions](#), to be included on the World Bank's roster database for a recommended list of consultants specialized in nature-based solutions projects implementation.

In short, experience with an adequate, tested, and experienced science-based methodological overall approach that evaluates and identifies specific areas, including nature-based solutions projects, through qualitative and quantitative results and studies, including economic analysis of all identified nature-based solutions projects. The technologies and methodology used in this approach are key to obtaining results, helping identify specific, evidence-based, measurable, sustainable

solutions to help mitigate climate risks, flood, and drought for Kisumu County. The evidence-based master plan project should become a valuable blueprint for the future development of all proposed nature-based solutions projects for international funding organizations such as the Green Climate Fund, African Development Bank, the World Bank, and other organizations.

Contribution to Programme of Work 2023-2027:

As per the 3rd Programme of Work of the CTCN², please indicate the system transformation area, key enablers and cross-sectoral themes related to the request:

System transformation areas (mandatory)

- | | | | |
|---|--|---|--|
| <input checked="" type="checkbox"/> Water-Energy-Food Nexus | <input checked="" type="checkbox"/> Sustainable Mobility | <input type="checkbox"/> Energy Systems | <input checked="" type="checkbox"/> Buildings and Infrastructure |
| <input checked="" type="checkbox"/> Business and Industry | | | |

Key enablers (optional)

- | | |
|--|---|
| <input checked="" type="checkbox"/> National Systems of Innovation | <input type="checkbox"/> Digitalization |
|--|---|

Cross-sectoral themes (optional)

- | | | |
|---------------------------------|---|--|
| <input type="checkbox"/> Gender | <input checked="" type="checkbox"/> Youth | <input checked="" type="checkbox"/> Indigenous Peoples |
|---------------------------------|---|--|

Sectors:

Please indicate the main sectors related to the request:

- | | | | |
|---|--|--|---|
| <input type="checkbox"/> Coastal zones | <input checked="" type="checkbox"/> Early Warning and Environmental Assessment | <input checked="" type="checkbox"/> Human Health | <input checked="" type="checkbox"/> Infrastructure and Urban planning |
| <input type="checkbox"/> Marine and Fisheries | <input checked="" type="checkbox"/> Water | <input checked="" type="checkbox"/> Agriculture | <input checked="" type="checkbox"/> Carbon fixation |
| <input type="checkbox"/> Energy Efficiency | <input checked="" type="checkbox"/> Forestry | <input checked="" type="checkbox"/> Industry | <input type="checkbox"/> Renewable energy |

² <https://www.ctc-n.org/resources/ctcn-third-programme-work-2023-2027>

Transport

Waste
management

Please add other relevant sectors:

Additional relevant sectors that will be part of this proposal are sustainable disaster risk management and assessment, sustainable waste management, sustainable agricultural management, sustainable infrastructure planning and design, and sustainable urban and regional planning.

Technical assistance requested (up to one page):

Founded on the problem statement, past/on-going efforts and technology barriers, please describe the requested technical assistance. The technical assistance should clearly contribute to mitigation or adaptation to climate change as described in the problem statement and contribute to overcome the specific technology barriers. Please explore the CTCN website and WIPO Green Technology Database for more information on climate technology options.

Within a clearly defined scope, the description of technical assistance should be structured into the following:

- 1. Overall objective
- 2. Anticipated groups of activities to be performed by the technical assistance
- 3. Anticipated products to be delivered by the technical assistance.

Please note that CTCN facilitates technical assistance and is not a project financing mechanism.

The focus and objective of the applied project technologies is the development of science-based studies to help mitigate and adapt to climate risks in Kisumu. All technologies proposed for this project, namely, the two hydrological models, Storm Water Management Model (SWMM) developed by the US Environmental Protection Agency (EPA), and the Hydrological Engineering Center - River Analysis System (HEC-RAS) Developed by the US Army Corps of Engineers – Institute for Water Resources (USACE-IWR) as well as the Geographic Information System (GIS) software analysis QGIS. All of the software platforms mentioned are open-source, readily available, and downloadable at no cost to project stakeholders, a good fit for this project and the agencies this project focuses on in Kenya.

1. Overall Objective

The overall project objective of this project is to increase sustainability, resilience, and quality of life for urban, periurban, and rural populations in Kisumu County, Kenya. This project will highlight the benefits of integrating green and grey infrastructure solutions for adaptation to water-related hazards as well as water quality improvement under current and altered climate conditions, and build the capacity of urban planners, engineers, and related county, municipal, national-level, and other government professionals in Kisumu, through the project's practical evaluation and applications, to value, understand and implement nature-based solutions to help mitigate climate risks. Specifically, the project will:

- i) develop a nature-based solutions master plan for Kisumu County in Kenya, identifying priority investments to mitigate current and future water hazards, improving water quality conditions, and benefiting at least 600,000 people.
- ii) increase awareness and influence among policy makers in the Kisumu County area and

Kenya, on the potential role of nature-based solutions in promoting sustainable, resilient urban development, and other co-benefits, including social, environmental, and economic.

- iii) strengthen the capacity of national and regional planners and engineers in Kenya, to incorporate nature-based solutions in urban, regional, and national planning processes to help mitigate climate risks.

2. Anticipated Groups of Activities to be Performed by the Technical Assistance

This demand-led project will develop a collaborative program with Kisumu County, the municipality, engineering and planning departments, local NGOs, and other key relevant stakeholders. It will combine science and engineering with planning and design, recognizing the need to integrate sustainable urban, regional, and environmental planning and design principles with nature-based solutions and sustainable water resources, agricultural sciences, and social sciences. The implementation period will be one year (12 months) and will involve an interdisciplinary team comprising: water resource engineers, geoscientists, landscape architects, planners, agroecologists, ecological economists, and other social scientists and professionals. The overall approach will be to work with County, regional, municipal, and national authorities to demonstrate the applicability of integrated green and grey infrastructure solutions in Kisumu County, from which generic guidance will be developed. This project aims to become a model for other cities in Kenya and Africa, particularly the Lake Victoria area. The work will be conducted through twelve primary tasks, namely:

Task 1: scoping

Task 2: data collection (including existing downscaled climate scenarios)

Task 3: hydrological/hydraulic modelling and GIS/Remote sensing, to develop vulnerability analysis.

Task 4: sustainable water resources engineering, ecological landscape and urban design, environmental ecology planning, and social sciences, research analysis.

Task 5: develop a political mapping of project stakeholders, and identify communities and government officials at the local, county, and national levels.

Task 6: studies on water quality improvement through phytoremediation in Kisumu County and urban, periurban, and rural areas i.e., wetlands, canals, agricultural areas, etc.

Task 7: financial/economic analysis/ to determine the return on investment/incremental cost analysis of the proposed projects/ideas.

Task 8: alignment with Kenyan planning law and practice

Task 9: training/capacity building, at the County, municipality, national, and more broadly

Task 10: explore the possibility of developing a future 'Nature-based Solutions International Conference in Kenya', to help raise awareness at national and regional levels on the importance and relevance of nature-based solutions in the Lake Victoria Region and Kenya, sustainable planning strategies, and sustainable agriculture systems in urban, periurban, and rural areas in African cities.

Task 11: preparation of preliminary generic guidelines

Task 12: preparation of the project, *Building Sustainable Climate Resilience for Kenya: Nature-based Solutions Master Plan for Kisumu County*.

3. Anticipated Products to be Delivered by the Technical Assistance

- i) develop the feasibility study project, *Building Sustainable Climate Resilience for Kenya: Nature-based Solutions Master Plan for Kisumu County*
- ii) using the historical ecology approach, combined with remote sensing/GIS, develop an analysis and evaluation of Kisumu County, including urbanized areas, watershed areas, forests, agricultural areas, etc., to help understand the landscape, its functions, and how it has evolved and transformed. Particularly, it will evaluate the impact of the different human interventions through time in those areas (i.e., infrastructure, deforestation, urbanization, etc.)

- iii) report of water hazards, including results of hydrological and hydraulic modelling simulation, under existing conditions and possible altered climates in Kisumu County.
- iv) report reviewing the integration of sustainable water resources principles together with nature-based solutions, such as incorporating agroecological systems and principles as strategies and infrastructure to help mitigate climate risk in urban, periurban, and rural environments in Kisumu and Africa.
- v) report on how nature-based solutions strategies, such as sustainable urban/rural Infrastructure projects, i.e., green streets, canal restoration, environmental restoration, retaining basins, agriculture as nature-based solutions, etc., type projects and strategies, help mitigate climate risk, improve water quality, and help improve the local population's quality of life, in urban, periurban, and rural areas of Kisumu County.
- vi) report on economic feasibility and evaluation of different nature-based solutions, options, and strategies to determine the return on investment.
- vii) establish priority project development order, with a focus on identifying and developing a first future pilot priority project in a disadvantaged community, working in coordination with project stakeholders.
- viii) report on the planning and integration of sustainable inland fisheries management into nature-based solutions strategies in rural areas, including area based conservation measures
- ix) guidelines for city and regional planners and engineers on integrating nature-based solutions and existing grey infrastructure solutions in urban, periurban, and rural areas for climate change adaptation.
- x) all project studies will be included in a final document and a pre-feasibility study project; *Building Sustainable Climate Resilience for Kenya: Nature-based Solutions Master Plan for Kisumu County*. This project will provide an analysis of Kisumu County urban, periurban, and rural areas.
- xi) work with international lending agencies, including the UN GCF, throughout the length of the project to help develop future financing of the proposed nature-based solutions projects as a result of the *Building Sustainable Climate Resilience for Kenya: Nature-based Solutions Master Plan for Kisumu County*.

Expected timeframe:

Please indicate the expected duration period for the requested technical assistance. Please note CTCN technical assistance usually has a maximum duration of 12 months.

The project 'Building Sustainable Climate Resilience for Kenya: Nature-based Solutions Master Plan for Kisumu County' will last a total of 12 months

Anticipated gender and other co-benefits from technical assistance:

Please describe the activities with gender linkages as well as the anticipated gender and other co-benefits (e.g. biodiversity, economic, social, cultural, etc.) that are likely to be generated because of technical assistance.

For more information you can find guidelines on the CTCN's website here:

<https://www.ctc-n.org/technologies/ctcn-gender-mainstreaming-tool-response-plan-development>

Further reading on gender can be found on the CTCN website here:

<https://www.ctc-n.org/technology-sectors/gender>

This project will evaluate the impact of the project on women and men in Kisumu, as part of the project activities, planning, deliveries, outputs, and impacts. Nature-based Solutions (NbS) and

gender are interconnected, with a gender-responsive approach being essential to ensure equitable outcomes. While NbS projects aim for broad environmental and social benefits, they can perpetuate or even worsen existing inequalities if they don't actively consider gender dynamics in their design and implementation.

Regarding the issue of identifying specific **gender linkages** for this project, the gender linkages could occur during the hiring process of project collaborators, as well as when our team provides capacity to government agencies, at the municipal, county, and national levels, when we could request a percentage of female planners and engineers attending our workshops. Any other gender related linkages with any other project activity will be noted.

Below are some general linkages between nature-based solutions and gender.

Gender Linkages in Nature-based Solutions (NbS) Type-Projects

The link between gender and nature-based solutions is complex, rooted in the different roles, responsibilities, and vulnerabilities of men, women, and gender-diverse people in relation to nature.

- **Gendered roles and responsibilities:** Women are often the primary managers of natural resources, including collecting water, firewood, and food for their households. This deep, daily interaction provides them with valuable traditional knowledge and a specific perspective on climate and environmental changes.
- **Vulnerability to climate change:** Women and girls, especially in vulnerable communities, often face disproportionate impacts from climate change and environmental degradation due to existing inequalities. NbS projects, if not designed inclusively, can fail to address these specific vulnerabilities.
- **Access to resources and decision-making:** Across many societies, women have unequal access to and control over land, financial capital, and technology. This limits their ability to participate in and benefit from NbS initiatives. In some cases, traditional governance structures controlled by men can exclude women from resource management decisions.
- **Participation and leadership:** Gender-diverse participation is critical for successful NbS implementation, but it must move beyond tokenism to truly empower women and other marginalized groups. Studies show that women-led groups can achieve better environmental and social outcomes.
- **Intersectional factors:** The impact of NbS is also determined by other individual characteristics such as age, ethnicity, and disability. An intersectional approach is needed to address the specific challenges faced by diverse, marginalized people.

Anticipated Gender Co-Benefits

When designed with a gender-responsive and socially inclusive approach, NbS can deliver significant co-benefits that advance gender equality and women's empowerment.

- **Women's empowerment and leadership:** Inclusive NbS projects provide opportunities for women to develop skills, take on leadership roles, and participate in community decision-making. This strengthens their voices and influences natural resource management.
- **Increased food and nutritional security:** By engaging in sustainable agricultural practices and agroforestry promoted by NbS, women can improve food and nutritional security for their families and communities.
- **Enhanced income generation:** NbS often involves eco-friendly livelihood activities such as regenerative agriculture or sustainable forestry. These projects can help women generate income and achieve greater financial independence.

- **Climate resilience and adaptation:** Women's unique knowledge can lead to more effective and sustainable climate adaptation strategies. Studies have shown that female farmers have made different adaptation choices than men, highlighting the value of their insights.
- **Improved community well-being and social cohesion:** Collaborative NbS projects strengthen community bonds and build social cohesion as men and women work together towards shared goals. A more inclusive process leads to greater buy-in and ownership among community members.
- **Recognition of traditional and indigenous knowledge:** For many Indigenous communities, NbS are rooted in traditional practices. Respectful engagement with Indigenous women can ensure the preservation of this valuable cultural and ecological knowledge.

Project additional co-benefits in areas such as biodiversity, economic, and social/cultural.

Biodiversity Co-Benefits

- **Habitat Restoration:** NbS projects, like wetland and river restoration, create and improve habitats, increasing the quantity and quality of areas for various species.
- **Species Protection:** Interventions such as restoring water biotopes and establishing buffer zones around wetlands directly benefit threatened species, like the Bittern and Ferruginous duck, as seen in the AYBOTCON project.
- **Ecological Corridors:** Habitat restoration can establish ecological corridors, fostering the movement and connectivity of species across landscapes, a key aspect of biodiversity conservation.

Economic Co-Benefits

- **Job Creation:** NbS can generate economic opportunities and green jobs in areas like conservation, restoration, and sustainable resource management.
- **Resilient Supply Chains:** Companies can leverage nature-based approaches to enhance the resilience of their supply chains and build stronger brand reputations, integrating nature into their business models.
- **Ecosystem Services:** Healthy ecosystems provide vital services, such as increased agricultural productivity from fertile soils and improved fishing yields from robust aquatic environments, which support economic activities.

Social & Cultural Co-benefits

- **Improved Public Health:** NbS initiatives, such as creating green urban spaces and restoring natural coastlines, enhance public health by providing recreational areas and mitigating the impacts of natural disasters.
- **Disaster Risk Reduction:** Restoring natural coastal defenses like mangroves or wetlands can protect communities from waves and wind, reducing their vulnerability to natural hazards.
- **Water Security:** Restoring healthy watersheds and implementing sustainable water management practices can improve the availability and quality of drinking water, ensuring water security for communities.
- **Cultural Preservation:** Heritage-based conservation projects that utilize NbS can contribute to the protection of cultural heritage sites by recognizing and preserving the co-benefits these sites provide to biodiversity.

Integrated Approach

- Nature-based solutions are an integrated approach designed to deliver multiple core benefits, including biodiversity, climate resilience, and human well-being, thereby avoiding trade-offs when projects are focused on a single outcome.
- These solutions often contribute to multiple Sustainable Development Goals (SDGs), such as "life on land" (SDG15) and "life in water" (SDG14) for biodiversity, "climate action" (SDG13), and social and economic goals like "zero hunger" (SDG2) and "decent work and economic growth" (SDG8).

Anticipated follow-up activities after this technical assistance are completed:

Please describe the expected future use of the outputs and deliveries produced by this technical assistance, after the CTCN implementation is completed. For example, what organizations or stakeholders will use the outputs of the technical assistance after it is completed, for what purpose, at what scale and scope the outputs and deliveries will be applied, when, and what will be the next steps undertaken, what options exist to scale up the results, what funding could be leveraged, etc.

Use of Project Outputs and Deliveries

One of the main characteristics of this project is the use of a methodological approach, helping provide a clear framework and goals. As explained in section ‘Specific Technology Barriers’, we described in detail the evidence-based methodological approach [CRIDA](#), which the estudioOCA–UCRISP team uses on their projects. CRIDA integrates hydrology with climate science, ecological economics, stakeholders' collaboration, risk-informed decision making, and pathways forward. In short, helping manage uncertainty in a more uncertain future and always using science. As the estudioOCA-UCRISP's own contribution to the CRIDA methodological analysis, they include landscape ecological and urban planning and design as part of the overall project analysis process.

The work of estudioOCA – UCRISP for the last 15 years, focusing on sustainable development-type projects, working in developing countries, has had a strong focus on developing methodologies that could lead to the actual implementation of sustainable infrastructure, such as nature-based solutions. Specifically, this project goal aligns with estudioOCA - UCRISP work and methodology, to help develop a complete analytical process, feasibility or pre-feasibility study projects, with a focus on identifying sustainable infrastructure, such as nature-based solutions, to help mitigate climate risks, namely flood and drought, in the context of a developing country, which means among other key components, considering issues such as insufficient data, etc.

The main goal and purpose of this project is to develop a clear pathway for future project implementation. The project's final master plan document should be a roadmap for the development of the proposed projects in the master plan; therefore, this is a practical results-type project.

Agencies such as the Green Climate Fund, the World Bank, the African Development Bank, the European Investment Bank, and others understand the evidence-based approach that the estudioOCA–UCRISP has developed for their projects, as shown earlier regarding the buy-in by the World Bank rating of the CRIDA methodological approach; therefore, these organizations should be interested in learning about the Kisumu project.

Key stakeholders:

Please list the stakeholders who will be involved in the implementation of the requested CTCN technical assistance and describe their role during the implementation (for example, government agencies and ministries, academic institutions and universities, private sector, community organizations, civil society, etc.).

Stakeholders	Role to support the implementation of the technical assistance
National Designated Entity	Kenya Industrial Research and Development Institute (KIRDI)
Request Applicant	Ecofinder, a local Kisumu non-profit organization

Please add as many stakeholders and lines as required.	<ul style="list-style-type: none"> ● <u>estudioOCA – UCRISP</u>, a nature-based solutions planning and design international specialist and non-profit organization, working with Ecofinder to develop this project. ● <u>The County Government of Kisumu</u> has provided support for this project, see letter of support signed by the Kisumu County Director.
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<p>Alignment with national priorities (up to 2000 characters including spaces):</p> <p>Please describe how technical assistance is consistent with national climate priorities such as: Nationally Determined Contribution, national development plans, poverty reduction plans, technology needs assessments (incl. whether this request refers to any technologies prioritized within Technology Action Plans), Long-term Low Emission Development Strategies, National Adaptation Plans, GCF Country Programme, sectorial strategies and plans, etc.</p>	
Reference document (please include date of document)	Extract (please include chapter, page number, etc.).
Nationally Determined Contribution (NDC)	<p>Direct alignment and contribution to NDC implementation is required for all CTCN technical assistance. Please include a direct reference to the INDC/NDC document</p> <p>The NDC supports tapping into nature-based solutions projects for climate change mitigation and adaptation as follows:</p> <p>Relevant Mitigation Priorities</p> <ul style="list-style-type: none"> ● Making progress towards increasing the tree cover of the land area through afforestation, reforestation, and agroforestry ● Reduced deforestation and forest degradation by rehabilitation and protection of natural forests (REDD+ approach), in both land and water-based ecosystems <p>Relevant Adaptation Priorities</p> <ul style="list-style-type: none"> ● Continuous strengthening of mainstreaming of climate change at the subnational level and enhancing continuous climate change technical capacity building for County Climate Change Units for locally led climate initiatives. ● Disaster Risk Reduction planning and preparedness for adaptation ● Ecosystems Restoration and Conservation for Adaptation <p>Link: https://unfccc.int/sites/default/files/2025-05/KENYAS%20SECOND%20NATIONALLY%20DETERMINED%20CONTRIBUTION%202031_2035.pdf</p>
Technology Needs Assessment and Technology Action Plan	The developed TNA advances nature-based solutions such as watershed restoration and conservation for climate change adaptation and sustainable development:

	Link for TNA: https://tech-action.unepccc.org/wp-content/uploads/sites/2/2013/12/technologyneedsassessmentreport-mitigation-kenya-13.pdf
National Adaptation Plans	<p>National Adaptation Plan (NAP-2015-2030) provides for climate hazard and vulnerability assessment, adaptation actions prioritization as set out in this project.</p> <p>Link: https://www4.unfccc.int/sites/NAPC/Documents%20NAP/Kenya_NAP_Final.pdf</p>
GCF Country Programme	
Long-term Low Emission Development Strategies	<p>The National Climate Change Response Strategy (NCCRS) and National Climate Change Action Plan (NCCAP-2023-2027) support the Country's advancement towards low-carbon, climate-resilient, sustainable development and mainstreaming climate change into national and sectoral development planning and the Country's Integrated Development Plans (CIDPs) as envisaged in the project, which aims at nature-based solutions for resilience planning at the sub-national level.</p> <p>Link NCCRS: https://repository.kippra.or.ke/server/api/core/bitstreams/76de97e1-8065-4bd0-9946-b91de62754ea/content</p> <p>Link: NCCAP: https://emsi.co.ke/wp-content/uploads/2024/08/Kenya-NCCAP-2023-2027-1.pdf</p>
Add others here as relevant	<p>The Kenya Vision 2030, which is the national development blueprint, vouches for the integration of climate change mitigation and adaptation in national and sub-national development planning, and is envisaged in this project.</p> <p>Link: https://www.planning.go.ke/wpcontent/uploads/2025/06/Vision_2030.pdf</p>

Development of the request (up to 2000 characters including spaces):

Please describe how the request was developed at the national level and the process used by the NDE to approve the request before submitting it (who initiated the process, who were the stakeholders involved and what were their roles?) and describe any consultations or other meetings that took place to develop and select this request, etc.

This project was initiated in 2020 when estudioOCA – UCRISP director Ignacio Ortinez connected with Leonard Akwany, director at Ecofinder, the Kisumu-based organization, with a long experience

in sustainable-type projects in Kisumu, Kenya, and the region. Together, both estudioOCA – UCRISP and Ecofinder decided to connect with local government stakeholders interested in developing sustainable climate risk studies, similar to the ones the estudioOCA – UCRISP team had been working on under similar climate risk characteristics and conditions in the Southeast Asia region for 15 years.

Ecofinder director Mr. Akwany suggested contacting the Kisumu County director and getting his support for the project, who later in 2021 provided support for the project a few years ago, signing a letter of support for our team.

A few years later, in mid-2025, the estudioOCA–UCRISP director Ignacio Ortinez, and Ecofinder Director Mr. Leonard Akwany connected with the CTCN team in Europe and Kenya, and requested CTCN support for the project.

Background documents and other information relevant to the request:

- Please list all relevant documents that will help CTCN analyze the context of the request and national priorities. Please note that all documents listed/provided should be mentioned in this request in the relevant section(s), and that their linkages with the request should be clearly indicated. For each document, please provide web-links (if available) or attach them to the submission form. Please add any other relevant information as required.
- Please indicate if this request has been developed with the support of the CTCN Request Incubator.

This request has not been developed with the support of the CTCN Request Incubator.

List of Relevant Documents Related to this Nature-based Solutions Proposal

- A. Climate Risks in Kenya**
- B. Climate Risk Evaluation, Methodology & Project Approach**
- C. Proposed Project Approach: Practical Case Studies**
 - i. Urban Scale Project Approach**
 - ii. Periurban/Rural Scale Project Approach**
 - iii. Rural Scale Approach**
- D. Mainstreaming Nature-based Solutions**
- E. Multidisciplinary Project Approach and Nature-based Solutions**

A. Climate Risks in Kenya

This [World Bank article](#) underlines future damages due to climate risks going up to 7% of GDP by 2050 unless adaptation measures are in place in Kenya, mostly due to flood and drought climate-related risks. The World Bank article has been confirmed by the World Economic Forum's '[The Global Risks Report 2025](#)', where it reports that the most important threat amongst all other possible threats to the planet is by far the 'Extreme Weather Events', followed by 'Biodiversity Loss and Ecosystem Collapse' and 'Critical Change to Earth Systems'. There are also additional studies on climate risks in Kenya, including [a survey from GIZ](#) that lists the main risks for Kenya. In particular, this study project underlines the risks for Kenya's infrastructure due to floods. This CTCN project proposal also has an important agricultural component since working at the landscape watershed scale, to help evaluate climate risk issues, proposing sustainable solutions, such as nature-based

solutions, to help mitigate those risks, is an important strategy of the approach of this project. Related to this issue is an interesting recent study focused in particular on climate, water, and agriculture, published by [The African Climate Foundation](#), which analyzes impacts and climate risks to the Kenyan economy, particularly the agricultural sector, which is part of the focus of this report, as it is also a big part of this project, since to project focus will be at urban, periurban and rural scales. All these have also been analyzed in detail in the 'Problem Statement' section and other sections of this support request.

B. Climate Risk Evaluation, Methodology & Project Approach

In this chapter, we will describe some of the basic analysis processes, based on decades of practical experience by the estudioOCA–UCRISP team, with the specific goal of developing methodologies to help implement nature-based solutions projects. There are methodological approaches, such as CRIDA, where we point out some generalities. Also, since the approach we describe is based on the experience, used and developed by the estudioOCA–UCRISP team, based on a multidisciplinary approach, and going deeper than the one we also mentioned called CRIDA, specifically, on the planning and analysis of nature-based solutions.

CRIDA: Climate Risk Informed Decision Analysis (CRIDA) is a UNESCO initiative. [CRIDA](#) is an important part of the project methodology that the estudioOCA-UCRISP team has been using for more than 10 years in their projects, and that could be applied to this project as well. CRIDA is a bottom-up risk analysis approach that focuses on understanding failure rather than predicting deeply uncertain futures. CRIDA focuses on understanding chronic unacceptable failure, stress testing the system, and, through science, assessing its plausibility to implement adequate planning and design project measures. CRIDA has been rated with an [A+ by the World Bank](#) as part of their Resilience Rating System as a means of planning and designing resilient infrastructure, such as using nature-based solutions for Disaster Risk Reduction (DRR).

C. Proposed Project Approach: Practical Case Studies

i. Urban Scale Project Approach

In 2017, the estudioOCA–UCRISP team was awarded a research grant by The Rockefeller Foundation to develop a [Green Infrastructure Master Plan for Udon Thani](#), a city in Northeast Thailand. The estudioOCA–UCRISP team developed a multidisciplinary approach that allowed the development of a science-based design methodology that included combining hydrological model analysis with urban planning and design. The main project goal was to help [mainstream the development and implementation of Nature-based Solutions](#) in the context of a developing country. Working with key community, municipal, and government stakeholders effectively helped us identify critical flood risk areas in the city. In 2018, through [this feasibility study project](#), the government of Thailand awarded the Udon Thani municipality [funding](#) to support the implementation of the proposed projects in the estudioOCA–UCRISP study project, which is currently under development. Since 2015, when the estudioOCA–UCRISP team started to develop what later would become a nature-based solutions master plan for Udon Thani, this project has provided a seminal opportunity for the estudioOCA–UCRISP team to develop and improve their methodology, which continues to this day to refine and improve on all projects they work on.

ii. Periurban/Rural Scale Project Approach

The estudioOCA-UCRISP team recently finished a [new project phase in Udon Thani, Thailand](#), developing strategies to develop nature-based solutions, such as green infrastructure, for the city's periurban area. This time, the focus was on studying large-scale infrastructure needs for Udon Thani, a prototypical secondary Southeast Asian city, containing similar climatic and social conditions to those found in many cities in developing countries. In the studies, the estudioOCA–UCRISP team developed and analyzed through a combined approach that included historical ecology, remote-

sensing GIS, and hydrological modelling as planning analysis tools, assessing present and future climate and urbanization disaster risk impacts through the year 2100. They also looked at specific climate risk issues such as flood and drought mitigation, focusing on sustainable approaches, such as nature-based solutions type strategies, including floodplain restoration, agriculture as green infrastructure, canal restoration, and retention areas, as part of the development of a feasibility study that included an overall sustainable future vision for the city, including a sustainable transportation network system.

iii. Rural Scale Approach

Right afterward, the estudioOCA–UCRISP team worked on an Asian Development Bank (ADB) project in two cities in the Philippines: [Malay](#) and [Januay](#). These projects were designed to develop disaster risk nature-based solutions, studies, and strategies to help mitigate watershed-scale flash floods in Malay and drought in Januay. Both projects were in rural communities in the Philippines.

D. Mainstreaming Nature-based Solutions

[This ICLEI Document on Nature-Based Solutions \(NbS\) in Africa](#) clearly exposes many of the issues that have been explained in detail and developed through this CTCN project proposal. Starting from the methodological approach towards mainstreaming nature-based solutions, ecological planning approaches, the financing of nature-based solutions, and much more. As explained earlier, one of the main goals of this project is to develop nature-based solutions-type projects to help implement sustainable solutions to help mitigate climate risks that are well adapted to the specific conditions of developing countries, including costs and technical capacity, to facilitate the implementation of the proposed projects, that is the main goal of this project.

[This is one of the best reports on nature-based solutions.](#) It was developed by the GFDRR (Global Facility for Disaster Reduction and Recovery) at the World Bank; a team focused on sustainable solutions to climate risks, such as nature-based solutions. In this case, the report focused on sub-Saharan African countries. The GFDRR team in this report has made a good compilation of some of the most significant nature-based solutions projects in sub-Saharan countries and has made an in-depth analysis of each of the selected projects. We will use this information as part of our initial analysis, and will follow many of their recommendations, which we are already applying to our projects, including in-depth cost-benefit analysis of all proposed nature-based solutions projects proposed in any future study. Many of the recommendations in the report are already in this CTCN proposal document. We included this document because it is a 2025 document from a leading international organization that follows the methodological approach and has the same philosophical approach to the estudioOCA–UCRISP team projects. As a final note, mention that the estudioOCA-UCRISP team has been included by the [GFDRR](#) on the World Bank roster database for their recommended list of consultants specialized in nature-based solutions.

E. Multidisciplinary Project Approach and Nature-based Solutions

- **Kibera Informal Settlement Projects:** Various initiatives in Nairobi's Kibera settlement use NbS for climate adaptation and resilience. Projects include community-led river cleanups, tree planting along the Ngong River, and the creation of green walls and kitchen gardens. The Kibera Public Space Project establishes a network of community-designed public spaces to manage drainage and reduce flooding.
- **Nature-based Solutions Compendium for Urban Resilience:** The Global Center on Adaptation (GCA) produced a compendium focused on promoting urban resilience through NbS in Kenyan secondary cities. It provides guidance for local stakeholders on identifying and scaling up replicable initiatives.

Agriculture and forestry

- **Sand Dams and Climate-Smart Agriculture:** In Makueni County, sand dams act as an NbS to improve water security in areas facing prolonged droughts. These dams capture rainwater, raise the local water table, and enable related initiatives like land terracing and the planting of drought-tolerant crops.
- **Kenya Climate Smart Agriculture Strategy (2017–2026):** This policy harmonizes agricultural development and climate change objectives by promoting agricultural NbS. It aims to improve farmer livelihoods through product diversification, natural capital management, and improved farming methods.
- **Forests and Food Systems in the Mau Forest Complex:** A UNEP-led initiative uses the TEEBAgriFood approach to help local communities understand the long-term economic benefits of forest restoration over short-term land clearance.
- **Forest and Landscape Restoration (cifor-icraf & UK PACT):** UK PACT and the World Agroforestry Centre (cifor-icraf) are collaborating on a project to address policy, institutional, and monitoring gaps in forest and landscape restoration.

Policy and strategy

- **UN Development Programme (UNDP) Kenya Country Programme (2022–2026):** This programmatic blueprint outlines UNDP's support for Kenya, with a focus on three pillars, including "Nature-based solutions and resilience".
- **Financing Nature-Based Solutions:** Climate Focus, in partnership with the Food and Land Use Coalition (FOLU), has published technical reports exploring financing strategies for NbS in Kenya through carbon markets.

Relevant organizations and resources

- **Global Center on Adaptation (GCA):** The GCA has published a **Nature-based Solutions Compendium for Urban Resilience in Kenya**, which documents existing and potential projects in secondary cities.
- **UN Environment Programme (UNEP):** Based in Nairobi, UNEP is deeply involved in promoting NbS, including initiatives in East Africa for wastewater treatment with constructed wetlands and forest restoration.
- **UNDP Kenya:** The UNDP supports the Kenyan government in implementing national policies and frameworks related to NbS and resilience.

OPTIONAL: Linkages to Green Climate Fund Readiness and Preparatory Support

CTCN is collaborating with the GCF to facilitate access to environmentally sound technologies that address climate change and its effects, including through the provision of readiness and preparatory support delivered directly to countries through their GCF NDA. These actions are in line with the guidance of the GCF Board (Decision B.14/02) and the UNFCCC, particularly paragraphs 4 and 7 of 14/CP.22 and paragraph 4, 7 and 8 of 14/CP.24 that addresses Linkages between Technology and the Financial Mechanisms³.

The CTCN is therefore implementing some of its technical assistance using GCF readiness funds accessed via the country's NDA. Any application for GCF support, including the amount of support

³ Please see:

https://unfccc.int/files/meetings/marrakech_nov_2016/application/pdf/auv_cop22_i8b_tm_fm.pdf

provided, is subject to the terms and conditions of the GCF and should be developed in conjunction with the NDA.

Please indicate whether this request has been identified as preliminarily eligible by the NDA to be considered for readiness support from the GCF.

Initial engagement: The GCF NDA of the requesting country has been engaged in the design of this request and the NDA will be involved in the further process leading to an official agreement for accessing GCF readiness support.

Advanced engagement (preferred): The GCF NDA of the requesting country has been directly involved in the design of this request and is a co-signer of this request, the signature indicating provisional agreement to use readiness national funds to support the implementation of the technical assistance.

NDA name:

Date:

Signature:

Monitoring and impact of the assistance:

By signing this request, I affirm that processes are in place in the country to monitor and evaluate the technical assistance provided by CTCN. I understand that these processes will be explicitly identified in the CTCN Response Plan and that they will be used in the country to monitor the implementation of the technical assistance following standard CTCN procedures. This includes active engagement as NDE together with the key project proponent / beneficiary in regular project steering meetings.

I understand that, after the completion of the requested assistance, I shall support CTCN efforts to measure the success and effects of the support provided, including its short, medium and long-term impacts in the country. This includes the completion of NDE feedback and post-implementation forms.

Signature:

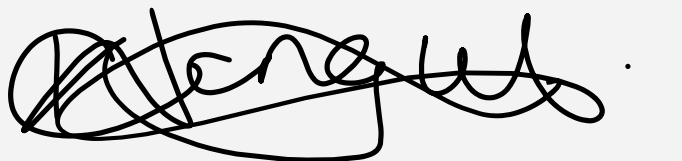
NDE name:

Carolyn Njuguna, Kenya Industrial Research and Development Institute

Date:

13/10/2025

Signature:



THE COMPLETED FORM SHALL BE SENT TO THE CTCN@UNEP.ORG

The CTCN is available to answer all questions and provide guidance on the application process.