«$call.Title»

Technology concept submission form

Guidelines:

- Technology concept submission form should be completed by an applicant organization in collaboration with the national focal points to the CTCN (National Designated Entity, NDE). Please see updated contact list of the NDEs and the Designated Authorities through web-links as below:
  - NDE: http://unfccc.int/ttclear/support/national-designated-entity.html
- The form must be signed by the NDE before official submission to UNEP-CTCN.
- 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 the technology concept submitted by multiple countries, all the NDEs of the respective countries shall sign identical forms before official submission to UNEP-CTCN.

Country or countries:	Nigeria
Title of the technology concept:	*Please reflect the objective of the technology concept in the title (maximum 200 characters).* Empowering communities of Kaduna State, located in the North-west Nigeria with sustainable agricultural practices (Em-Hydro)
NDE:	National Council on Climate Change. Name of NDE focal point: Mr. Chukwuemeka Okebugwu Email: chuksokebugwu@yahoo.com Address: Plot 444, Aguiyi Ironsi Way, Maitama Abuja
Applicant:	*Please add name of the organisation, name of the contact person, position, email and address of the organisation.* Région of Kaduna State Kubau Local Government Area Community of Kubau

Geographical scope:

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

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

Kaduna State, located in the North-west Nigeria is one of the regions most severely impacted by both insurgency and climate change-induced challenges. It is one of the regions where farmers have faced significant threats to their livelihoods due to insecurity. However, despite the obvious need for initiatives to cushion the effects of these two problems in the state, the Northeast states like Borno and others receive much of the humanitarian attention. Implementing hydroponics systems in this state will transformatively provide a climate smart as well as a secure means of food production for communities affected by violence.

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

This section should answer the question "what is the problem?" Please summarise the problem related to climate change and/or the negative impacts of climate change in the country that the technology concept aims to address.

In the Northern part of Nigeria particularly places like Kaduna State the northern part of Nigeria, which is generally arid, the impacts of drought and desertification have been disproportionately pronounced, particularly affecting communities predominantly reliant on rain-fed agriculture. These environmental crises have triggered inter-communal conflicts between traditional farmers and nomadic communities engaged in livestock herding as land and water resources become increasingly scarce[1][2]. These have heightened violence perpetrated by armed groups, including the extremist organisation Boko Haram, bandits, and herdsmen. Characterised by armed banditry and kidnapping incidents, this violence has significantly disrupted food accessibility across Nigeria, with the northern region, especially in Kaduna state. An alarming consequence of this violence is the forced displacement of at least 78,000 farmers residing in the North-western states such including Kaduna, as they grapple with threats posed by Boko Haram terrorists, bandits, and armed herders[3].

Evidencing the severity of the food security crisis as a result of these two factors, a recent report emanating from the Food and Agriculture Organization of the United Nations has signified that an alarming 25.3 million Nigerians stand on the precipice of acute food insecurity in the imminent months. Consequently, the federal government felt compelled to declare a state of emergency concerning the nation's food security on July 14, 2023[4][5].

These negative impacts of climate change and insecurity have also resulted in the loss of livelihood of the agrarian communities. They cannot go out to their farms for any activity for fear of insurgents and the droughts the environment is facing.

[1] https://sci-hub.se/downloads/2021-06-30/e7/oruma2021.pdf
[2] https://saudijournals.com/media/articles/SJEF_64_118-125.p
[3] https://guardian.ng/opinion/as-northern-farmers-abandon-food-production/
[4] https://guardian.ng/opinion/as-northern-farmers-abandon-food-production/
[5] https://www.fao.org/giews/reports/crop-prospects/en/

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.

The Nigerian government has enacted and implemented various policies to tackle climate change and food insecurity with the National Adaptation Plan in the forefront of these policies. The revised National Determined Contributions (NDC) Document of Nigeria demonstrates the government's dedication to allocating resources towards the adoption of climate-resilient agricultural methods and advanced technologies, aimed at improving both sustainable food production and food security. However, there's a lack of practical information on its implementation at the community level.

In 2021, the World Bank launched a $700 million project focusing on improving landscape management for food security in northern Nigeria. Security challenges, including armed conflicts and terrorism, have however raised uncertainties about the project's success[6].

Furthermore, in July 2023, the government declared a "State of Emergency" on food security and introduced a comprehensive intervention plan. The plan includes immediate distribution of fertilisers and grains, promoting irrigation, establishing a National Commodity Board, enhancing farm security, strengthening the role of the Central Bank in funding agriculture, activating additional farmland, deploying funding, improving transportation and storage, boosting revenue from food exports, streamlining trade facilitation, creating employment opportunities, and ensuring food affordability. Concerns have been raised about the government's capacity to deliver on these commitments in a timely manner.

Specific technology[7] 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 technology concept 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 applicant to identify, assess or deploy climate technology(ies) in an effort to address the problem statement. The described barriers should be within the scope of the technology concept (described in the section below).

[6] World Bank. (2021). Development Projects: Agro-Climatic Resilience in Semi-Arid Landscapes (ACReSAL) - P175237. World Bank. https://projects.worldbank.org/en/projects-operations/project-detail/P175237

[7] *"**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)*

Efforts by the Federal Government of Nigeria, state governments, and stakeholders like the World Bank to address climate change and insecurity's impacts on food production have shown promise, but technology barriers hinder their full implementation. Small-scale hydroponics systems offer a solution to complement these national efforts by addressing key technology obstacles:

Limited Access to Climate-Resilient Agricultural Technology:

Barrier: Vulnerable communities lack access to climate-resilient agricultural technologies.
Solution: Small-scale hydroponics systems offer an accessible and climate-resilient alternative to traditional farming, insulating farmers from climate-related risks.

Inadequate Irrigation Infrastructure:

Barrier: Reliable irrigation infrastructure is lacking in many northern regions, affecting crop production in changing rainfall patterns.

Solution: Hydroponics systems, with their closed-loop water recirculation, reduce dependence on external water sources and overcome inadequate irrigation infrastructure, making them suitable for water-scarce regions.

Infrastructure and Storage Challenges:

Barrier: Inadequate transportation and storage facilities in the northern region lead to post-harvest losses, exacerbated by insecurity restricting movement.

Solution: Hydroponics can be implemented closer to markets, reducing transportation needs, and minimising post-harvest losses due to efficient resource utilisation.

Insufficient Agricultural Extension Services:

Barrier: Remote communities lack access to agricultural extension services for climate-resilient farming knowledge.

Solution: Hydroponics implementation can include extensive training programs, empowering farmers with the skills needed to operate these systems, reducing reliance on traditional extension services.

Sectors:

Please indicate the main sector(s) related to the technology concept:

- ☒ Agriculture
- ☐ Coastal zone management
- ☒ Disaster risk reduction
- ☒ Food security
- ☐ Forests
- ☒ Human health
- ☐ Marine and fishery
- ☒ Rural development (resilience)
- ☐ Urban development (resilience)
- ☒ Water management

Please add other relevant sectors:

Cross-sectoral enablers and approaches:

Please indicate the main cross-sectoral enablers and approaches:

☒ Communication and awareness	☒ Economics and financial decision-making	☐ Governance and planning	☒ Community based
☒ Disaster risk reduction	☐ Ecosystems and biodiversity	☒ Gender	

Technology concept requested (up to one page):

Founded on the problem statement, past/on-going efforts and technology barriers, please describe the technology concept. The technology concept should clearly contribute to adaptation to climate change as described in the problem statement and contribute to overcome the specific technology barriers.

Within a clearly defined scope, the description of the technology concept should be structured into the following:

- *Overall objective*
- *Anticipated groups of activities to be performed by the micro-grants project*
- *Anticipated products to be delivered by the micro-grants project*

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

In response to the complex and urgent challenges facing Kaduna State, we propose a small-scale solar-powered hydroponics system as a strategic solution. These systems embody a climate-resilient approach to address the convergence of issues stemming from climate change, insecurity, and food security in the region. Hydroponics, a sustainable and innovative agricultural practice, departs from traditional soil-based farming, offering precise control over essential environmental factors like water, nutrients, and temperature. This reduces reliance on unpredictable weather patterns, especially erratic rainfall due to climate change. Furthermore, hydroponics systems can be adapted to operate within controlled environments, shielding farmers from the vagaries of violent conflicts and insecurity that has disrupted traditional farming practices. Their scalability and adaptability enable community-level deployment, providing an immediate and tangible response to food security concerns.

Anticipated Groups of Activities

1. Hydroponics System Deployment: The project will involve the setup and deployment of small-scale hydroponics systems in selected communities. These systems will be designed to optimise crop cultivation without relying on traditional soil-based methods.
2. Community Training and Capacity Building: Extensive training programs will be conducted to empower community members with the knowledge and skills needed to construct, manage, and sustain hydroponics systems.

3. Customised Adaptation: Adaptation of hydroponics systems to the local context, considering factors such as available materials, climate conditions, and community needs, will be a key focus.
4. Monitoring and Evaluation: Rigorous monitoring and evaluation mechanisms will be put in place to assess the performance and effectiveness of the hydroponics systems in terms of crop yield, food security improvement, and climate resilience.

Anticipated Products

1. Established Hydroponics Systems: The project aims to deliver functional hydroponics systems in targeted communities which can reduce transportation needs, and minimising post-harvest losses due to efficient resource utilisation.
2. Secured Livelihood: This project will provide farmers with secured means of livelihood which could reduce risk of conflicts in the area.
3. Agricultural and technical expertise for farmers: Through training and capacity-building initiatives, beneficiary farmers will acquire the knowledge and skills necessary to construct, operate, and maintain hydroponics farms, contributing to reduced reliance on extension services.
4. Localised Adaptation Solutions: The project will yield customised adaptation solutions tailored to the community's specific needs and challenges.
5. Improved Food Security: The adoption of hydroponics systems is expected to result in increased crop yields, which will contribute to enhanced food security within the project areas.
6. Climate-Resilient Agriculture Practices: By integrating hydroponics into traditional farming practices, the project will foster climate-resilient agricultural methods that can withstand the impacts of climate change.

Expected timeframe:

Please indicate the expected duration period for the micro-grants project. Please note that the micro-grants project is limited to a maximum duration of 18 months.

The proposed project is expected to be implemented within the duration of 12 months.

Anticipated gender and other co-benefits from the technology concept:

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 as a result of the micro-grants project.

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

The implementation of small-scale hydroponics systems as outlined in the technology concept can yield several anticipated gender and co-benefits as follows:

Gender Benefits

1. **Empowerment of Women:** Hydroponics systems can provide women, who often play a significant role in agriculture in many Nigerian communities, with opportunities for active participation and leadership in farming. The technology's-controlled environment and reduced physical labour can help overcome traditional gender barriers, allowing women to engage more effectively in agricultural activities.
2. **Income Generation:** Increased agricultural productivity resulting from hydroponics can lead to greater economic opportunities for women, especially when they are actively involved in managing these systems. The surplus produce can be sold in local markets, contributing to household income and financial autonomy for women.
3. **Food Security:** Enhanced crop yields and diversification through hydroponics can lead to improved food security within households. This is particularly crucial for women, who often bear the responsibility of ensuring family nutrition.
4. **Reduced Drudgery:** Hydroponics systems typically require less physical labour and are less strenuous than traditional farming methods. This can reduce the physical burden on women, allowing them more time for other productive activities or personal well-being.
5. **Skills Development:** The training and capacity-building component of the project can provide women with valuable skills and knowledge in hydroponics technology, increasing their expertise and confidence in agriculture-related activities.

Other Co-Benefits

1. **Climate Resilience:** Hydroponics systems, being less reliant on rainfall and soil quality, are inherently climate resilient. This can help communities better adapt to changing weather patterns and reduce the vulnerability of agriculture to climate-related risks.
2. **Resource Efficiency:** Hydroponics systems use significantly less water and space compared to traditional farming. This promotes efficient resource utilisation, which is beneficial in regions facing water scarcity and land degradation.
3. **Improved Nutrition:** The ability to control nutrient levels in hydroponics systems can lead to the production of nutrient-rich crops, potentially improving the nutritional intake of communities and addressing malnutrition issues.
4. **Community Engagement:** The project can foster community engagement and cooperation through shared responsibility for managing hydroponics systems. This can strengthen social bonds and collective efforts in addressing food security challenges.
5. **Economic Growth:** The increased agricultural productivity and surplus produce generated by hydroponics can stimulate economic growth at the community level, generating income and employment opportunities.
6. **Environmental Sustainability:** By reducing the need for pesticides and herbicides and minimising soil erosion, hydroponics systems contribute to more environmentally sustainable agricultural practices.

Anticipated impact of the technology concept on security

When analysing security risks from the direct and indirect effects of climate change, three risk dimensions should be considered:

- *Climate stressor or shock includes erratic, extreme and/or changed rainfall patterns, temperature increase, storms, shifting seasonal patterns, and ecosystem degradation;*
- *Exposure: the presence of people, livelihoods, natural resources, infrastructure, or economic, social or cultural assets in places that could be adversely affected;*
- *Vulnerability or coping capacity: the propensity of exposed elements to be adversely affected and the ability of systems to manage and overcome adverse conditions.*

A couple of questions can help diagnose the level of exposure and resilience of a specific country of communities, such as:

- *Is any climate pressure and shocks prevalent in the area / region?*
- *Are there specific regions, communities, economic or cultural assets that are particularly exposed to these pressures and shocks?*
- *Do climate pressures and shocks exacerbate existing vulnerabilities?*
- *Is there sufficient capacity at the local, national or regional levels to absorb the impacts of climate change, especially among the most affected groups?*
- *Do these different exposure and vulnerability factors (or perceptions thereof) impact conflict dynamics within and between communities and/or across borders in the area/ region? If so, how?*
- *Will the impact of climate pressures and shocks affect the sustainability of existing agreements at local, national or regional levels?*
- *How will the combined impact of climate change and mitigation/adaptation policies affect the political economy in the area/region?*
- *Are there synergies between initiatives to address the impact of climate change and peacebuilding objectives? If not, are there opportunities to create such synergies?*

The implementation of small-scale hydroponics systems as part of the technology concept is expected to have a notable impact on security, addressing various risk dimensions related to climate change and food security.

i. Climate Stressor Mitigation: Hydroponics systems offer a climate-resilient approach to agriculture by reducing reliance on erratic rainfall patterns and soil quality. By providing controlled environments for crop cultivation, these systems can withstand climate stressors such as extreme weather events, changing rainfall patterns, and temperature increases. This resilience can contribute to the stability of food production and reduce the risk of food shortages triggered by climate shocks.

ii. Reduced Exposure to Climate Vulnerabilities and armed violence: By allowing agriculture to take place within controlled environments, hydroponics systems can reduce exposure to climate vulnerabilities. This is particularly important in Kaduna, Northern part of Nigeria, the major food producing region and where traditional farming practices are increasingly challenged by climate-induced risks and violent conflicts. The ability to farm year-round without being dependent on external factors like weather conditions can enhance food security by minimizing exposure to adverse climate events.

iii. Enhanced Coping Capacity: Hydroponics systems empower communities with the ability to manage and overcome adverse conditions. Through training and capacity-building, communities can develop the knowledge and skills required to construct, operate, and maintain

these systems effectively. This increased coping capacity enables communities to adapt to changing climate conditions and secure their food supply, reducing their vulnerability to food insecurity.

iv. Diversification of Livelihoods: The adoption of hydroponics can provide an additional source of income and livelihood diversification for communities. This diversification can reduce dependence on single livelihoods that are vulnerable to climate stressors and, in turn, enhance economic security.

v. Resource Efficiency: Hydroponics systems are resource-efficient, using less water and space compared to traditional farming. This can help conserve natural resources, reduce ecosystem degradation, and promote environmental security.

Key stakeholders:

Please list the stakeholders who will be involved in the implementation of the micro-grants project and describe their role during the implementation (for example, government agencies and ministries, academic institutions and universities, private sector, community organisations, civil society, etc.).

Stakeholders	**Role to support the implementation of the micro-grants project**
National Designated Entity National Council on Climate Change. *Name of NDE focal point: Mr. Chukwuemeka Okebugwu*	Ensure alignment with National climate change policies and regulations. Monitor and appropriate implementation processes
Designated Authority National Council on Climate Change	Ensure alignment with National climate change policies and regulations. Focal Point of Nigeria on Climate Change Activities and the Designated National Auhourity
Applicant Green Habitat Initiative	General implementation and coordination
Federal Ministry of Agriculture (Agricultural and Rural Management Training Institute)	Provide technical expertise and training resources for hydroponics system setup and management.
Kaduna State Government	Facilitate project coordination, policy alignment, and resource allocation within their respective states.
FCFM-Afaka Agricultural Entrepreneurship Centre, Kaduna, Kaduna State	Support with training of beneficiaries in basic Hydroponic facility development and management.

Local Government Area Council	Help identify suitable project locations, liaise with community leaders, and support project activities within their jurisdiction.
Traditional Institutions	Community mobilisation and cultural legitimacy
The Ministry of Defence (The Joint Security Task Force)	Collaborate with project organisers to ensure the safety of project participants and installations, especially in regions with security challenges.
Farmers Associations	Mobilize and engage local farmers in the adoption of hydroponics systems
Women's Groups	Mobilize and empower women in the targeted local communities to actively participate in hydroponics system setup and management.
Youth Associations	Mobilize youth participation

Alignment with national priorities (up to 2000 characters including spaces): *Please describe how the technology concept is consistent with national climate priorities such as: Nationally Determined Contribution, national development plans, poverty reduction plans, Technology Needs Assessments, Technology Action Plans, National Adaptation Plans, sectorial strategies and plans, etc.*	
Reference document (please include date of document)	**Extract** (please include chapter, page number, etc.).
Nationally Determined Contribution (NDC) Updated 2021	Page 25 of Nigeria's updated NDC Document indicates the Government's commitment to invest in Climate Smart Agricultural practices and technologies to enhance sustainable food production and food security. This small-scale Hydroponics technology directly aligns with this commitment.
National Climate Change Policy for Nigeria. 2021 – 2030	According to the National Climate Change Policy For Nigeria chapter 6, page 42 "Nigeria recognises that technology and innovation are central for addressing environmental problems. Modern technologies can help address the climate crisis in many new ways by helping the country to move toward a low carbon climate resilient development pathway…… The main policy direction is to move the country's economic base from a natural resources economy to a knowledge-based growth pathway that is low-carbon, gender-responsive and socially inclusive using available and innovative technologies". The small-scale Hydroponics technology directly aligns with this commitment

National Science, Technology and Innovation Policy (NSTIP) 2022	One of Nigeria's sectoral strategies mentioned in the National Science, Technology and Innovation Policy (NSTIP) 2022 is to encourage modern technologies in agriculture including: organic agriculture, smart farming systems, e-agriculture, hydroponics, vertical farming, urban agriculture, digital agriculture, drones and artificial intelligence in agriculture.

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

Please describe how the technology concept was developed at the national level and the process used by the NDE and the Designated Authority to approve the technology concept 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 the technology concept, etc.

The technology concept has been developed in cooperation with the region of Kaduna State, located in the North-west Nigeria.

Background documents and other information relevant for the technology concept:

Please list all relevant documents that will help UNEP-CTCN analyse the context of the technology concept and national priorities. Please note that all documents listed/provided should be mentioned in the technology concept in the relevant section(s), and that their linkages with the technology concept should be clearly indicated. For each document, please provide web-links (if available) or attach to the form. Please add any other relevant information as required.

1. Revised Nationally Determined Contributions (NDC) link
2. National Science, Technology and Innovation Policy (NSTIP) 2022 link
3. NATIONAL CLIMATE CHANGE POLICY FOR NIGERIA 2021 – 2030 link
4. Hydroponic Technology Trial in Nigeria link 2
5. Food crisis and insecurity in Northern Nigeria (Kaduna State) link 2, 3, 4, 5

Consultation with the Designated Authority of the country:

Please indicate whether the technology concept has been developed in consultation with the Designated Authority of the country.

☒ The Designated Authority of the country has been engaged in the design of the technology concept and will be involved in the further process leading to the implementation of the micro-grants project.

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Monitoring and evaluation:
By signing this form, I affirm that processes are in place in the country to monitor and evaluate the micro-grants project funded by the European Commission through UNEP-CTCN. I understand that these processes will be explicitly identified in the Project Concept Note (response plan of the micro-grants project) and that they will be used in the country to monitor the implementation of the micro-grants project. I understand that, after the completion of the micro-grants project, I shall support UNEP-CTCN efforts to measure the success and effects of the support provided, including its short, medium and long-term impacts in the country.

Signature:	
NDE name:	OKEBUGWU CHUKWUEMKA
Date:	12/02/2024
Signature:	

Signature:	
Name of Community/LGA	Kubau, Kubau Local Government
LGA Representative name:	Musa Sale
Position	Executive Chairman Kubau Local Government
Phone number	09035571654
Email address	musasalebanki@gmail.com
Date:	29th November, 2023
Signature:	

THE COMPLETED FORM SHALL BE SUBMITTED BY EMAIL TO NADEGE TROCELLIER:

Nadege.trocellier@un.org

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