Please note that this request was initially made by the country under the Adaptation Fund Climate Innovation Accelerator (AFCIA) programme, using a template for the application (technology concept) of AFCIA. As the implementation of technical assistance under AFCIA was limited, the request was not selected; however, in discussion with the country, it was agreed in principal that the request can be implemented using CTCN resources. Hence, a reference number for the CTCN TA request is generated with the AFCIA application attached here. As soon as the signed request in CTCN TA request template is received from the country, this document (AFCIA application) will be replaced by the same. Please see the AFCIA Technology Concept from the next page onwards.

Technology concept submission form

Country or countries:	Nepal
Title of the technology concept:	Developing Integrated Water Resources Management (IWRM) Models for Hill Ecosystem in Nepal
NDE:	Ministry of Forests and Environment Singhadurbar, Kathmandu, Nepal Mr. Raju Sapkota, Under-Secretary and Head, Climate Change Section Telephone: +977 1 4200090 E-mail: rajusapkota140@gmail.com
Applicant:	*Environment Culture Agriculture Research and Development Society Nepal (ECARDS-Nepal), post Box no 8115 Kathmandu Nepal* *Website: ecardsnepal.org.np* *email: ecards@ecardsnepal.org.np* *Phone: +977-5147166*

Geographical scope:

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

The technology Concept will be implemented in Ramechhap District of Bagmati Province of Nepal. The District is one of the climate vulnerable districts in the country. Specifically, the district is facing water stress.

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

The cause of climate change is human activities that have released large amounts of carbon dioxide and other greenhouse gases (such as methane, nitrous oxide and fluorinated gases) into the atmosphere. Anthropogenic activities are the major cause of climate change. Nepal is exposed to various kinds of disasters. The young mountain geology, fragile ecosystems, poverty, lack of capacity and resources, and weak governance has made the country extremely vulnerable to environmental degradation and impacts of climate change and disaster risks.

Water sources situated at high elevations are more sensitive to reduced rainfall than sources at low elevation because less water is retained in the high groundwater systems. Springs at high elevations are drying early and the annual period of flow of rain-fed streams and rivulets has grown shorter. The frost line also has shifted up. Variability in rainfall patterns and timing will increase the incidence of drought, which in turn will affect forests, pasture and rain-fed agriculture. In fact, droughts are already occurring more frequently.

According to German Watch Index 2006, Nepal is ranked the sixth most vulnerable country in the world in terms of vulnerability to climate change-induced hazards. Climate model projections for

Nepal indicate a rise in annual mean temperature by an average of 1.2°C by 2030, 1.7° C by 2050 and 3° C by 2100 compared to a pre-2000 baseline. Nepal is among the most vulnerable countries to climate change. Water induced disasters and hydro-meteorological extreme events such as droughts, storms, floods, inundation, landslides, debris flow, soil erosion and avalanches are frequent. Based on National Adaptation Program of Action (NAPA) 2010, out of 75 districts, 29 districts are highly vulnerable to natural hazard such as landslides, 22 districts to drought, 12 districts to glacier lake outburst flooding, and 9 districts to flooding. Other hydrological problem that needs to be addressed is that, the immediate areas above the river side are very dry. The people of that zone are being victimized; the agriculture system has been collapsed.

Climate impacts are often first detectable within the water sector, the state of which is shaped by the hydrological cycle of a given river basin. Hence, as the approach paper recommends, adaptation needs to be enveloped within the ecosystem-based basin management and to emphasize climate-responsive agriculture, climate-responsive infrastructures, biodiversity conservation, water management, and disaster risk reduction and management measures. In other words, water is very sensitive to changes in precipitation and temperature. Climate model simulations suggest that climate change will impact total flows, seasonal runoff, high- and low-flow conditions, and surface-groundwater interactions.

Many villages sit far above the streams and rivers, which lie at the bottom of deep gullies and valleys far below, and the cost of carrying or pumping water to the hill settlements from rivers can be prohibitive. Since the early 1980s, people have started to face increasing shortages of water. There are many factors involved, including increases in population, land use changes, infrastructure development, and now climate change. The flow from many springs has lessened, permanent springs have become seasonal, and seasonal springs have dried up completely.

People have started to look for other ways to fulfill their water needs including bringing in piped water from distant sources, digging wells to tap the groundwater, and harvesting rainwater. But efforts to understand and address the major problem of disappearing springs remain few and far between. Ponds used to be a common feature of the landscape in the mid-hills, but in recent years they have all but disappeared in many places. Many changes have taken place in the study areas over the past ten to 15 years. Water resources have depleted significantly, leading to increased hardship, and land use and agricultural systems have also undergone noticeable change.

The people of Ramechhap area are highly affected by climate change; not being able to get the water has become the described above issues. Not only this, they do collect the rainwater in rainy season but in spring season they have no other choices. None of the institutions involved in water supply in Nepal appear to be concerned with the problem of water in the hills – whether government, non-government, or development agencies due to limited resources and capacity.

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

Policy and regulatory frameworks

Nepal has transformed from a unitary administrative system to federal governance model. The new **constitution 2015** has provisioned three administrative levels – federal, provincial and municipal levels concurrently, provincial and local governments are in the process of formulating laws and policies. Following are key laws and policies related to nutrition, youth, Environment and Climate change.

Environmental management and climate change policies

Environment Protection Act 1996 and the corresponding **Environment Protection Rule 1997** regulate environmental issues. The act has listed the type of projects that require an initial

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Environmental Examination (IEE) or Environmental Impact Assessment (EIA) in the prescribed manner.

Water Resources and energy (Nepal Climate change policy, 2019)

Policy

Energy security will be ensured by promoting multiple uses of water resources and production of low carbon energy.

Strategies and Working Policies

- Technologies for storage, multiple use and efficient use of water will be developed and promoted in risk-prone areas and settlements considering the effects of climate change on availability of, and access to, water.
- Rainwater harvesting ponds will be constructed for groundwater recharge and their multiple uses.

Country priorities and links to environmental and climate change regional and international policy, plans and program

1. In 2016, Nepal ratified the Paris Agreement and submitted a Nationally Determined Contribution (NDC) that looked into clean energy development, afforestation measures, and sustainable transport systems, climate friendly practices in agriculture, waste management and building codes.
2. The enhanced NDC also includes adaptation component in the spirit of the Climate Change Policy (2019) and commits to, inter alia, prepare and implement climate resilient and gender-responsive adaptation plans in all 753 local levels by 2030 and formulate National Adaptation Plan (NAP) by 2021.
3. Considering climate change mitigation and resilience as one of the major strategic pillars, the **Forestry Sector Strategy (2016-2025)** aims to enhance Nepal's forest carbon stock by at least 5 % by 2025 as compared to 2015 level, and to decrease mean annual deforestation rate by 0.05 % from about 0.44 % and 0.18 % in the Terai and Chure respectively.
4. Nepal's overarching **sustainable development goal by 2030** is to reduce poverty and **Agriculture Development Strategy (2015)**, **National Conservation Strategy Framework (2015)**, **Disaster Risk Reduction Management Strategy** and periodical policies provide ample opportunities to help climate vulnerable to adapt and build resilience to climate change impacts.

Activities:

- Like solar energy, rainwater is another natural, sustainable resource that can be harnessed to benefit the home and community. Rainwater capture, which collects, diverts, and stores rainwater, provides many uses, including landscape irrigation, toilet flushing, wash applications, and ornamental pond or fountain filling.
- Spring recharge schemes using eyebrow pits, slope vegetation, and other methods for trapping monsoon rainfall and increasing infiltration have been successfully tested in some small scale studies (e.g., Sharma and Banskota 2005; ICIMOD 2007).
- One of the most visible strategies is the replacement of grain crops with vegetables and fruit.

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Singh Durbar, Kathmandu

Specific technology[1] barriers (up to one page):

There are many barriers while coping up with climate change. Nepal being the developing country has a lot to face from climate change. For an example, Nepal is practicing solar measures to cope up with the different climate related hazard, but the economic, geographic and informational aspects being weak make it even harder.

Therefore, on the basis of the foregoing discussion of the dimensions of technology, barriers to adaptation programs in the field of watershed and hydrology include:

Financial

- Lack of financial resources;
- High level of debt;

Informational

- Lack of access to information;
- Lack of access to relevant technical data;

Human resources

- Lack of skill/expertise in dealing with various aspects of climate change related projects; and
- Lack of skilled personnel for the installation and operation of environmentally sound technologies;

Infrastructural

- Lack of minimal technological infrastructures;

Social and cultural

- Social practices, beliefs and norms that prevent acceptance of climate change mitigation/adaptation options;
- Lack of awareness of environmentally sound technologies and energy efficiency benefits;

Water resource for irrigation is found to be the most affected one in the project area. Landslides and debris flow have destroyed the channels, whereas the water flow in the streams has decreased. On the other hand, the availability of water seems to be less for agricultural aspect in the project area.

The activities of the proposed projects will address issues related to integrated water resources management (IWRM) for Hill Ecosystem in Nepal. It will support in designing the reviving ponds in the study area will increase the water availability. The project seems to address the agricultural problems by providing irrigation facility to the communities. The agro forestry practice will also be channelized so that this can help local people in their livelihood upliftment. Climate change have affected people's livelihood and this COVID has worsen the situation. This project will help them to live a better life.

Sectors:

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

[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)*

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☒ 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):

The project aims to address the water scarcity problems through water harvesting and ground water recharge by rehabilitating the traditional ponds in the community. Rain water as well water from river through solar lifting technology will be used.

To develop the replicable and cost effective technology, ECARDS-Nepal will implement the following group of activities:

a) Interaction with local government and the community, b) Situation assessment of the community (socio-economic, gender role, agriculture practices, knowledge and practice on water management), c) rehabilitate the traditional ponds and new construction assessing the technical aspect (potentiality of rain water collection and lifting from river in dry season), and water harvesting from rain water as well as solar lifting technology d) farmers group formation and capacity development for agriculture (vegetable farming) and agro-forestry based income generation activities by using the harvested water). Sprinkler and drip irrigation technology will be promoted for the efficient irrigation d) coordination and collaboration with local government and other stakeholders for resource leverage e) preparation and dissemination of the findings/ knowledge management (technical aspect, cost benefit analysis, operation guideline, guideline for short term and long term income generation activities can be connected with the technology)

For the implementation of the concept Sunapati and Khadadevi Rural Municipality of Ramechhap district are selected. Ramechhap is the most climate vulnerable district of Nepal. In south face of the rural municipality and above the sunkoshi river, the land is so dry and the changing precipitation trend also increasing stress to the farmers. In this context, the proposed water management technology could be effective in such locality.

At the end of the project, tested water management technology to increase the adaptation practices at community will be in place. The proponent organization will prepare the process document including cost benefit analysis and operation and maintenance procedure documents of the technology for wider dissemination.

Expected timeframe:

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The proposed concept will be implemented within 18 months after contract signing between UNEP and the proponent organization

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

ECARDS-Nepal will ensure the Gender equality in the project. It will ensure at least 50% women participation in group formation, training and other activities. Similarly, in key position of the groups it will be ensured. During the implementation of the project, economic activities (which will be implemented as co activities in this concept) will focus on women.

Further in the initial phase of the project implementation, gender analysis will be made and the action plan will be prepared based on the analysis report to ensure the gender equality in the project. The Government guidelines developed for the promotion of gender equality will be fully applied during project activities.

Water stress management is the core theme of the proposed concept, however it will contributes for other theme also such as economic status of the community, biodiversity and social development. Agroforestry activities and vegetable farming activities will be implemented as co activities which increase the economic benefits and capacity development of the community. Vegetable farming will contribute for income generation in short term where other agro-forestry activities will increase income in long term. The production of vegetable and fruits (from agro-forestry activity) will also support for nutrition of the families. These agro-forestry activities will contribute for the bio-diversity as well. For social development; knowledge transfer to the community people, develop technology and knowledge will contribute.

Key stakeholders:

Stakeholders	**Role to support the implementation of the micro-grants project**
National Designated Entity	Guidance and supervision of the programme, coordination with different organizations for smooth implementation, monitoring of the programme activities. Knowledge management and integrate the findings/learning in future planning.
Designated Authority	Guidance and supervision of the programme, coordination with different organizations for smooth implementation, monitoring of the programme activities.
Applicant	In close supervision and guidance of National designated entity, plan and implement the project activities. Coordination with concerned stakeholders and local government. Detail plan and implementation. Capacity development of the community for the piloting of the technology, regular supervision and monitoring and reporting of the field level activities and ensure quality of the project activities.
Province level Ministry of Industry Tourism Forest and Environment	Coordination, supervision and monitoring. Technical backstopping, resource sharing for the piloting project
Rural Municipality	Ownership of the programme, coordination with the community, resource sharing, supervision and monitoring

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Agriculture Knowledge center Ramechhap	Technical backstopping, capacity building support to farmers group
Division Irrigation Office	Technical backstopping
Private sectors	Provide developed technology (solar, drip irrigation package and so on)
Farmer groups/community	Participate in the project activities

Alignment with national priorities (up to 2000 characters including spaces):

Reference document	**Extract** (please include chapter, page number, etc.).
Nationally Determined Contribution (NDC) 2020	*Direct alignment and contribution to NDC implementation is required.* • *This project will directly contribute to the NDC plans by harvesting the water and supplying it to the local people of Ramechhap district. (Directly aligns with the topic of Environment friendly local governance framework of NDC on the sub point on Promote rainwater harvesting and ponds construction of page no 6.)* • This project will also focus on agroforestry practice that will ultimately address the Afforestation and enhancing carbon sequestration program (page 8) • This project area will work on three thematic areas of NDC, they are: Agriculture and Food Security; Forests, Biodiversity and Watershed Conservation; Water Resources and Energy. (SECOND NDC, Page no 17)
National Adaptation Plans	• This project will directly link to major objective of NAP which is to reduce vulnerability to climate change impacts by improving resilience and adaptive capacity. (NAP process, Nepal's NAP process, page no 11) • And also will be doing the work of NAP pathways (Nepal's adaptation pathways, page no 14)
Climate Change Policy 2019	Sectoral Policy, Strategies and Working Policies 8.3 Water Resources and energy, Strategies and Working Policies (page 10)

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

The technology concept has been developed in close consultation with the NDE by proponent organization. The proponent organization is working in the climate Change sector since more than a decade and currently it is working for the capacity development of Province level stakeholders to integrate CCA into Sub-national Policies/Strategies/Plans and Contribute in NAP Process. Previously, it has implemented a pilot programme "Demonstrating Enhanced Productivity of Irrigated Agriculture System Through Multifunctional Water system" in Rasuwa and Nuwakot in support from ADB. Similarly, it had implemented "Rain Water Harvesting and Ground Water Recharge" Programme in Bagmati river corridor of Kathmandu in support from Bagmati River Basin Improvement Project/ADB. The rough idea presented in this concept note was adopted from those projects report. The Project Cooperation Agreement has been Made between UN Environment

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Programme and ECARDS-Nepal for the mentioned activities. The climate change Management Division, Ministry of Forest and Environment is the main agency to monitor the activities. The concept was discussed in the regular meetings in the Climate Change Management Division by proponent organization. NDE has provided guideline and suggestion to the organization for the development of the concept. Similarly, coordinate with other stakeholders for information collection and gather views on concept note. Regular meetings were held between proponent organization team and the NDE.

Background documents and other information relevant for the technology concept:

- https://lib.icimod.org/record/32016
- http://www.mofe.gov.np/downloadfile/MOFE_2019_Climate%20change%20scenarios%20for%20Nepal_NAP_1562647620.pdf
- https://napglobalnetwork.org/wp-content/uploads/2018/07/napgn-en-2018-nepal-nap-process.pdf
- https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Nepal%20First/Nepal%20First%20NDC.pdf
- https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Nepal%20Second/Second%20Nationally%20Determined%20Contribution%20(NDC)%20-%202020.pdf
- https://mofe.gov.np/downloadfile/climatechange_policy_english_1580984322.pdf

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.

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 Adaptation Fund 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: Ministry of Forests and Environment
Singhadurbar, Kathmandu, Nepal
Mr. Raju Sapkota, Under-Secretary and Head, Climate Change Section

Date: April 29, 2021

Signature:

Under Secretary

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Singh Durbar, Kathmandu