

CONCEPT IDEA NOTE FOR CLIMATE RELATED ACTIVITIES THAT MAY BE FUNDABLE BY THE GREEN CLIMATE FUND AND OTHER FINANCIAL SOURCES

This Concept Idea Note is based upon the GCF Concept Note. It is designed to prepare any Concepts or Project Ideas with GCF financing in mind, however, can also be applicable to other financial institutions. Once the Concept Idea Note is completed please send to the CCCI office (as the GCF National Focal Point), where an assessment will be undertaken as to whether the Concept could be eligible for funding under the GCF or other financial source, or both. CCCI will then communicate the result of the assessment back to the proponent, and outline what will next happen to the Concept Idea Note, such as require more information to make a clearer assessment, the submitted Concept is GCF eligible for funding and the next steps, or a determination that outlines the Concept is not eligible for GCF funding but may get funding from another source.

Title of Concept OR Project Idea: Solar Hydroponics Greenhouse

Date of Submission: 19/10/2018

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<p>Indicate the areas for the Concept, which is based upon the CKI Country Program thematic areas</p>	<p><u>Mitigation:</u> Reduced emissions from:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Energy access and power generation <input type="checkbox"/> Low emission transport <input type="checkbox"/> Buildings, cities and industries and appliances <input type="checkbox"/> Forestry and land use <p><u>Adaptation:</u> Increased resilience of:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Most vulnerable people and communities <input type="checkbox"/> Health and well-being, and food and water security <input type="checkbox"/> Infrastructure and built environment <input checked="" type="checkbox"/> Ecosystem and ecosystem services
<p>Indicative total project cost</p>	<p>Amount: NZD \$713,430*</p>
	<p>* Costing for 1 self-contained Solar Hydroponics Greenhouse: NZD \$79,270. The amount estimate is for 9 self-contained greenhouse</p>

Project/Programme rationale, objectives and approach of programme/project (max 100 words)

Brief summary of the problem statement and climate rationale, objective and selected implementation approach, including the executing entity(ies) and other implementing partners.

Problem statement:

Programmatic Area 8: Agriculture and Ecosystem Based Adaptation

Rising temperatures, variable rainfall, salt water intrusion, pollution of the ground and water table, all impact on ecosystems and agricultural production. With the predictions of more adverse impacts of climate change these effects will become more acute on the livelihoods of people and communities, food security and the ability of ecosystem services to fulfil their purposes.

Impacts experienced are reduced agricultural production, changes in the suitability of land for crop production, availability of water, changes in the duration of growing seasons, lower yields, and loss of income, increase in negative coping mechanisms, and instability of food supply, reduced nutrition and wellbeing. This is exacerbated by human actions, such as land clearance and overuse, intensive agriculture and unsustainable agricultural practices. These actions contribute to land degradation, water insecurity and erosion.

Objective: to implement alternative agriculture technologies or climate-smart agriculture CSA. Such as Greenhouses containing hydroponics hooked up with its own water supply (tanks) and solar panels to power LED, fans and water pumps

Approach: The adoption of climate-smart agricultural practices and technologies is viewed as a mainstream opportunity. FAO (2010) defined climate-smart agriculture to encompass agricultural innovations that achieve:

- (1) increased productivity for improved food security,
- (2) improved adaptation and resilience to climate change and variability, and
- (3) reduced greenhouse gas emissions (mitigation) where possible.

Recently, the concept of CSA has been introduced to cover technical and institutional options for dealing with climate change (Lipper, 2014)

Impact areas: to enhance the livelihood of people and communities, increased wellbeing, food and water security, and resilient ecosystems

Executing entity: Hydroponic growers association

Key Partners: Ministry of Agriculture, Environment service, Private sector, CSO and communities, Island government

Context and baseline (max. 2 pages)

Describe the climate vulnerabilities and impacts, GHG emissions profile, and mitigation and adaptation needs that the prospective intervention is envisaged to address.

Vulnerabilities:

Rising temperatures, variable rainfall, salt water intrusion, pollution of the ground and water table, all impact on ecosystems and agricultural production. With the predictions of more adverse impacts of climate change these effects will become more acute on the livelihoods of people and communities, food security and the ability of ecosystem services to fulfil their purposes.

Impacts:

Impacts experienced are reduced agricultural production, changes in the suitability of land for crop production, availability of water, changes in the duration of growing seasons, lower yields, and loss of income, increase in negative coping mechanisms, and instability of food supply, reduced nutrition and wellbeing. This is worsened by human actions, such as land clearance and overuse, intensive agriculture and unsustainable agricultural practices. These actions contribute to land degradation, water insecurity and erosion.

Mitigation and Adaptation:

When it comes to tackling climate change to prevent the impacts it causes in the different systems of the planet, two types of measures are applied: mitigation and adaptation.

Mitigation measures are those actions that are taken to reduce and curb greenhouse gas emissions, while adaptation measures are based on reducing vulnerability to the effects of climate change.

Mitigation

- Reducing forest degradation can reduce GHG emission intensity http://ar5-syr.ipcc.ch/topic_adaptation.php
- Greater use of renewable energy will contribute directly to the reduction of greenhouse gas emissions <https://www.international-climate-initiative.com/en/issues/mitigation/>
- Increasing water use efficiency will reduce greenhouse gas emissions through the reduced use of water-utilities which are energy intensive http://www.waterrf.org/knowledge/climatechange/FactSheets/ClimateChange_MitigationStrategies_FactSheet.pdf
- Greater use of innovative technologies for example, automating the mix of nutrients for hydroponic vegetables
- Using hydroponic systems to grow vegetables
- Growing vegetables under greenhouses

Adaptation:

In terms of adaptation measures, there are several actions that help reducing vulnerability to the consequences of climate change:

- Growing crops in Greenhouses to increase productivity
- Using hydroponics to increase water use efficiency
- More secure facility and infrastructures e.g. water tanks, solar panels
- Landscape restoration (natural landscape) and reforestation
- Flexible and diverse cultivation to be prepared for natural catastrophes

<https://www.activesustainability.com/climate-change/mitigation-adaptation-climate-change/>

Drip irrigation systems, like the one we use at Urban Oasis Hydroponic Farm, use one-tenth of the water required by traditional agriculture. <https://www.linkedin.com/pulse/role-hydroponics-agricultureclimate-change-nexus-trista-brophy>

Please indicate how the project fits in with the country's national priorities and its full ownership of the concept. Is the project/programme directly contributing to the country's INDC/NDC or national climate strategies or other plans such as NAMAs, NAPs or equivalent? If so, please describe which priorities identified in these documents the proposed project is aiming to address and/or improve.

Cook Islands government NAMAs (nationally appropriate mitigation actions) such as Indicators 10.1, 10.2 and to some extent indicators 10.3 and 10.4 (NSDP) is aligned with the primary agricultural development goals of *Solar Hydroponics Greenhouse*. Which is to:

1. Increase the percentage of agriculture food produced locally
2. That will contribute to the overall local food production
3. Retain arable land for tourism and residential, commercial real estate
4. Improve biosecurity measures through the security of a Greenhouse

Source document: NSDP Nationally Sustainable Development Plan 2016-2020

Adopting climate-smart agriculture seems to be a suitable strategy to achieving food security while also mitigating and adapting to climate related risks.

In practice, **climate-smart agriculture** such as the proposed concept of *Solar Hydroponics Greenhouse*, means food security through better yields from more resilient, adaptive agriculture

Describe the main root causes and barriers (social, gender, fiscal, regulatory, technological, financial, ecological, institutional, etc.) that need to be addressed.

While greater emphasis in the literature has been placed on climate change and its variability effects, there is limited attention to lessons learnt and challenges that confront the development and adoption of agricultural practices that counter climate change (Neumann, 2010).

As policy makers and development experts attempt to help marginal farmers adapt to climate change as an opportunity to deliver on the food security targets defined by the sustainable development goals, knowledge on agriculture innovations that deliver on the principles of climate-smart agriculture will be crucial for bringing climate-smart agriculture to scale in the Cook Islands. Challenges for climate-smart agriculture in the Cook Islands include:

1. Limited understanding of climate-smart agriculture
2. Setting priorities right between farmers and policy makers
3. Limited investment due to the lack of adapting and broadening a number of appropriate technologies or technological packages to underpin climate-smart agriculture
4. Fitting climate-smart agriculture into existing policy frameworks

Where relevant, and particularly for private sector project/programme, please describe the key characteristics and dynamics of the sector or market in which the project/programme will operate.

Rarotonga Market characteristics

Number of tourist accommodation: 118

Type of accommodation: hotel, motel, resort, bungalows, etc...

Three big hotels: Pacific Resort, Rarotongan Resort, and Edgewater Resort. The remaining accommodation are of various sizes with different number of rooms

In 2017 there were 174,776 visitors to the Cook Islands. According to the statistics department, there is a 5% increase in visitors.

Brief demographics 2017:

The most number of visitors are from New Zealand at 107,000 for 2017. In the same year approximately 25 Australians visited the Cook Islands

Residential population for the Cook Islands 2016 was 11,700

According to the statistics office, there is a 19.3% increase in imports from 141 million (2013) to 182 million (2017). Exports for 2017 was 29 million.

Aitutaki Market Characteristics

Number of tourist accommodation: 21

5 star: pacific resort

4 star: Aitutaki lagoon resort, kuru club, Etu Moana villa

The rest of the tourist accommodation are 3 star, 2 star and lower

Resident population: 2,038 (2011 census)

Source: Statistics office, Rarotonga

Market Sector: this project will operate in the Tourism market and the local market in the short to medium term.

Engagement among the NDA, AE, and/or other relevant stakeholders in the country (max ½ page)

Please describe how engagement among the NDA, AE and/or other relevant stakeholders in the country has taken place and what further engagement will be undertaken as the concept is developed into a funding proposal.

Support from stakeholders:

1. On developing a strategy to achieve a gradual improvement on the efficiency of irrigation systems such as hydroponics. Discussions with the Ministry for Water is key to achieving these targets.
2. On greater use of renewable energy: discussions with private contractors for installing solar panels and Te Aponga Uira has been very useful in understanding how renewable energy can contribute to farming
3. We have been trial and testing hydroponics for over a year and very happy with the outcome. input from other growers using hydroponics and the Ministry of Agriculture has been very helpful
4. The ministry of agriculture has been using greenhouses for seeding plants. their advice and insight in this area is vital
3. On planting newly developed varieties with resistance to drought and planting early maturing crop varieties: discussions with other planters and Ministry of Agriculture is key to finding out how successful these varieties are and which ones to use.

Expectations are that further discussions with the relevant NDA or stakeholders in the above areas will continue as the concept is developed into a funding proposal.

Sustainability and replicability of the project (exit strategy) (max. 1 page)

Please explain how the project/programme sustainability will be ensured in the long run and how this will be monitored, after the project/programme is implemented with support from the GCF and other sources.

GFC: green climate fund

For non-grant instruments, explain how the capital invested will be repaid and over what duration of time.

Key strategies for project monitoring and ensuring the sustainability of the project in the long run:

1. Having close ties with the relevant ministries such as the Ministry of Agriculture, Environment, Water and Te Aponga Uira
2. Having close ties with stakeholders and other growers
3. Employing standardised 'Project Management Techniques' e.g. PMBOK
4. Using ISO quality standards of 'continuous improvement'
5. Utilising chartered accountants for revenue management advice

Making sure that vegetables or crops are growing nicely for the market is one part of the equation. The Strategies listed below can help with minimising post-harvest food losses and improving other areas such as market facilities and services:

1. Improving self-sufficiency in strategic food commodities: this goal requires work programs and identifying where local projects would be capable of improving self-sufficiency in some food commodities imported at present.
2. Reducing pre-harvest and post-harvest food losses: this goal would require work programs to improve marketing facilities and services and getting food products to customers and reducing pre-harvest and post-harvest losses.
3. Improving food quality and safety: this goal would require updating of food standards of agriculture commodities and products, and enforcing standards and improving consumer safety measures
4. improving the quality of agriculture products to meet market requirements
5. improving the quality standards for agriculture products, including sorting, grading and packaging
6. improving marketing facilities and services
7. applying information technologies
8. applying modern techniques and practices in monitoring, analysing, predicting natural & marketing risks and developing risk mitigation measures
9. improving agriculture production to market supply chain

Replicability

Project success in the short to medium term will provide confidence in expanding operations. However there are risks, as mentioned before in the above section: '*Describe the main root causes and barriers...*', Policy makers and development experts attempt to help marginal farmers adapt to climate change as an opportunity to deliver on the food security targets defined by the sustainable development goals; knowledge on agriculture innovations that deliver on the principles of climate-smart agriculture will be crucial for bringing climate-smart agriculture to scale in the Cook Islands.

Assessed By and Date:

Recommendation: