



ក្រសួងបរិស្ថាន
MINISTRY OF ENVIRONMENT



CTCN
UN Climate Technology Centre & Network
UNFCCC Technology Mechanism



**SUSTAINABLE
SOLUTIONS FOR AFRICA
SSA**

Workshop Report on Market Assessment of Climate Technologies for Rural Development in Cambodia

18-19 December 2023, Phnom Penh, Cambodia



The two-day inaugural workshop for assessing the market of climate technologies in rural Cambodia was initiated with the support of the Ministry of the Environment of the Kingdom of Cambodia. This event, a collaborative effort between the UN Climate Technology Center & Network (CTCN), Sustainable Solutions for Africa (SSA) and the Ministry of the Environment took place in Phnom Penh on 18-19 December 2023. Adopting a hybrid format, it brought together 43 participants including officials from the Ministry of Environment, representatives from other government bodies, research and development entities, NGOs, and the private sector. The workshop featured a dynamic and intensive program consisting of presentations, discussions and interactive group activities. Discussions were comprehensive, focusing on stakeholder engagement, operational approaches, and valuable insights aimed at enhancing the understanding of approach to support the adoption of climate technologies for the advancement of rural development in Cambodia, including a thought assessment of both challenges and opportunities in the field.. This gathering marked a significant step in promoting informed dialogue and action towards integrating sustainable technologies in rural environmental initiatives in the Kingdom of Cambodia.

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Acronyms and Abbreviations

COP	Conference of the Parties
CTC	Climate Technology Centre
CTCN	Climate Technology Centre and Network
GCF	Green Climate Fund
NAMAs	Nationally Appropriate Mitigation Actions
NAPs	National Adaptation Plans
NCDD	National Committee for Sub-national Democratic Development
NDAs	National Designated Authorities
NDCs	Nationally Determined Contributions
NDE	National Designated Entity
MoE	Ministry of Environment
SDGs	Sustainable Development Goals
SSA	Sustainable Solutions for Africa
TAPs	Technology Action Plans
TNAs	Technology Needs Assessments
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

1. Workshop Background and Objective

Cambodia is actively addressing the pressing challenges of climate change, striving to shift towards a more climate-resilient and sustainable low-carbon development. The country has made notable strides in weaving climate change strategies into both its national and local planning. Despite these efforts, Cambodia continues to be highly susceptible to the negative effects of climate change, with adaptation being a crucial element in its climate action plan, as reflected in its Nationally Determined Contributions (NDCs).

To foster a more robust climate response, Cambodia has pinpointed key areas for adaptation and mitigation, highlighting the importance of innovative finance solutions to encourage the adoption of green technologies and expand the use of renewable energy. Despite its abundance in water and renewable energy resources, Cambodia has yet to fully tap into this potential. Optimizing the utilization of these resources is essential for the country. By improving access to essential services like food, water, and energy and promoting sustainable, low-carbon development, Cambodia can make significant strides towards addressing climate change and respond to adaptation pressing needs. This will require the adoption of advanced technologies, the implementation of supportive fiscal strategies, and the enactment of comprehensive policy reforms aimed at sustainable growth and development.

However, rural communities in Cambodia face several challenges in adopting climate technologies. These include a lack of awareness about available solutions, prohibitive initial costs, difficult credit conditions, limited access to finance and technical support, insufficient knowledge for effective technology implementation, and a lack of reinforcing local policies. As Cambodia experiences rapid economic growth, particularly in rural areas, the demand for efficient food production, water management, and climate adaptation intensifies. Climate-induced stressors such as extended droughts, variable rainfall, and more frequent storms are threatening the nation's water resources. With the rising temperatures and increasing climate variability, it's expected that water scarcity in rural areas may worsen.

In response to its pressing climate challenges, Cambodia has initiated several strategies, including its National Determined Contributions (NDCs), The National Climate Change Action Plan, and the Green Economy Strategy and Implementation Plan, specifically targeting the agricultural sector's resilience and sustainability. The updated NDCs include a range of mitigation and adaptation projects and actions that align with these overarching goals, demonstrating Cambodia's commitment to a sustainable and resilient future in the face of climate challenges.

1. **Mitigation projects/activities:**
 - a. Bio-digesters construction;
 - b. Increasing the effectiveness and sustainability of agricultural land management techniques;
 - c. Organic input agriculture and bio-slurry; and deep placement fertiliser technology;
 - d. Promote manure management through compost-making process to reduce carbon emission.

2. **Adaptation actions:**
 - a. Towards an Agroecological transition in the uplands of Battambang;
 - b. Development of Rice crops for increase production, improved quality-safety; harvesting and post harvesting technique and agro-business enhancement;
 - c. Development of Horticulture and other food crops for increase production, improved quality-safety; harvesting and post harvesting technique and agro-business enhancement;
 - d. Development of Industry crops for increase in production, improved quality-safety; harvesting and post harvesting technique and agro-business enhancement.

Upon request of the Climate Technology Center Network (CTCN)' National Designated Entity (NDE) of Cambodia, the CTCN has designed the project to implement the market assessment in the application of climate technologies in the agriculture sector for rural development, which is expected to support Cambodia in implementing its NDCs. The proposed project will support analysing the market in the application of climate technologies in the agriculture sector, including irrigation, water, harvesting and agro-food processing such as solar cooling, solar pumping, and food product saving and packaging. This endeavor is expected to enhance production efficiency and climate resilience in the agriculture and water sectors, thereby contributing to rural development in Cambodia.

The outcomes of this project are intended to guide the development of a detailed, actionable plan for the government. This plan will assist in formulating funding concept ideas. It is also designed to clarify the roles of relevant stakeholders and foster collaboration during both the development and commercial stages.

The project includes various consultation methods, featuring two workshops in Phnom Penh, Cambodia, under the auspices of the Ministry of Environment of the Kingdom of Cambodia. The first of these, a 2-day kick-off workshop, was held on 18-19 December 2023. It convened relevant stakeholders to outline the implementation timeline, discuss consultation approaches, and gather essential information on national and operational conditions.

2. Overview of CTCN Mandate and Services

As the operational arm of the United Nations Framework Convention on Climate Change (UNFCCC)'s Technology Mechanism, the CTCN received from the UNFCCC the mandate to promote the accelerated transfer of environmentally sound technologies for low carbon and climate-resilient development at the request of developing countries (cf. COP decisions 1/CP.16, 2/CP.17, 14/CP.18, and 25/CP.19). To achieve this, the CTCN provides technology solutions, capacity building and technical advice on policy, legal and regulatory frameworks tailored to the needs of individual countries and based on specific country requests submitted by a National Designated Entity (NDE). The CTCN is, therefore, a demand-driven mechanism; as its services are offered upon request by developing countries, the volume and specific nature of activities ultimately depend on countries' requirements and needs.

The CTCN is composed of a Climate Technology Centre (CTC) and a Network (cf. COP decision 2/CP.17). The CTCN is hosted by the United Nations Environment Programme (UNEP).

The CTC Network, including the Sustainable Solutions for Africa (SSA), Togo, consists of institutions forming a Technical Resource Pool and is responsible for supporting the CTC Climate Technology Manager in the initial appraisal, refinement, and technical support of requests received through NDEs. When necessary, a designated expert team from these institutions is established to support the Climate Technology Manager in responding to a request, prepare a response plan for more in-depth support, and deliver immediate technical assistance assuring a rapid and flexible response and implementation (flexibility and speed that have been one of the main selling points of the UNEP proposal to the UNFCCC). The Network partners also provide support to the CTCN's capacity-building, networking, knowledge-sharing, and awareness-raising activities.

This project on Market Assessment of Climate Technologies for Rural Development in Cambodia contributes to the Climate Action Subprogramme of the UNEP Results Framework for 2022-2023, including Indicator

(i) “Number of national, subnational and private-sector actors that adopt climate change mitigation and/or adaptation and disaster risk reduction strategies and policies with UNEP support”, indicator

(iv) “Positive shift in public opinion, attitudes and actions in support of climate action as a result of UNEP action”, and indicator

(v) “Positive shift among private sector actors in support of climate action as a result of UNEP engagement”.

CTCN has awarded SSA the responsibility of implementing this project. SSA is enhancing CTCN's capacity to facilitate the transfer of climate technologies in developing countries, leveraging its strong international presence and recognized expertise in the agricultural sector. With its robust experience in consulting and capacity building, SSA will assist the NDE, along with public and private institutions. Its role includes creating a roadmap for mobilizing climate funding, identifying technological solutions, and establishing effective channels for stakeholder engagement, all aimed at fulfilling the CTCN project's objectives.

3. Workshop Participants

The workshop successfully convened a diverse group of stakeholders, including representatives from the government, educational and research institutions, development partners, international organizations, private sector, civil society, and NGOs. Notably, 35% of the participants were from the Ministry of Environment, complemented by attendees from other ministries such as Agriculture, Forestry, and Fisheries and Land Management, Urban Planning and Construction, Water resource and Meteorology and so on. The event also welcomed representatives from the National Committee for Sub-national Democratic Development (NCDD), an entity accredited by the GCF.

In total, there were 43 participants, with 36 attending in person and 7 connecting remotely via the Zoom platform. For a complete list of participants, please refer to Annex 2.

The Workshop was further distinguished by the presence of two high-level officials from the Ministry of Environment, who graciously opened the inaugural session:

- Mr. OU Chanthearith, Director of the Department of Science and Technology of the General Directorate of Policy and Strategy, Ministry of Environment of the Kingdom of Cambodia. And
- H.E. SUM Thy, Acting Director General of the General Directorate of Policy and Strategy, Ministry of Environment of the Kingdom of Cambodia.

4. Summary of the Sessions

The workshop was organized by SSA on behalf of CTCN, in close collaboration with the NDE office for program design and distribution of invitations. It took place at the Hyatt Regency Phnom Penh, #55, Street 178, Sangkat Chey Chumnas Khan Doun Penh, in Meeting Suite 2 on the L Floor, on December 18th and 19th, 2023.

This event was conducted in a hybrid format, accommodating both in-person attendance and remote participation via the Zoom platform. Live interpretation between Khmer and English was available for all participants, whether attending in person or remotely.

For detailed information about the program and session timings, please refer to Annex 1.

Day 1 Overview, 18 December 2023, Monday

Day 1 of the workshop was dedicated to understanding the landscape of adopting climate technologies in Cambodia and sharing insights on technologies through discussions and group activities following the plenary sessions.

Session 1.1 High Level Inaugural Session

The workshop was opened by the inaugural high-level session opened by distinguished guests:

- Mr. OU Chanthearith, Director of the Department of Science and Technology of the General Directorate of Policy and Strategy, Ministry of Environment of the Kingdom of Cambodia.
- H.E. SUM Thy, Acting Director General of the General Directorate of Policy and Strategy, Ministry of Environment of the Kingdom of Cambodia.
- Sandra Freitas, CEO and Co-founder of Sustainable Solutions for Africa.



The esteemed speakers underscored the critical role of climate technologies in advancing rural development in Cambodia. Representatives from the Ministry of Environment highlighted Cambodia's dedication to climate change efforts, adherence to National Determined Contributions (NDCs), and commitment to the principles of the UN Framework Convention on Climate Change (UNFCCC), with a particular focus on sustainable agriculture. Mr. Ou Chanthearith, Director of the Department of Science and Technology, emphasized the need for technology transfer and cooperation with organizations such as the Climate Technology Centre and Network (CTCN) and the South-South Alliance (SSA), recognizing their proficiency in energy technology and resource mobilization. The speakers collectively pointed out the importance of joint efforts and partnerships in steering Cambodia towards a future that is sustainable, low in carbon emissions, and resilient to climate change, especially in rural regions where agriculture is a cornerstone of the community's livelihood and economic development.

Session 1.2 Plenary Session: Introductory Session

The introductory plenary session, led by Sandra Freitas, CEO and Co-founder of SSA, provided a platform to present the CTCN project on Market Assessment of Climate Technologies for Rural Development in Cambodia.



Key topics discussed included its proponents, the implementation timeline, and the envisaged consultation modalities. The session's main focus was to highlight the project's objective: creating a detailed and actionable roadmap. This roadmap aims to lay a foundation for the government to develop funding concepts, including Green Climate Fund (GCF) concept notes, and to facilitate stakeholder engagement.

Furthermore, the presentation outlined the project's impact in promoting low-carbon and climate-resilient technologies in agriculture, focusing on developing a roadmap to access climate funding, capacity building, stakeholder collaboration, and alignment. The project is coupled with co-benefits, such as promoting gender equality, ensuring food security, improving farmers' income, and enhancing the livelihoods of rural communities. Additionally, it was emphasized that the project supports current government initiatives, including NDCs, Technology Needs Assessments (TNAs), Technology Action Plans (TAPs), National Adaptation Plans (NAPs), and Nationally Appropriate Mitigation Actions (NAMAs), among others.

The session concluded with self-introductions from the participants, followed by a group photo.

Session 1.3 Plenary Session: Overview of Climate Technologies for Rural Development in Cambodia and Session 1.4 Group Discussion: Current Technological Capabilities and Gaps

The session, led by Sok Pheak, the Project's local consultant, provided an overview of climate technologies supporting the Nationally Determined Contributions (NDCs) goals in the agricultural and water sectors for rural development. Participants were asked to discuss and reflect on the promotion of climate technologies, their barriers, and key stakeholders. This discussion led to a survey to gather participants' reflections.

According to the participants, all climate technologies supporting the NDCs were endorsed for technical assistance and climate funding support:

- I. Harvesting and post-harvesting techniques, agro-food processing including solar cooling, food product saving, and packaging.
- II. Development of Horticulture and industrial crops, drought and pest-resistant crop varieties, and crop management.
- III. Water management for improved crop production and quality-safety (including solar water pumping, hydroponics, and rainwater harvesting systems).
- IV. Rice crop development.
- V. Bio-digester and biochar production, manure management, and compost-making.

Regarding barriers, the participants highlighted insufficient knowledge about the identified climate technology areas at different levels and limited incentives and policy support for their adoption. These were followed by concerns about underdeveloped markets and poor linkage with technology providers, as well as restricted access to finance and the high cost of adoption.

The participants prioritized the following stakeholders for their capacity to promote the adoption of climate technologies:

- I. Development Partners and International Organizations.
- II. Education and Research Institutions, Climate Funds, and Impact Investors.
- III. Private Sector ensuring access to technologies and innovations, and Civil Society & NGOs.
- IV. Regional and Local Financial Institutions.

Suggested stakeholders by the participants, listed in alphabetical order, included: ADB, ARDB, CARITA, CEDAC, CHALATEX, CIRD, CTCN, EGE Cambodia, FAO, Heifer International, IMB Cambodia Group, Mloup Beitong, NGO Forum, Oxfam, UN, UNDP, UNFCCC, UNIDO, the World Bank, WTO.

See the results of the survey below.

Survey I. Endorsement of the climate technology areas that require technical assistance and identification of barriers and stakeholders for their adoption for rural development

Table 1.1 Climate technology areas that require technical assistance and climate funding for rural development in Cambodia

Climate technology areas supporting NDCs' goals	% of participants endorsing TA for the NDCs technology
1) Development of Rice crops for increase production, improved quality-safety	65%
2) Development of Horticulture and industrial crops, drought and pest-resistant crop varieties and crop management	82%
3) Harvesting and post-harvesting techniques, agro-food processing incl. solar cooling, food product saving and packaging	94%
4) Bio-digester and biochar production, manure management, and compost-making	53%
5) Water management for improved crop production, improved quality-safety (incl. solar water pumping, hydroponics, and rainwater harvesting system)	76%
6) Agricultural land management techniques	65%

Table 1.2 The main barriers to the adoption of the identified climate technology areas for rural development

Barriers to the adoption of the identified climate technologies for rural development	% of participants acknowledging the barriers
1) Insufficient knowledge about the identified climate technologies at different levels.	76%
2) Limited incentives and policy support for adoption of the identified climate technologies.	76%
3) Underdeveloped market and poor linkage with the identified climate technology providers.	65%
4) Restricted access to finance and high cost of adoption of the identified climate technologies.	65%

Table 1.3 The stakeholders that can catalyze the adoption of the identified climate technology areas in agriculture for equitable rural development, in addition to the Government.

In addition to the Government, please select the stakeholders that can catalyze the adoption of the identified climate technologies in agriculture for equitable rural development in Cambodia.	% of participants supporting the stakeholders
1) Education and Research Institutions	82%
2) Development Partners and International Organizations	94%
3) Climate Funds and impact investors	82%
4) Regional and Local Financial Institutions	65%
5) Private sector ensuring access to technologies and innovations	76%
6) Civil Society & NGOs	76%

Sessions 1.5-1.7 Breakout Session for Group Activities and Group reports: Deep Dive into NDCs’ Climate Technology Areas

Sok Pheak’s presentation on how climate technology supports National Determined Contributions (NDCs) led to interactive group discussions. These conversations delved into the specifics of the technologies, their challenges, stakeholders, success stories, and insights from pilot projects and programs. Attendees were prompted to discuss the broader climate impact and additional benefits of expanding the use of various technologies. Notably, 93% of participants considered the presentation highly informative or enlightening. Furthermore, an impressive 100% committed to advocating for the climate technologies discussed, particularly in the context of enhancing agriculture and rural development in Cambodia, as indicated in the results of Survey II. Detailed outcomes from the group activities are documented in the tables of Survey III.

Survey II. Presenting climate technology areas supporting NDCs’ goals

Figure 2.1-2 Survey results on supporting identified climate technology areas

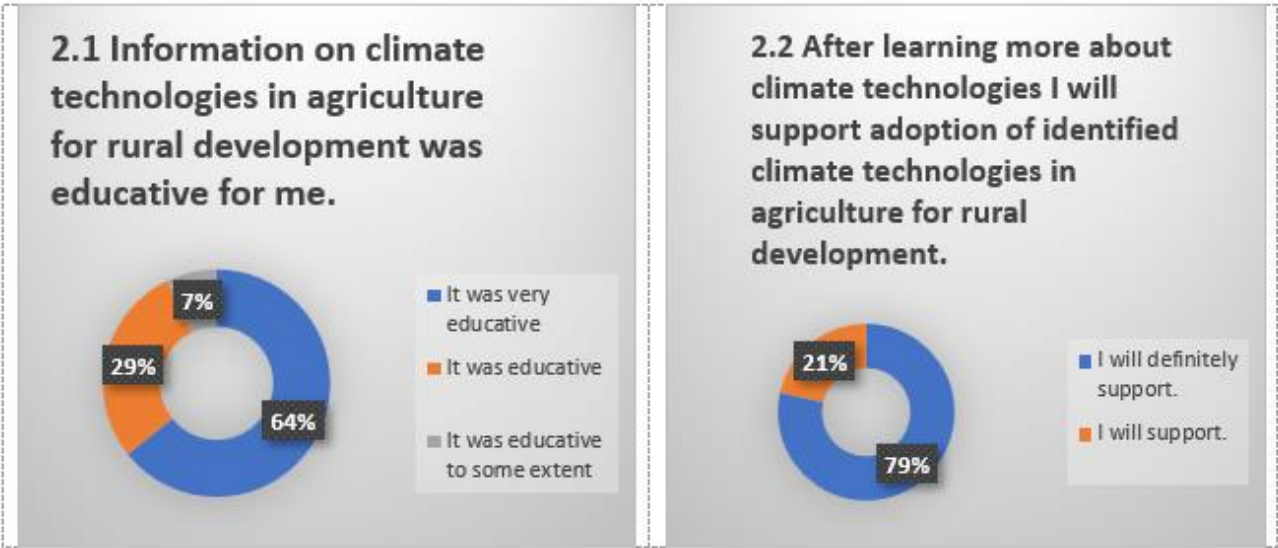


Table 2.3 Based on the information provided and to the best of my knowledge, the following climate technology areas hold the most promising potential for making a positive climate, economic, and social impact on rural development.

Climate technology areas supporting the NDCs Goals	% of participants supporting potential of the technology
1) Development of Rice crops for increase production, improved quality-safety	57%
2) Development of Horticulture and industrial crops, drought and pest-resistant crop varieties and crop management	71%
3) Harvesting and post-harvesting techniques, agro-food processing incl. solar cooling, food product saving and packaging	93%
4) Bio-digester and biochar production, manure management, and compost-making	50%
5) Water management for improved crop production, improved quality-safety (incl. solar water pumping, hydroponics, and rainwater harvesting system)	79%
6) Agricultural land management techniques	57%

Survey III. Group discussion on climate technologies to support NDCs goals

Table 3.1 Development of Rice crops for increase production, improved quality-safety

Technology-focused questions for group discussion: Development of Rice crops for increase production, improved quality-safety	Responses
1 What are the gaps and barriers to the adoption of this climate technology widely for rural development?	(1) lack of knowledge, scientific data, and access to information, (2) lack of roles in communities stakeholders
2 What are the key stakeholders necessary to make the adoption of the technology sustainable and maximize its impact?	Farmers, development partners, private sectors, research institutions, CSOs, agriculture cooperative
3 What are the climate impact and socio-economic benefits of this technology for rural development?	Less emission and save time. Increase crop resilience, increase crop yields, crop safety
4 Are you aware of economic benefits of wide adoption of this technology?	Save money and time. Less pollution
5 Please share lessons learned from pilots and programs outcomes.	NA

Table 3.2 Development of Horticulture and industrial crops, drought and pest-resistant crop varieties and crop management

Technology-focused questions for group discussion: Development of Horticulture and industrial crops, drought and pest-resistant crop varieties and crop management	Responses
1 What are the gaps and barriers to the adoption of this climate technology widely for rural development?	Lack of knowledge and information; Insufficient budget, lack of technology experience.
2 What are the key stakeholders necessary to make the adoption of the technology sustainable and maximize its impact?	Research institute, university and private sectors.
3 What are the climate impact and socio-economic benefits of this technology for rural development?	Increase production, reduce food waste.
4 Are you aware of economic benefits of wide adoption of this technology?	New technology reduce work force and increase production, Save time. It is large investment for the project start up.
5 Please share lessons learned from pilots and programs outcomes.	The investment on new technologies huge investment but long term good result.

Table 3.3 Harvesting and post-harvesting techniques, agro-food processing incl. solar cooling, food product saving and packaging

Technology-focused questions for group discussion: Harvesting and post-harvesting techniques, agro-food processing	Responses
1 What are the gaps and barriers to the adoption of this climate technology widely for rural development?	Lack of knowledge and information; Insufficient budget, lack of technology experience.
2 What are the key stakeholders necessary to make the adoption of the technology sustainable and maximize its impact?	Research institute, university and private sectors.
3 What are the climate impact and socio-economic benefits of this technology for rural development?	Generate knowledge, income and reduce environmental impact.
4 Are you aware of economic benefits of wide adoption of this technology?	Profitable, friendly to environment.
5 Please share lessons learned from pilots and programs outcomes.	The investment on new technologies huge investment but long term good result.

Table 3.4 Agricultural land management techniques

Technology-focused questions for group discussion: Agricultural land management techniques	Responses
1 What are the gaps and barriers to the adoption of this climate technology widely for rural development?	Lack of technique and finance
2 What are the key stakeholders necessary to make the adoption of the technology sustainable and maximize its impact?	Researcher, development partner and private sector
3 What are the climate impact and socio-economic benefits of this technology for rural development?	Drought and water use efficiency
4 Are you aware of economic benefits of wide adoption of this technology?	NA
5 Please share lessons learned from pilots and programs outcomes.	NA

Day 1 of the workshop was concluded with a summary of the progress, activities, and plans for Day 2.

Day 2 Overview, 19 December 2023, Tuesday

Session 2.1 Plenary Session: Barriers to Adoption of Climate Technologies, Financing and Policy Framework

The second day of the workshop began with a comprehensive plenary session focusing on the obstacles, business frameworks, governance, and policy-making strategies needed to foster the adoption of climate technologies. Marvin Mulima, a Project Manager at SSA, initiated the day with an activity prompting participants to consider the project's broader impact and the classification of climate initiatives.

The session reviewed challenges noted on the first day, such as a general lack of awareness regarding climate technologies, scarce incentives, and policy support for adoption, undeveloped markets, weak connections with technology providers, and the high costs associated with adoption. To address these, participants suggested various strategies including:

- Launching educational and training initiatives on climate technologies for local bodies and agriculturalists.
- Offering financial inducements and subsidies to encourage farmer participation.
- Strengthening research and development to bolster rural progress.
- Enhancing market access and modifying trade policies for better technology reach.



Further discussions on business models recognized the potential of public-private partnerships, microfinance institutions, agricultural cooperatives, social enterprises, and value chain initiatives in promoting climate technologies. As for governance, village development committees were highlighted as pivotal in encouraging the adoption of such technologies, supplemented by local schemes and community-based organizations. In terms of policy-making, participants ranked the following areas by potential impact:

1. Educational and training programs tailored to climate-smart technologies.
2. Provision of financial incentives and subsidies specifically aimed at agriculturalists.
3. Enhanced support for research and development in relevant fields.
4. Improved market access and adjustments in trade policies to facilitate adoption.

These discussions and solutions aimed to construct a more informed, incentivized, and accessible pathway for the integration of climate technologies, particularly in the context of rural development.

For more details, please refer to the Survey IV data below.

Survey IV. Business models, governance solutions, and policy initiatives for climate technologies adoption

Table 4.1 Business models with the potential to promote climate technologies adoption for rural development in Cambodia

Business models for climate technologies promotion	% of participants supporting potential of the business model
1. Agricultural cooperatives	50%
2. Public-Private Partnerships (PPPs)	86%
3. Microfinance institutions (MFIs)	71%
4. Social enterprises	50%
5. Value chain development	50%

Table 4.2 Governance solutions with high potential to promote climate technologies adoption for equitable rural development in Cambodia

Governance solutions for climate technologies promotion	% of participants supporting its potential
1. Community-Based Organizations	71%
2. Ensuring access to local programs for climate funding and cooperation models with development partners	71%
3. Village Development Committees	93%

Table 4.3 Areas of policymaking and programs with high potential in facilitating the adoption of climate technologies for equitable rural development in Cambodia

Policies and program for climate technologies promotion	% of participants supporting the initiative
1. Education and training programs on climate-smart technologies for local institutions and farmers	93%
2. Promoting financial incentives and subsidies for farmers	86%
3. Research and development support for rural development	79%
4. Market access and trade policies	64%

Session 2.2-2.3 Breakout Session for Group Activities: Barriers and Opportunities for Rural Development through Climate Technologies

The group discussion session, focusing on barriers and opportunities for Rural Development through Climate Technologies, concluded with a questionnaire on the discussed topic. The responses are outlined below in the Survey V tables.



Survey V. Group discussion on policy recommendations, business models, and governance to promote climate technologies

Table 5.1 Discussion Group A: Policy and regulatory recommendations

Questions for group discussion related to policy recommendations, business models, and governance to promote climate technologies	Participants' responses
What are the gaps, barriers, and risks impeding the adoption of climate technologies?	Limited knowledge, lack of capacity and policies at the sub national level, limited data access, limited facilities to support the use of technology, lack of technical and funding support.
What opportunities will be created by adopting climate technologies through the specified mechanism?	Agriculture development policy, updated skill and knowledge to be able to compete with other countries, save time, energy and money, improved community lifestyle, creating green jobs, adapting to climate change impacts, reducing greenhouse gas emissions, contributing to socio-economic development, support of NDCs.
Suggest solutions to facilitate rural development through climate technologies and how they can be implemented.	Capacity building at grassroots level and at the subnational level; survey the facilitator on which technologies they can possibly learn and practice; ask for their opinion on what option they want us to help them improve, provide training to rural stakeholders; develop guidelines for rural stakeholders; provide innovative financial mechanism and incentives; setup national long term program for CSTs.
Identify key stakeholders crucial for the successful adoption of climate technologies in rural development and underscore strategies to engage them.	PPPs, local NGOs, Development partners, local community, local authorities, SMEs, researchers, financial institutions, CST providers, MOR, MAFF.
Please share relevant success stories and programs examples.	Kampot organic pepper Association, Focal person for the project should be local authorities which he/she understand well about the areas and people.
Please add a comment, if required.	Furthermore, for formulation this project, it is nesessary to do grond observation and discusstion with su-natioal level, communities and villagers.

Table 5.2 Discussion Group B: Financial mechanisms and incentives

Questions for group discussion related to financial mechanisms and incentives to promote climate technologies	Participants' responses
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What are the gaps, barriers, and risks impeding the adoption of climate technologies?	Limited access to information; expensive smart technology price; lack of technology and budget; high cost, limited technology, limited awareness by farmers; capacity building and increase access to green financing by the banks and financial institutes; access to green Technology; cooperation with donors; research collaboration.
What opportunities will be created by adopting climate technologies through the specified mechanism?	Green Climate Fund, International partners, Social Media, Globally trend to support the climate technology, government actively support and development partner are actively involve in green finance, Clean and renewable investment, Environmental protection, Community development, Green economic; Microfinance; increased product output, fair prices; organizing meetings, holding workshops, disseminating videos, broadcasting through online media.
Suggest solutions to facilitate rural development through climate technologies and how they can be implemented.	The government should organize the inter ministries meeting and collaborate with financial institution and development partner. In the same time the policy makers should review and update the national policies to support green finance policy. Financial. Create of new economic opportunities. Increase access to clean affordable energy; Disseminate more widely, openly provide assistance, provide opportunities or priorities for those facing direct problems.
Identify key stakeholders crucial for the successful adoption of climate technologies in rural development and underscore strategies to engage them.	Government, NGOs, Private sector, Communities, research and education institutinos, local community and development partners, Participate from the Ministry of Aging, People's Government and Inter-Miniterial.
Please share relevant success stories and programs examples.	Energy Lab & SOGE
Please add a comment, if required.	NA

Table 5.3 Discussion Group C: Technology transfer and capacity building

Questions for group discussion related to technology transfer and capacity building to promote climate technologies	Participants' responses
What are the gaps, barriers, and risks impeding the adoption of climate technologies?	Lack of knowledge, economics with taking care on equipment.
What opportunities will be created by adopting climate technologies through the specified mechanism?	Stakeholders getting more easy to get higher quality product and standards. Policy of government
Suggest solutions to facilitate rural development through climate technologies and how they can be implemented.	Let them know how is technology was developed by media (Facebook) and platforms or applications about CSTs; transfer technology with Training, share experience...
Identify key stakeholders crucial for the successful adoption of climate technologies in rural development and underscore strategies to engage them.	Communities , School, NGOs and Private Sector and Governments
Please share relevant success stories and programs examples.	NA
Please add a comment, if required.	We need the policy of the government to support this project including all stakeholders related the work, tell and takes the real outcome show to them for they easy to understand and join to implementation. Thanks

Session 2.4 High-level Closing Session: Charting the Way Forward

The workshop wrapped up with an important closing session, spearheaded by Mr. OU Chantearith, who is also the Director of the Department of Science and Technology of the General Directorate of Policy and Strategy, Ministry of Environment of Cambodia, along with Sandra Freitas, the CEO and Co-founder of Sustainable Solutions for Africa. The concluding remarks focused on acknowledging the significance of the program and the workshop's role as a crucial step in the consultative journey, underlining the potential it holds for future collaborations. The session ended on a positive note, extending gratitude to all participants and organizers, and expressing eagerness for the next workshop, which is set to focus on financial instruments and policy-making consultation in 2024.



Conclusion

During the workshop organized by the Climate Technology Centre and Network (CTCN) and Sustainable Solutions for Africa (SSA) under the Ministry of Environment in Cambodia, speakers delved into the acute issue of climate change's effects on agriculture and the most vulnerable rural people in Cambodia. They stressed the importance of harnessing climate technologies in agriculture and water management, aiming to devise a concrete, actionable plan for securing climate finance and engaging various stakeholders.

The agenda included accelerating the adoption of these technologies, investigating potent technological solutions, and identifying creative financing avenues. Participants exchanged insights on both the impediments and prospects, underscoring the immediate need and the critical roles different stakeholders play in implementing sophisticated climate solutions.

Based on the recognition of the program's potential and the need to support the NDCs, the next steps will involve initiating an actionable plan to access climate finance and mobilize private sector funding for the adoption of climate technologies in rural development. This approach will ensure a sustainable and scalable impact of the intervention. Achievement of these goals will be facilitated by creating a nexus among network stakeholders, emphasizing the importance of collaboration, learning, and innovation.

The workshop underscored the value of cooperation, local insights, and shared learning. Appreciation was specifically directed towards Mr. OU Chantearith, and his team for their pivotal role in spearheading and organizing the workshop, as well as to all the contributors for their dedication to fostering a sustainable future for rural Cambodia. The workshop concluded with high praise from attendees, with detailed feedback provided in the post-event survey results in Annex 3.



Annex 1- Workshop Concept Note and Agenda



Concept Note for CTCN Workshop on Market Assessment of Climate Technologies for Rural Development in Cambodia

Hybrid Event at Hyatt Regency in Phnom Penh, Cambodia

Dates: 18-19 December 2023

The Climate Technology Centre and Network (CTCN) project, awarded to Sustainable Solutions for Africa, aims to drive sustainable rural development in Cambodia through the application of climate technologies in the agriculture sector. The primary objective is to support Cambodia in achieving its NDCs by enhancing climate resilience and production efficiency in agriculture and water management.

Project Scope

The proposed project will support analysing the market in the application of climate technologies in the agriculture sector, including irrigation, water, harvesting and agro-food processing such as solar cooling, solar pumping, and food product saving and packaging. This is expected to improve production efficiency and climate resilience in rural development in agriculture and water sectors in Cambodia.

Expected Outcomes

The project's ultimate goal is to create a roadmap for a detailed and actionable plan, serving as a foundation for the government to develop funding concepts, including GCF concept notes. Furthermore, it will facilitate stakeholder engagement by clarifying roles and fostering collaboration during both the development and commercialization stages of climate technologies.

Kick-off Workshop

To initiate this project, a two-day kick-off workshop will convene key stakeholders. The workshop's objectives include presenting the project's implementation timeline, discussing consultation methods, and gathering essential insights into national and operational conditions. This collaborative effort marks the beginning of an impactful journey toward sustainable rural development in Cambodia.

Through this workshop and subsequent activities, we aspire to create lasting positive change by harnessing the potential of climate technologies for the benefit of Cambodia's rural communities.



Agenda for CTCN Workshop on Market Assessment of Climate Technologies for Rural Development in Cambodia

Hybrid Event at Hyatt Regency in Phnom Penh, Cambodia

Dates: 18-19 December 2023

Day 1: Understanding the Landscape & Sharing Insights on Technologies Monday, 18 December 2023

Session time in local time	Session details
Registration 8:30-9:00	Registration & Welcome Tea/Coffee
Session 1.1 9:00-9:20	<p>High Level Inaugural Session <i>High-Level Welcome from the Ministry of Environment by OU Chanthearith, Director of the Department of Science and Technology, MoE; by H.E. SUM Thy, Acting Director General of the General Directorate of Policy and Strategy, MoE; by Sandra Freitas, CEO of SSA.</i></p>
Session 1.2 9:20-10:30	<p>Introductory Session <i>by Sandra Freitas, CEO of SSA</i> Presentation on CTCN, the project, its proponents, the implementation timeline, and a discussion of envisaged consultation modalities. Participants will review the two-day agenda. The session will commence with an introduction, followed by participant introductions, and will conclude with a group photo.</p>
10:30-10:45	Tea/Coffee Break
Session 1.3 10:45-11:30	<p>Overview of Climate Technology Areas for Rural Development in Cambodia <i>by Sok Pheak, project focal point</i></p>

	An overview of climate technology areas with examples in support of Cambodia's NDCs in the agricultural and water sectors for rural development.
Session 1.4 11:30-12:00	Interactive Session to Discuss: Current Technological Capabilities and Gaps moderated by <i>Sok Pheak, project focal point</i> Discussion on the current technological landscape, success stories, challenges, knowledge gaps, and barriers for adoption.
12:00-13:00	Lunch Break
Session 1.5 13:00-13:45	Breakout sessions: Deep Dive A deep dive into every technology baseline and opportunities in support of NDC for rural development; collecting first-hand data <i>The groups will be led by the organizer and participants will be grouped according to their preference and knowledge / experience:</i> Group A: Development of Rice crops for increase production, improved quality-safety, Group B: Development of Horticulture and industrial crops, drought and pest-resistant crop varieties and crop management, Group C: Harvesting and post-harvesting techniques, agro-food processing incl. solar cooling, food product saving and packaging.
Session 1.6 13:45-14:30	Breakout Sessions: Deep Dive <i>by group leads, moderated by the organizer</i> A deep dive into every technology baseline and opportunities in support of NDC for rural development; collecting first-hand data <i>The groups will be led by the organizer and participants will be grouped according to their preference and knowledge / experience:</i> Group D: Bio-digester and biochar production, manure management, and compost-making, Group E: Water management for improved crop production, improved quality-safety (incl. solar water pumping, hydroponics, and rainwater harvesting system), Group F: Agricultural land management techniques.
14:30-14:45	Tea/Coffee break
Session 1.7 14:45-15:45	Plenary Session: Insights from Day 1 Breakout Sessions <i>by group leads, moderated by the organizer</i> Report back from each group on main findings, discussions, and recommendations (10 min for each group).
Session 1.8 15:45-16:00	Key Highlights for Day 1 <i>by Marvin Mulima, Project Manager at SSA</i>



Day 2: Solutions, Challenges, and Path Forward

Tuesday, 19 December 2023

Session time in local time	Session details
Session 2.1 9:00-10:00	<p>Presentation: Barriers to Adoption of Climate Technologies, Financing and Policy Framework <i>by Marvin Mulima, Project Manager at SSA</i> Presentation detailing the current barriers and challenges faced by rural communities in adopting new technologies.</p>
10:00-10:15	Tea/Coffee Break
Session 2.2 10:15-11:00	<p>Breakout Sessions on Barriers and Opportunities for Rural Development through Climate Technologies <i>by group leads, moderated by the organizer</i> Focused discussion on barriers and opportunities in the landscape of climate technologies adoption in support of NDC for rural development; collecting first-hand data.</p> <p>Group A: Policy and regulatory recommendations Group B: Financial mechanisms and incentives Group C: Technology transfer and capacity building and PPP</p>
Session 2.3 11:00-11:15	<p>Plenary Session: Insights from Day 2 Breakout Sessions <i>by group leads, moderated by the organizer</i> Report back from each group on main findings, discussions, and recommendations (10 min for each group).</p>
Session 2.4 13:00-13:45	<p>High-Level Closing Session: Charting the Way Forward & Vote of Thanks <i>by OU Chanthearith, Director of the Department of Science and Technology, MoE;</i> <i>By Sandra Freitas, CEO of SSA.</i> Consolidating a roadmap for rural development with climate technologies in Cambodia and future collaboration mechanism among the stakeholders.</p>
12:00-13:00	Lunch break

Annex 2 – List of Participants

1) List of in-person participants registered in the Workshop venue:

Kingdom of Cambodia
Nation Religion King

Attendance list

Workshop on Market Assessment of Climate Technologies for Rural Development in Cambodia

Hybrid Event at Hyatt Regency in Phnom Penh, Cambodia

Dates: 19 December 2023

No.	Name	Sex	Role of Occupation	Organization	Phone Number	Sign
1	Heang Setha	M	Director	NLMUPC	099699639	
2	Sok Phak	M	Consultant		0898315501	
3	Marvin Medina	M	Project Manager	SSA	+22870459134	
4	Dy. Vertleasa	F	officer	RECOFTC	012 819306	
5	Sem Donuch	M	officer	HOE	088 8094614	
6	Kaewly Samdita	M	Consultant	CCA	012 2645331	
7	DOK DOMA	M	Deputy General Director	NLMUPC	012 725669	
8	Sandra Freitas	F	Consultant	SSA	+229	
9	HO LYHON	M	Vice chief	MOWRAM	012 585685	
10	Chheng Tharisa	F	Chief of office	3ST IMOE	098 410470	
11	Heng Sotromany	F	Teacher	NIA	099818735	
12	Mohm Saret	M	CD	Heifer	012 221722	
13	SOK SEYLA	M	Dep. Director	MDE	012 315885	

Kingdom of Cambodia
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Attendance list

Workshop on Market Assessment of Climate Technologies for Rural Development in Cambodia

Hybrid Event at Hyatt Regency in Phnom Penh, Cambodia

Dates: 19 December 2023

No	Name	Sex	Role of Occupation	Organization	Phone Number	Sign
14	Pheng Sokline	F	Lecturer	RUPP	017 599 742	
15	HR CHANKOMAR	M	Secretary General	FAEC	017 77 4523	
16	Chan Somtha	M	Interpreter		07021111	
17	Seth NARIN	M	Council Rep	UNIDO	012 25 73 71	
18	Tak Sraon Pisey	M	Chief	FB	077 92 93 99	
19	HAM SARITH	Mr	Researcher	RAC	092 94 47 40	
20	Sour Vannin	M	Chief office	GST	077 88 70 67	
21	ITH Channan	M	vice director	SPC /MAFF	012 44 54 58	
22	Ms Souanna	M	Lecturer	TIC	096 52 41 92	
23	UCH RITHY	M	Deputy Director	COMPOSTED	012 49 85 67	
24	CHONG BOU	M	Dep Director	MISTI	012 83 52 80	
25	AM PHIRUM	M	Deputy Director	GD/MAFF	04 82 28 62	

Kingdom of Cambodia
Nation Religion King

Attendance list

Workshop on Market Assessment of Climate Technologies for Rural Development in Cambodia

Hybrid Event at Hyatt Regency in Phnom Penh, Cambodia

Dates: 19 December 2023

No	Name	Sex	Role of Occupation	Organization	Phone Number	Sign
26	អៀង សារ៉ាណា	M	PBDM	Harfax	012722261	
27	Chak So Anvichheak	M	Deputy Director	DDO/MoE	012 519921	
28	Song Leathera	F		RST/MoE	070 225 301	
29	អ៊ុន ស៊ីវណា	F	Chief office	BCE/IRD	012545090	
30	Saeung Lydy	F	Vice-chief office	EDGE/MoE	092555523	
31	Lok Chanthana	F	Communications	NSGOF	093258368	
32	វណ្ណា ធីនារ៉ា	M	Chief of office	DDO/MoE	077 226497	
33	ស៊ីវ សុវណ្ណា	M	deputy office	MLMUPC	012555586	
34	Ky channamal	F	chief addressal	DDO/MoE	0966302928	
35	Hing Sountheavy	F	Staff	Ministry of Environment	089 932 228	
36	វណ្ណា វណ្ណា	M	NUEDDS	Chief of office	07070717	

2) Remote participants

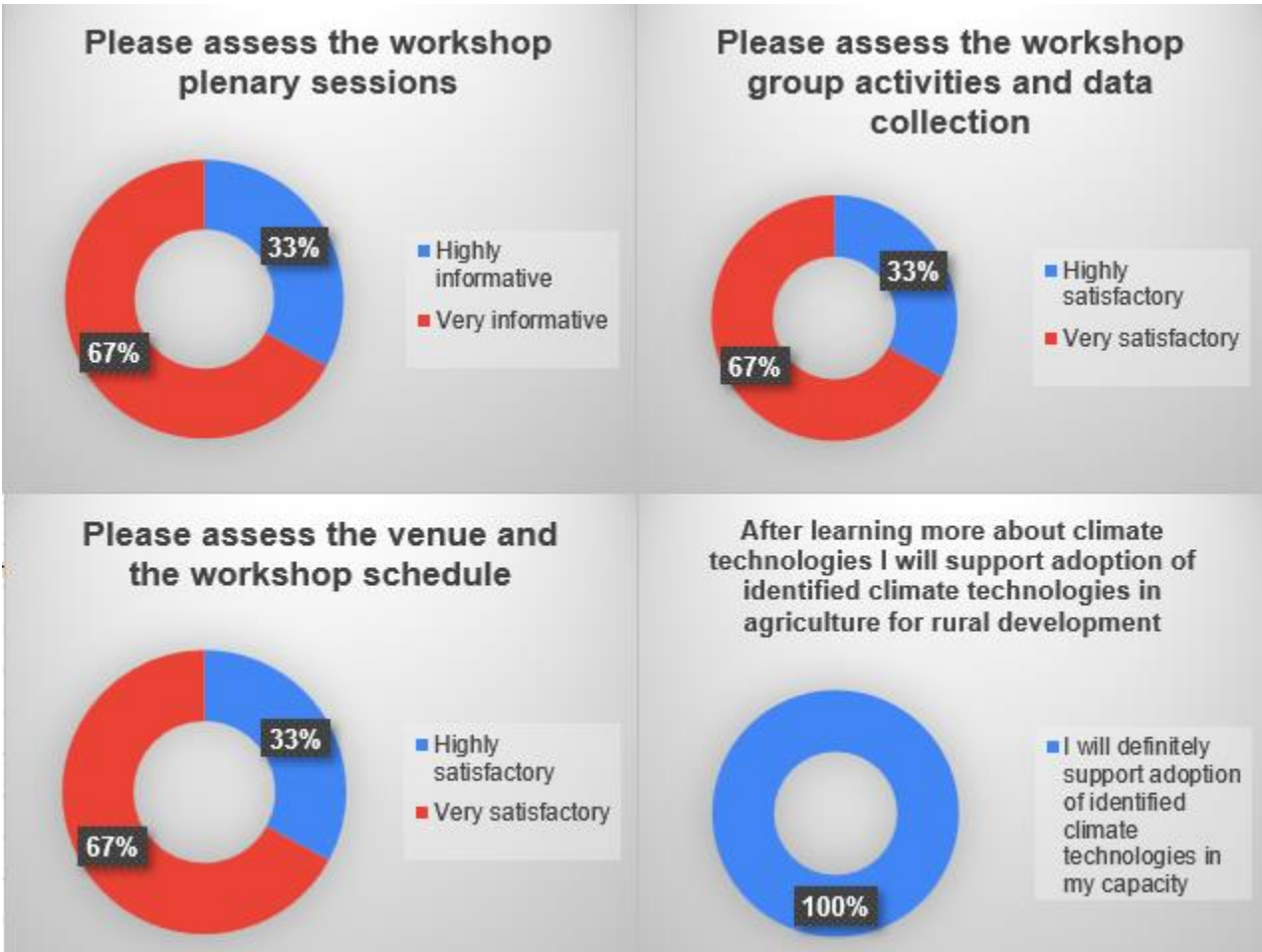
Table A.2 List of remote participants connected via Zoom

No	Full Name	Organization	Designation	Email
1	Kim On Korn	Ministry of environment	Deputy chief of office	kornkimonie@gmail.com
2	Sokuntheavy Hong	Ministry of Environment	-	sokuntheavy.hong@gmail.com
3	Sum Cheat	Ministry of Environment	Deputy Director	sumcheat@gmail.com
4	Lyda Hok	Royal University of Agriculture	Faculty member	hoklyda@rua.edu.kh
5	Rithy Uch	The Environmental Education and Recy-	-	rithy@composted-cam.org
6	Lawani Honore	Sustainable Solutions for Africa	Analyst	honore.lawani@ssa.tg
7	Anna Katsantonis	Sustainable Solutions for Africa	Senior Investment Officer	anna.katsantonis@ssa.tg

Annex 3 – Post-event Evaluation Survey Results

The participants responded to the post-event evaluation survey, with the majority giving ratings ranging from high to the highest for the event. The rate of post-event engagement is within our anticipated range

Figure A.3 Post-event evaluation survey responses



5. Based on the information provided and to the best of my knowledge, the following climate technologies hold the most promising potential for making a positive climate, economic, and social impact on rural development:

Table A.3 Post-event responses about support on promoting of identified climate technology areas

NDCs Climate technology areas	% of supporters
1) Development of Rice crops for increase production, improved quality-safety	100%
2) Development of Horticulture and industrial crops, drought and pest-resistant crop varieties and crop management	100%
3) Harvesting and post-harvesting techniques, agro-food processing incl. solar cooling, food product saving and packaging	100%
4) Bio-digester and biochar production, manure management, and compost-making	100%
5) Water management for improved crop production, improved quality-safety (incl. solar water pumping, hydroponics, and rainwater harvesting system)	100%
6) Agricultural land management techniques	67%

6. Other comments or feedback to be considered for future engagements.

- Provide farmers with access to local technologies for producing organic fertilizer by encouraging them to recycle their existing resources and providing financing for researchers.
- Proposed best practices from vulnerable countries whose has been implemented and experienced for application climate technology.
- To promote capacity building and awareness raising for climate technology to all relevant ministries and organizations involved.