

Climate Resilience Enhancement for Building Adaptive Capacity in Agri-Value Chains in Cambodia (CREA)

General Project information

Project Title:	Climate Resilience Enhancement for Building Adaptive Capacity in Agri-Value Chains in Cambodia (CREA)		
Region:	Cambodia	GEF Project ID:	11051
Country(ies):	Cambodia	Type of Project:	FSP
GEF Agency(ies):	IFAD	GEF Agency ID:	2000004367
Executing Partner:	Ministry of Agriculture, Forestry and Fisheries (MAFF)	Executing Partner Type:	Government
GEF Focal Area (s):	Climate Change	Submission Date :	10/28/2022
Project Sector (CCM Only):	Climate Change Adaptation Sector		
Taxonomy:	Focal Areas, Climate Change, Climate Change Adaptation, Renewable Energy, Climate Change Mitigation, Influencing models, Demonstrate innovative approach, Stakeholders, Private Sector, SMEs, Gender Equality, Sex-disaggregated indicators, Gender Mainstreaming, Gender results areas, Capacity, Knowledge and Research, Knowledge Generation, Knowledge Exchange, Innovation		
Type of Trust Fund:	LDCF	Project Duration (Months):	48

GEF Project Grant: (a)	4,860,000.00	GEF Project Non-Grant: (b)	0.00
Agency Fee(s) Grant: (c)	437,000.00	Agency Fee(s) Non-Grant (d)	0.00
Total GEF Financing: (a+b+c+d)	5,297,000.00	Total Co-financing:	11,560,000.00
PPG Amount: (e)	150,000.00	PPG Agency Fee(s): (f)	14,250.00
PPG total amount: (e+f)	164,250.00		
Total GEF Resources: (a+b+c+d+e+f)	5,461,250.00		
Project Tags:	CBIT: No NGI: No SGP: No Innovation: No		

Project Summary

Provide a brief summary description of the project, including: (i) what is the problem and issues to be addressed? (ii) what are the project objectives, and if the project is intended to be transformative, how will this be achieved? (iii), how will this be achieved (approach to deliver on objectives), and (iv) what are the GEBs and/or adaptation benefits, and other key expected results. The purpose of the summary is to provide a short, coherent summary for readers. The explanation and justification of the project should be in section B "project description".(max. 250 words, approximately 1/2 page)

The objective of the Climate Resilience Enhancement for Building Adaptive Capacity in Agri-Value Chains in Cambodia (CREA) project is to scale up climate resilient technologies and innovative finance solutions to support agriculture, farmers' livelihood, and food security in rural Cambodia. CREA builds on the achievements and learnings of the Building Adaptive Capacity through the Scaling-Up of Renewable Energy Technologies in Rural Cambodia (S-RET), financed by the Special Climate Change Fund for Technology Transfer (SCCF-B), and aims to leverage the momentum that has increased the market space for renewable energy (RE) and other climate resilient technologies (CRT). Climate change not only brings challenges to farm production but also exacerbates problems around processing and post-harvest activities i.e. drying, cooling, storage, freezing. By using suitable sets of CRT and services (CRT packages), including RE technologies, farmers can significantly improve their competitiveness, diversify farm and food processing revenues, remove dependence on fossil fuels and reduce greenhouse

gas (GHG) emissions, while at the same time building their adaptive capacity to withstand climate shocks. The project plans to engage more systematically smallholder farmers, agricultural organizations (agricultural cooperatives, business clusters), CRT suppliers, extension services and partner financial institutions (PFIs); and support priority agricultural sub-sectors most vulnerable to climate change impacts. The project is innovative as it supports the identification of new collective business models and innovative financial solutions to support the rollout of CRT to enhance agriculture climate resilience. The project is also transformative with activities focusing on human resource development, R&D support and policy dialogue to strengthen the ecosystem and frameworks of climate adaptation in Cambodia.

Indicative Project Overview

Project Objective

Scaling up climate resilient technologies and innovative finance solutions to support agriculture and food security in rural Cambodia.

Project Components	Component Type	Project Outcomes	Project Outputs	Trust Fund	GEF Project Financing(\$)	Co-financing(\$)
Component 1: Promoting climate resilient technologies (CRT) for building adaptive capacity in climate vulnerable agri-value chains	Technical Assistance	Adoption of climate resilient technologies packages by smallholders and agri-MSMEs to strengthen farming systems in response to climate change impacts.	<ul style="list-style-type: none"> - 10 partner financial institutions (PFIs) / CRT providers have received tailored capacity building and fine-tuned end-user financing to be more inclusive, sustainable and adapted for a CRT package; - 7 climate chain vulnerability assessment briefs prepared (1 for each key value chain) - 10 CRT packages tested - 30,000 smallholder farmers/ (semi-) commercial farmers that are members of agricultural cooperatives (ACs) have been introduced to climate resilient technologies (15,000 men and 15,000 women) 	LDC F	2,300,000.00	5,260,000.00

- 50 structured ACs of ASPIRE-AT have been trained on CRT

- 10,000 farmers are benefiting from CRT packages

- 200,000 hectares of land under improved climate resilience management

- 200,000 beneficiaries reached with nation-wide digital marketing and outreach campaigns on benefits from adoption of climate resilient technologies to address climate variability and change

- Completed studies on suitable microfinance products and other financial products / schemes that strengthen the resilience of farming systems to climate change effects.

- Training of ACs local technology providers, and PFI officers on the promotion of new end-user financial mechanisms and MFI products

Component 2: Unlocking sustainable microfinance products to support inclusive adoption of CRT	Investment	Existing or innovative financial instruments used to enhance climate resilience in agriculture	- 1 blended finance model (lines of credit, guarantee schemes, end-user mechanisms, etc.) developed and piloted with selected PFI to deploy CRTs - Dedicated line of credit, MFI product, guarantee scheme etc. for investment in CRT solutions accessed by agri MSMEs, smallholder farmers	LDC F	1,644,000.00	5,000,000.00
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Component 3: Strengthening the enabling environment for more resilient agri-value chains	Technical Assistance	Institutional and human capacities strengthened to identify and implement climate resilient technologies with adaptation benefits	<ul style="list-style-type: none"> - MAFF action plan developed for the Renewable Energy in Agriculture policy - Three academic institutions in Cambodia integrate modules on climate resilient technologies with high adaptation potential into their course syllabus. - Completed 5 training courses to raise awareness of climate change impacts, vulnerability and adaptation for relevant government agencies at national and provincial levels - 2 Policy briefs advocating for policies to promote uptake of climate resilient technologies in agri-value chains prepared and disseminated through high-level regional events -3 R&D projects on a concrete CRT issue 	LDC F	379,000.00	100,000.00
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Monitoring and Evaluation (M&E)

M&E	Technical Assistance	Project progress and results systematized to improve management, promote learning, and support upscaling of best practices	Effective monitoring and evaluation plan implemented	LDC F	306,000.00	
				Sub Total (\$)	4,629,000.00	10,360,000.00
Project Management Cost (PMC)						
				LDCF	231,000.00	1,200,000.00
				Sub Total(\$)	231,000.00	1,200,000.00
				Total Project Cost(\$)	4,860,000.00	11,560,000.00

Please provide justification

PROJECT OUTLINE

A. PROJECT RATIONALE

Briefly describe the current situation: the global environmental problems and/or climate vulnerabilities that the project will address, the key elements of the system, and underlying drivers of environmental change in the project context, such as population growth, economic development, climate change, sociocultural and political factors, including conflicts, or technological changes. Describe the objective of the project, and the justification for it. (Approximately 3-5 pages) see guidance here

Global environmental and adaptation problems

Cambodia's population is estimated at 16.9 million in 2021, with 75% of the population residing in rural areas^[1]. Located in Southeast Asia, Cambodia's economy has witnessed stable growth driven by the industrial, tourism and agricultural sectors. In 2015, Cambodia became a lower middle-income economy, after sustaining an average annual

gross domestic product (GDP) growth rate of 7.6% from 1994 to 2015. Between 2016–2019, total GDP grew by 7.1% annually, but then contracted to 3.1% in 2020 and 2.2% in 2021 due to the negative impact of the Covid-19 pandemic. Cambodia's GDP growth rate is still expected to recover with 5.5% in 2022 and 6.5% in 2023^[2].

In the 2020 ND-GAIN Index^[3], Cambodia ranked as the 36th most vulnerable country to climate change, mainly due to flood and drought risks. The Third National Communication reports by the National Council for Sustainable Development (NCSD) that the mean annual temperature has risen from 26.5°C in 1985 to 27.3°C in 2017, with a rise in temperature anomalies over the period. The average temperature in the South of the country is expected to increase by 1.1°C by 2050, and as much as 2.5°C in the North. Under the worst scenario (RCP8.5), mean annual temperatures could rise by 3.5°C to 4.5°C by 2099^[4]. Cambodia already experiences some of the highest temperatures in the world, with an estimated national average of 64 days per year when the maximum temperature exceeds 35 degrees. Projected climate change trends indicate more severe floods and droughts, which are expected to affect Cambodia's GDP by nearly 10% by 2050^[5]. Given its physical characteristics as a low-lying tropical country, Cambodia is highly exposed to two major climate hazards: floods and droughts, with already 25% of its population affected when an extreme river flood strikes. Average annual rainfall is predicted to increase as a result of climate change, mainly due to increased rainfall in the wet season (i.e. May - October), likely resulting in an increased exposure of the population to river flooding. However, annual mean rainfall will not be uniform throughout the country: the south-western provinces are expected to experience the steepest rise in annual rainfall - up to 250mm by 2099 under the RCP8.5 scenario – while north-eastern rainfall levels should remain relatively similar on the long term⁵. Furthermore, sea levels in Asia are expected to rise between 0.3–0.5 m and 0.7–0.8 m for 2081–2100 relative to 1995–2014 depending on climate change scenarios^[6]. The worst scenario would cause permanent inundation of 25,000 ha of coastal Cambodia. Conversely, rainfall is expected to decrease during the dry season. The country is also vulnerable to heat waves, windstorms, seawater intrusion and the increase in vector-borne diseases. Climate change acts as a “multiplier” for socioeconomic vulnerabilities in Cambodia such as poverty, malnutrition, agricultural dependence, settlements in flood-prone areas, and poor public health. Cambodia is still ill-prepared to face climate change impacts: the country is ranked 164th in the 2020 ND-GAIN Index in terms of readiness, highlighting the need for an accelerated implementation of climate resilience measures. Taking all these factors into account, at least 563 communes (33.5%) of the 1,629 communes in Cambodia are considered highly or very highly vulnerable to climate change according to the NCSD⁵, particularly around the Tonle Sap and in the northern and eastern regions of the country.

Agriculture plays a crucial role in the Cambodian economy and society. The agricultural sector accounts for nearly a third of the total workforce and is set to continue to grow^[7]. It provides income for an estimated 1.7 million farm households (6.8 million people)^[8] according to the National Institute of Statistics (NIS). Moreover, the share of the sector value-added to total GDP averaged around 30% between 2000 and 2014 and remains high, amounting to 24% in 2021^[9]. The sector acts as a crucial economic and employment stabilizer, as showcased during the global pandemic: it provided employment opportunities for workers laid off in other sectors^[10], and limited the increase in malnutrition caused by rising Covid19-related insecurity and poverty.

However, the sector is still widely under-developed and vulnerable. Out of the 1.7 million agricultural households, 75% are smallholder farmers with holdings typically around one to two hectares. Their low mechanization level undermines their ability to compete with neighbouring countries such as Vietnam and Thailand. As a result, Cambodia was a net importer of agricultural goods in 2018, with a deficit of USD 1.26 bn^[11]. This situation creates a vicious circle as imports from these countries drive down prices in the domestic market and further reduce the ability of local farmers to scale up production. Cambodia is also dependent on foreign actors down- and upstream of the value chain, as the country lacks strong agricultural input production and processing industries. Still relying mostly on smallholders' production, the limited capacity of the farming and agro-processing industry is one of the factors limiting the country from fully exploiting its potential compared to neighbouring countries. Currently, only about 10% of Cambodia's total agricultural outputs are processed in the country^[12].

The Royal Government of Cambodia (RGC) aims to transform Cambodia into an upper-middle-income country by 2030 and a high-income country by 2050 and has identified agricultural modernization as one of its strategic cornerstones. The 2022-2030 Agricultural Development Policy aims to “increase agricultural growth by enhancing productivity, commercialization, agricultural diversification and promoting digitalization with high competitiveness and inclusivity, which will result in high-quality products, food safety and nutrition, while taking into account the sustainable management of land, water, forestry and fishery resources”. The

policy sets ambitious objectives for the development of the agricultural value chain: respectively 3.1% and 2.7% annual growth of value-added for crop production and livestock, 15% of processed food exports in total exports by 2030 compared to the target of 5% in 2019. In the short-term, Cambodia is also banking on recent or ongoing trade negotiations which will create huge opportunities in the sector for future growth, contributing to post-pandemic economic recovery objectives (2021-2023). In addition, the RGC has identified agriculture as a priority sector to fulfil its climate change mitigation objectives. Cambodia's Greenhouse Gas (GHG) emissions are rising, and it is estimated that the agricultural sector will directly produce 17.5% of total emissions in 2030 under the BaU (Business as Usual) scenario. In addition, agriculture is one of the main causes of deforestation, and therefore indirectly contributes to Forestry and Other Land Use (FOLU) emissions, which will account for 49.2% of the total in 2030 under the BaU scenario.

The necessity of modernizing Cambodia's agriculture is all the more crucial as it is the most vulnerable sector to climate change, because of direct impacts on both agricultural production and domestic supply chains. In the past 20 years, direct losses in production were mainly due to flooding during the wet season (approximately 62%) and droughts during the dry season (approximately 36%)^[13]. The Mekong River and Tonle Sap surroundings are the hardest-hit areas. Climate Change is expected to have tremendous adverse impacts on crop productivity and on production costs during both wet and dry seasons. As an example, a 1°C increase would result in annual mean crop losses of 10%, hindering the capacity of rice farmers to generate profits^[14].

One of the key current limitations of the agricultural sector is its heavy dependence on rain-fed irrigation. There are a total of 2,544 irrigation schemes built to date^[15], of which 47 are classified as large-scale (>5,000 ha command area), 1,243 medium-scale (200- 5,000 ha command area), and 1,254 small-scale (<200 ha command area). These schemes are serving some 1 million ha of cultivated area out of the total 4 million ha which are used for seasonal crops, and are mostly rain-fed, rendering them particularly vulnerable to droughts as crop farmers rarely have the water storage capacity to face prolonged dry seasons. Without year-round irrigation, crop intensification objectives cannot be met. For rice, a staple product for Cambodia, the production is likely to drastically decrease; by 2080, rain-fed rice production could fall by up to 70% of current yield levels¹³. In general, crops will suffer direct damages caused by floods and, to a lesser extent, land erosion, pests and windstorms, as well as water and heat stress due to increased temperatures and droughts.

Water management issues will also be worsened by increasingly unpredictable rainfall patterns, underground water salinization and seawater intrusion in coastal areas. Animal and fish raising will also be impacted by climate change, mostly due to water scarcity in dry seasons, but also as a result of heat stress and the wider spread of vector-borne diseases for livestock. Finally, climate change will impact agricultural logistics and storage, through flood damage on rural transport infrastructure, but also because rising temperatures and humidity will put further pressure on food safety and quality management practices. Although food production in Cambodia will be impacted, among the value chains selected by the Agriculture Services Programme for an Inclusive Rural Economy and Agricultural Trade (ASPIRE – AT), on which CREA is aligned, the rice, cassava, vegetables, livestock, cashew, mango, and longan value chains are identified as priorities due to their climate change high vulnerability and insufficient adaptation measures adopted so far.

To face these challenges, the Royal Government of Cambodia (RGC) and its development partners have increasingly integrated climate adaptation measures into agricultural policies and action plans as well as agricultural development programmes. One of the levers identified to boost the climate-preparedness of the sector is the adoption of climate-resilient technologies (CRT). There is already a range of existing technologies and solutions that can cover the adaptation needs of the most vulnerable value chains as shown in Table 1. Among those solutions are Renewable Energy Technologies (RETs) as was shown in the Building Adaptive Capacity through the Scaling-Up of Renewable Energy Technologies in Rural Cambodia project (S-RET).

Renewable energy technologies (RETs) such as solar water pumps, solar dryers, solar cold storage, or biodigesters can indeed provide particularly interesting solutions for Cambodia's agricultural sector and will play a crucial role in the transition. In a context where vulnerability of water resources to climate change is increasing, it is estimated that in the Tonle Sap area only, there is a direct reachable market for solar water pumps of over 12,000 farmers who would benefit and would be eager to switch to solar, for a total investment cost of USD 31.9 million. By using renewable energy resources along agricultural value chains, agri-MSMEs can improve their competitiveness, diversify farm and food processing revenues, remove dependence on fossil fuels, and reduce greenhouse gas (GHG)

emissions while at the same time building adaptive capacity of smallholder farmers to withstand climate shocks. A steady source of energy for smallholder farmers and agri-MSMEs can thus improve adaptation implementation measures and broaden the scope of adaptation by addressing the negative impacts of climate change such as decreased water availability and crop production.

TABLE 1. CLIMATE-RESILIENT TECHNOLOGIES AND MAIN ADAPTATION BENEFITS

Category	Climate-resilient solutions	Adaptation benefits
Risk management	Early warning systems	<ul style="list-style-type: none"> • Early response to climate-related hazards to prevent losses • Compensation for operating losses caused by extreme weather events
	Climate insurance	
Water management	Water pumps	<ul style="list-style-type: none"> • Year-round irrigation to face droughts during dry season and compensate for increased rainfall pattern unpredictability • Reduction of water need/ water used mismatch, resulting in reduced water waste and higher yields • Reduction of flood damage
	Sprinkler & drip irrigation systems	
	Wells, water storage	
	Crop water requirement planning	
	Hydroponics	
	Canal and drainage	
Agroecological practices / soil management	Greenhouse & net houses	<ul style="list-style-type: none"> • Reduction in soil degradation, which becomes more resilient to heatwaves, floods, and droughts • Higher crop resilience to rising temperatures and extreme climate events • Diversification of revenue sources (crops and livestock), limiting climate risk • Reduction in soil erosion caused by windstorms and floods • Better water retention, saving valuable water resources during dry seasons
	Mix farming systems	
	Integrated farming systems	
	Ecological integrated pest management	
	Integrated nutrient management	
	Mulching and cover crops	
	Drought-tolerant crop varieties	
	Biochar and organic fertilizers	
	Land levelling strategies	
	Crop planting calendar	
	Biodigesters	
	Cold storage	

Logistic and storage technologies	Refrigerated transportation	<ul style="list-style-type: none"> • Reduction in post-harvest losses • Reduced disruption in the agricultural supply chain due mostly to floods during the rainy season
	Washing and hot water treatment	
	Protection of transport infrastructure	
	Road rehabilitation	
Processing technologies	Dryers	<ul style="list-style-type: none"> • Reduction in post-harvest losses • Year-round access to market, limiting the conjunctural effects of bad harvests
Certification and traceability	GAP certification	<ul style="list-style-type: none"> • Signalling adaptive capacity to market players downstream of the value chain
	Traceability technologies	<ul style="list-style-type: none"> • Strengthening agricultural supply chain reliability

A key success factor for the installation of such technologies is their integration into the more general implementation of “climate-resilient agricultural packages”, which include agricultural practices, technology, other agricultural equipment, awareness raising, training, and other business services (including finance). Based on their field experience in Cambodia, development partners such as SNV, HEKS and SWITCH to Solar have highlighted the importance to adopt such approach. It enables the maximization of the adaptation and economic benefits of CRT based on each farmer’s specificities. Moreover, several research studies have stressed the importance to abandon a sole technology-oriented approach against a more holistic one. As an example, the importance of extension services in the information and virtuous adoption of CRT has been largely documented^[16].

Barriers that need to be addressed

Despite their strong potential for enhancing the adaptive capacity of the agricultural value chains, CRT and CRT packages remain marginal in Cambodia. Lessons learnt from S-RET and other development programs have enabled to identify several bottlenecks, which are hampering their adoption in the agriculture sector.

Global awareness on climate change and CRT remains low at all levels of the value chains (from farm to national level). Although farmers notice the impact of climate change through more common heavy rainfall, drought, and insect damage, they often do not have a deep understanding of the causes and a long-term vision on how CRT could improve their adaptive capacity and economic performance. Despite few farmers have already implemented basic conservation agriculture techniques (e.g.: planting cover crops or rotating crops) or basic technologies such as drip irrigation, often with the strong support of development programs, most of them remain unfamiliar with climate-resilient technologies and practices^[17]. Global awareness and skills around climate change and CRT also lack in the ecosystem of the farmers (extension services, agri-businesses, AC/PO, UAC, Financial institutions, local authorities), while capacity-building and human resource development on these topics remain poor. Development programs show that most of farmers are willing to adopt CRT, as long as they will help them to deal with climate crisis and result in improved livelihood and incomes. The demonstration of the potential of climate-resilient technologies and applications, with only a few having proven their benefits until now, combined with the reinforcement of the knowledge around climate change and benefits of CRT, could help disseminate the technologies and improve adaptive capacity at the production and downstream activities level.

Climate-resilient technologies, especially when they include RETs, have a high upfront cost, ranging from a few hundred dollars to tens of thousands, investments small-scale farmers rarely have the means to fund. One of the potential solutions is to increase private transition financing and investment lending to small-scale farmers. Yet, most banks and MFIs have so far mostly shielded away from lending to small-scale farmers. Such investments are considered too risky given the fragility of their business models aggravated by fluctuating input and output prices, the uncertainty about market opportunities caused by the weakness of the downstream value chain and the lack of proper registration, accounting and financial reporting. As a result, agriculture accounted to 9% of the total amount of loans in the country in 2022, with more than half of farmers not having any access to finance (JICA).

Farmers and agri-businesses have only poor alternatives to direct lending to a financial institution in Cambodia. A report from 2012 deciphered innovative financing schemes to transition agriculture^[18], ranging from wholesale lending, value chain finance, infrastructure finance to leasing options. There are some initiatives in the country such as contract farming agreements (Tropicam Fruits and Vegetables, Organic Cassava), cooperative loans (ARDB, AMK), or even leasing products on general agricultural equipment (JC Finance), but these remain scattered and limited compared to their potential. Besides, as explained by the Director of the Cambodian Association of Finance and Technology during the preparation phase, Fintech solutions, which potential for financial inclusion and climate adaptation financing have been largely acknowledged have only focused on digital wallet services so far. Overall, these financial limitations call for the development of inclusive and more sustainable financial solutions at the benefit of smallholder farmers and the whole value chains.

Moreover, when a farmer or agri-business would eventually acquire a CRT, its adaptation and economic benefits is usually lower than expected. Learnings from S-RET and other programs bring some explanations. Technology as a standalone remains the predominant approach. It can be explained by an agricultural knowledge remaining weak amongst CRT suppliers, but also a limited awareness on the necessity to work with CRT packages offering both technology(ies) and services. The initial difficulty to develop collaborations between technology suppliers, extension services and financiers limit the emergence of CRT packages, while those have proven highly successful both in Kenya or Bangladesh especially around irrigation or cold storage. This translates into Cambodian farmers and agri-businesses often not being supported with the right level of technical competency when using their CRT, due to underdeveloped supporting services in the sector (i.e. extension services, installation, after-sale services). There are currently limited agricultural extension services provided at the village level and farmers often rely on each other for their decision-making. Capacity-building is thus direly needed. Lastly, the current policy environment is not contributing to support investments in climate resilient technologies, in particular RET. The link between renewable energy and climate change adaptation is rarely explicit in present roadmaps or action plans. Specific policy or regulation promoting research, development and application of RET in agriculture remains absent, which consequently limits investors, private and public sectors, civil society organizations and local communities' engagement. Ultimately, farmers and agri-businesses are not incentivized to use CRT and especially RET. Policies underpinning clear adaptation goals, incentives, and awareness raising plans are required.

CREA aims to overcome these different challenges. The program will leverage the work done by programs such as ASPIRE, which have structured small-scale farmer communities into Producer Organizations (PO), and ASPIRE-AT, which objective is to foster the transition from POs into more structured Agriculture Cooperatives (ACs) and Business Clusters (BCs), including players downstream of the value chain like collectors or processors. CREA will thus work through these structures to strengthen the capacity of small-scale farmers and agri-businesses to adopt suitable CRT packages, to develop sustainable and inclusive financial models, to strengthen the whole ecosystem and pave the way for a large-scale-adoption of CRT to enhance the adaptive capacity of Cambodian agriculture.

Baseline scenario and any associated baseline projects

Assessment of climate vulnerability in the Cambodian agricultural sector

Cambodia’s Third National Communication highlights the vulnerability and ill-preparedness of agricultural value chains to natural disasters such as floods and droughts, high temperatures, and changes in rainfall patterns in a widely rainfall-dependent sector.

ASPIRE-AT has identified several priority value chains, namely premium traceable rice, fresh fruits (durian, coconut, banana), processed fruits and nuts (mango, cashew, longan), cassava, vegetables and livestock. They were assessed as key priorities by ASPIRE-AT because of their importance in Cambodia’s agricultural sector in terms of volume, revenue, and employment.

Among these value chains, CREA will focus on the ones that have the highest vulnerability to climate change impacts and a clear insufficient adaptive capacity so far – see Table 2 below for the targeted value chains.

To establish the baseline of CREA, the impacts of three scenarios (extreme climate events, rising temperatures and change in rainfall patterns) are assessed on each priority value chain – see Table 2 below. Detailed vulnerability assessments will be conducted within the project to validate the selection of the value chains and the associated climate-resilient technologies.

TABLE 2. VULNERABILITY OF PRIORITY VALUE CHAINS TO CLIMATE CHANGE IN CAMBODIA.

	Extreme climate events	Rising temperatures	Change in rainfall patterns
Rice	High Rice is vulnerable to both floods (62% of production loss) and droughts (36%)[19]. During the 2005 drought, net production was reduced by 14.7% ²¹ . Floods and droughts also trigger soil erosion	High A 1°C increase would cause a 10% crop loss, and favours the development of pathogens and weeds[20]	High Only 15 to 25% of total land size is irrigated, making rice very dependent on rainfall, affecting traditional crop calendars ²¹
Cassava	High Cassava is vulnerable to floods, particularly in the Mekong and Tonle Sap	Medium Cassava is known to resist higher temperatures, but heat also favors	Low Cassava is not as dependent on rainfall

	the spread of pests and diseases detrimental to the crop	regular irrigation as other crops	
Vegetables	<p>High</p> <p>Yields are significantly reduced during the “peaks” of the dry and rainy seasons, leaving small planting time windows. More frequent floods and droughts will further reduce the time windows and severely damage vegetables</p>	<p>High</p> <p>High temperatures directly damage vegetable tissues, affect photosynthetic activity, alter metabolisms and enzymatic activity, and reduce pollination. Post-harvest losses will also increase</p>	<p>High</p> <p>Most vegetables are dependent on daily irrigation and vulnerable to heavy rainfall</p>
Mango	<p>High</p> <p>Mango production is highly dependent on exports to Vietnam, floods damage logistic routes; mango trees are drought-resistant but yields and quality are affected by prolonged droughts, particularly affecting export-oriented orchards</p>	<p>Medium</p> <p>Flower fertility is affected by rising temperatures; the ripening process is also affected at 37°C and above, making mangoes mottled and a bit more acid</p>	<p>Medium</p> <p>Heavy rains damage mango flowers during the blooming period, reducing yields during harvest season</p>
Cashew	<p>Medium</p> <p>Cashews are vulnerable to droughts and windstorms, especially during the reproductive phase</p>	<p>Low</p> <p>High temperatures dry cashew flowers, affecting yield</p>	<p>High</p> <p>Unseasonal rains and heavy dew during flowering and fruiting periods have adverse impacts on yield and favor the development of pests. Continuous rain periods also affect the drying process</p>
Livestock	<p>Medium</p> <p>Floods and droughts may directly kill livestock. but mainly reduce th</p>	<p>High</p> <p>Livestock experiences heightened stress, reduced immunity and feed intake under very high temperatures (depends on breeds: above 38°C for traditional meat cows: reduced milk production above 25°C for Holstein</p>	

	<p>air feed intake and raise feed costs.</p>	<p>s)[21]. Rising temperatures and changes in rain patterns favour the spread of vector-borne diseases; commercial cattle, poultry and pig farmers are particularly vulnerable.</p>
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In these different value chains, climate change is expected to affect production, but also post-harvest and processing activities (collecting, cleaning, drying, packing, etc.). Logistics and storage are already put at risk through notably flood damage on rural transport infrastructure, as well as pressure on food safety and quality due to humidity and rising temperatures. CRT such as solar cold storage can provide relevant solutions for post-harvest activities to tackle these issues. ASPIRE, or CHAINS in the horticulture value chain, have also shown that the economic performance at production level highly depends on the healthiness of downstream activities – and associated outlets. Therefore, CREA’s scope of work will include both production and post-harvest activities as it makes sense from both an adaptation and economic perspective.

Situational analysis of the agricultural sector at the inception of CREA

Economics of the targeted value chains

- Rice. With 1.3M holdings across the country, 1.9M hectares of planted area and 4.7M tonnes harvested in 2018^[22], rice is by far the main source of activity for Cambodian farmers. Approximately 40% of total rice farmers use irrigation methods. The Tonle Sap area is a major paddy production zone, with about 1 million hectares cultivated in wet season, representing one third of the national production.
- Cassava. It is the second largest agricultural crop. There are 165 thousand holdings across the country for 329 thousand hectares of planted areas and 3.8M tonnes harvested in 2018¹⁸. Only 7% of cassava farmers use irrigation. Cassava is grown on high fertility upland soils with no additional fertilizer application and mainly through monoculture farming. Over the years, the lack of nutrient replacement combined with the heavy use of chemical fertilizers in the soil used to cultivate cassava has led to increased soil erosion and soil fertility depletion, entailing the reduction of agricultural productivity, and negatively impacting farmers’ income.
- Vegetables. Although they account for only 1.3% total cultivated area (41 thousand hectares), the NIS reports a total 217 thousand vegetable holdings in Cambodia in 2018, and vegetables (including home-grown) are crucial for food security, nutrition, and diversification of agricultural activities. According to MAFF, production climbed to 716,113 tonnes in 2020, but Cambodia still imported 329,612 tonnes of produce that year. Cambodian production is quite diverse, with snake gourds, water convolvulus, pumpkin, cucumber, squash, eggplant, and chili accounting for 76% of total holdings. Vegetables require daily irrigation, reducing yields during the dry season, and are subject to flood damage during the wet season. The bulk of for-profit production is located around the Tonle Sap area.
- Fresh fruits (mango). There are approximately 327 thousand holdings producing mangoes in Cambodia in 2018. Total planted area reached more than 80 thousand hectares in 2018^[23], with nearly 1,449 thousand tonnes produced^[24]. Fruits are mainly produced by smallholder farmers in the west of Cambodia, especially in Kampot and Battambang provinces. Mango is highly dependent on informal exports to Vietnam, with more than half of the national production exported to Vietnam before being sold to China.
- Cashew nuts. There are approximately 143 thousand cashew holdings in the country in 2018, covering 219 thousand hectares of land for approximately 108 thousand tonnes produced¹⁹. Only 6% of holdings reported using irrigation. Production is mainly concentrated in the Kampong Thom province, with a majority of smallholder farmers (1 to 2 ha orchards). Cashew production in Cambodia has the reputation of being of poor quality. The sector is mostly informal and most of the production is exported to Vietnam for processing.

- Livestock. Cambodia's livestock sector is split between cattle, pig, chicken, and duck farming.
 - Poultry (mainly chickens and ducks) is the main production sub-sector, with 40.3 million heads in 2019¹⁹. Poultry raising is an integral part of the rural life, and more than half of Cambodian households are involved in livestock and poultry production. Poultry farming is largely dominated by chicken, ducks only account for 18% of total production.
 - Pork is the highest-demanded meat, with 8,000 to 9,000 pigs needed daily. Pig farming is considered risky, as Cambodia's sector is largely dominated by smallholder and medium-scale producers which struggle to compete with imports from neighbouring countries (2,000 to 3,000 imported daily).
 - 90% of cattle is raised by households and smallholder farmers (2 to 10 heads) as a complement to crop farming. Production is highly concentrated in lowland areas, and the Tonle Sap area alone accounts for one-fourth of the national herd, providing additional income to 265,000 families.

Mapping of partner organisations for CREA

Agricultural organizations – The establishment of ACs is strongly promoted by the government as a key approach to support small-scale farmers in terms of financial service, input supply, marketing, and other support services. Currently, there are more than 1,200 agricultural cooperatives registered in Cambodia, with more than 155,000 members, including 98,900 women. There are also 2,584 business clusters supported by ASPIRE and AIMS^[25], with a total membership of more than 88,000 smallholders. A recent assessment suggests that around 25% of these established business clusters have acquired skills and experience in organizing commercial production and engage with private stakeholders to access reliable and remunerative markets extension services, finance, input and equipment supply. The Acs supported by ASPIRE-AT will be able to create the market space for climate resilient technologies given that aggregation and formalization of these is expected to result in about 500 high-capacity Acs. Following the same rationale as ASPIRE-AT, CREA will focus on smallholder farmers who are already members of ACs and business clusters and will work on developing capacity of Acs, BCs and UACs so that they become efficient counterpart for both CRT providers and financial institutions and capacity building relays for their members.

CRT suppliers – Despite a huge potential and several success-stories, the Cambodian market for CRTs and climate-resilient practices is still at an early stage. The demand remains low mostly due to a lack of awareness of the benefits, insufficient incentives from public authorities, the complexity of the behavior changes required and the high upfront costs of such solutions.

- The adoption of climate-smart solutions is still driven by the development programs in rural areas, mostly held in collaboration with the public authorities. These programs can marginally bring a financial support for the acquisition of such systems.
- In parallel, the supply of climate-resilient solutions is at his infancy and under professionalization. Without any standards set a national level, the quality of the products and after-sales services have been heterogenous on the market, with few robust, specialized suppliers. Most of the solutions are imported, especially from China. Informal distributors and second-hand channels are also undermining this nascent industry, hindering a strict control over the whole supply chains.

It is important to know that although the overall CRT and climate-resilient solution market is at an early stage, it entails various subsectors and various development stages. Among the specialized players in the market, several categories can be identified:

- *Standalone non-renewable climate-resilient technologies* (fuel and electric water pumps, flood protection equipment, non-solar cold storage, drip and sprinkler irrigation systems, greenhouse & net house, hydroponics, sensors & related software, mulching film etc.). These form a particularly heterogeneous group, with each provider specialized in one technology. Most of the equipment is imported. These providers are at very different development stages: while fuel

water pump or greenhouse/ net house providers for instance already have a mature product with established distribution networks covering most provinces, it is not the case for hydroponic or IoT providers for which both demand and supply are at pilot stage. Due to a lack of import standards for such technologies, product quality and prices vary greatly between providers.

- *RET (solar-powered technologies and biodigester) providers.* Although solar technologies are not yet widespread in the country, projects such as Switch to Solar (EU-funded) or S-RET have contributed to structuring their operations and business models to prepare them to scale-up. Such providers usually offer holistic services, including capacity sizing, installation, and maintenance. Through S-RET, 8 RET companies were supported, which successfully demonstrated the viability and benefits of solar poultry incubators, clean charcoal briquettes, solar water pumps, solar animal feed milling machines, solar cooling boxes, solar dryers and solar hydroponic systems.
- *Conservation agriculture service providers.* Farmers are mostly trained on conservation agriculture practices through development programs, public initiatives, and NGO trainings. There is one local private player, Smart Agro, that provides holistic conservation agriculture services, including crop seeds, cover crops, bio-fertilizers and pesticides, equipment, as well as training. Despite proven benefits, Smart Agro is still at an early stage.

Business service providers and AgriTechs – Agricultural business service providers include a variety of players and areas of operation: agricultural advisory, market linkage services (including digital marketplaces), FinTechs with a focus on agriculture, and specialized logistics platforms.

- In terms of advisory, the market is currently dominated by NGOs, governmental extension services through village-level Commune Extension Workers (CEW), and development programs. For example, the Cambodia-Australia Agricultural Value Chain (CAVAC) Program provided a grant to create Mekong Water Solutions, an advisory unit specialized in water management and irrigation which is currently in its incubation phase with the aim to make it economically sustainable in the long term. In parallel, AgriTech start-ups have launched digital advisory services consisting of weather information and automated advice based on geodata – examples include the Khmer Agriculture Suite platform and Angkor Salad, which provides irrigation, fertilizer and crop planning advice, as well as market information and Khmer GAP compliance advice via a mobile application. Private initiative in this category is usually limited to individual consultants and advisory provided as “added value” in procurement deals by input suppliers (seed, fertilizer, etc.). However, initiatives are underway to create larger-scale private consultancies but are still in business model development phase.
- In Cambodia, FinTechs are at a very early stage and presently mostly consist of e-banking services such as Wing. The development of more complex IA-powered services is hindered by the lack of access to trustworthy mass financial data in the agricultural sector. One of the most significant initiatives is Boost Capital, an initiative funded by the Women Enterprise Recovery Fund (WERF) which allows MSMEs to apply and receive a small loan (USD 25 to 20,000) with their smartphone in only a few minutes.
- Digital marketplaces and other linkage services are developing, and increasingly integrate advisory components such as the possibility to ask questions to online experts. Platforms like Agribuddy, CAMAgriMarket – created by the MAFF – or AMK’s Tonlesap, aim to connect producers, distributors and direct buyers.
- Agricultural supply chain service providers such as Bookmebus, Azaylla, KOC, Kenko Shoku, or Davane Company are developing fast in Cambodia and often integrate technological components to augment logistic services with supply optimization services, increased food quality control etc. In 2018, a pilot project called BlocRice was launched by communication consultancy firm Schuttelaar & Partners and Amru Rice, a leading exporter of rice in Cambodia, to use blockchain for food traceability in Cambodian agricultural value chains.

Financial suppliers – As described in the barriers, less than half of the farmers have access to finance. Financial services to farmers and agribusinesses are insured by a couple of microfinance institutions (MFIs) with a strong implementation in rural areas. The 5 deposit-taking microfinance institutions (MDI) of Cambodia account for 86.6% of total MFI outstanding loan amounts in 2021 and 94% of agriculture-related loan amounts: AMK, Amret, LOLC, Mohanokor and Prasac MFI. The range of the financial offer is limited and interest rates are rather high to cover the risk and operational costs. Even if MFIs are generally less strict than banks, they also require collateral in the form of soft title deeds or personal guarantees and not always offer flexible instalments. Their offer includes agricultural loans, small digital loans, and marginally wholesale loans (AMK, Chamroeun) and green loans (Prasac, Chamroeun). Local financial institutions face barriers to invest in green projects, CRT included, which they can perceive as highly risky and limited in terms of market potential (low demand, performance

supply). A survey conducted by Sevea in May 2022 targeting Cambodian PFIs, showed that only one respondent out of nine had developed a specific product to support renewable energies for agri-MSMEs. Possible misconceptions can arise from a global unfamiliarity with adaptation and mitigation investments in agriculture. Still, all MFIs which were surveyed by Sevea are showing an increased interest for these topics.

Two banks are also developing their activities towards smallholder farmers. The stated-owned Agricultural and Rural Development Bank, which focuses on supporting agriculture with an initial focus on the rice value chain, offers a wide range products from small farmers loans to wholesale lending to other financial institutions. They have recently signed a subsidiary loan agreement with AMK, Chamroeun and Cambodia Post Bank for them to develop products for farmers with lower interest rate than the average ones on the market. The second bank, Aceda, have been granted a significant credit line (up to USD 85M) from JICA to develop affordable loans in agriculture. They are developing very fast, with already 20.75% of their total loan portfolios in the agriculture sector in 2022. It is yet to be seen if these banking initiatives will enable a long-lasting financial inclusion of Cambodian smallholder farmers.

In parallel, alternative financing schemes are poorly developed and their penetration in rural areas is low. Some interesting examples of contract farming with an adaptation component can be identified, such as Organic Cassava or Tropicam Fruits and Vegetables. At the nexus of water management and renewable energy, SOGE has been implementing irrigation-as-a-service schemes since 2021, providing and operating solar pumps to irrigate a whole community. Pteah Baitong has introduced a PAYGO model for its solar water pumps, where smallholder farmers are requested a small upfront payment (USD 200) and then a monthly fee (USD 35) until full acquisition of the pump. Based on key learnings from projects such as Switch-to-Solar, such low financial innovation can be explained by two factors: 1) Difficulty to build strong cooperation models between organizations from different spheres (MFIs, CRT suppliers, agriculture organizations, etc.), who barely know each other, with potential mismatch in terms of objectives and expectations; 2) Capital-intensity of some models (pay-as-you-go, fee for service, rent-to-own) for the CRT companies, requiring them to back on financial partners willing to provide revolving or working capital loans (almost inexistent in the country). These organizational and financial bottlenecks can be even more difficult when developing and promoting CRT packages (identifying suitable solutions, building expertise and strong partnerships, guaranteeing good payback for all the partners, etc.).

Associated baseline projects - Coordination with other associated baseline projects will be sought ensuring collaboration and complementarity to support key objectives of other projects focusing on climate adaptation (ADB, UNIDO, FAO, EIB etc.). In particular, coordination with three new IFAD supported projects (currently under development and implemented during the period 2022-27) is planned:

- **Agricultural Services Programme for Innovation, Resilience, Extension and Agricultural Trade (ASPIRE AT; 2023-2028)** will be implemented by MAFF and will link smallholders to value chains for domestic and priority export markets through enhanced producer organizations (POs) including existing agricultural cooperatives (ACs). ASPIRE AT will be national in scope and reach out to about 125,000 rural households (corresponding to 500,000 people). The project is expected to begin implementation in 2023 and will focus on smallholders who are already members of ACs/POs as well as approximately 2,000 of the business clusters (BCs) established by ASPIRE and AIMS. Estimated available financing of the project totals USD 125.2 million. ASPIRE-AT will be the baseline project for CREA. The present Project Identification Form (PIF) was developed in close coordination with the design team of the ASPIRE-AT, jointly conducted throughout the period March-October 2022. The additional value will primarily be the possibility to connect technology providers and organized ACs/POs, which offer a concrete market space and an opportunity for CRT and finance providers to achieve economies of scale. Specific mechanisms of ASPIRE-AT such as the Centers of Excellence or the result-based grant will be leveraged through CREA, respectively for supporting awareness raising and capacity-building on climate change and co-financing demonstration pilots. In return, the CREA project expects stimulating productive and resilient assets including CRT in production, post-harvest and processing, enhancing the adaptive capacity of farmers and agribusinesses within the scope of ASPIRE-AT.

- **Climate Adaptive Irrigation and Sustainable Agriculture for Resilience (CAISAR)** will be implemented by the Ministry of Water Resources and Meteorology (MoWRAM) with finance from AIB, GCF and IFAD to support climate-adaptive irrigation. The proposed investments under this project will support the efforts of the Government of Cambodia to sustain food security and rural livelihood during and after the Covid-19 crisis through the restoration and enhancement of smart

and climate resilient irrigation systems under the theme of “Build Back Better”.

- **AMK Microfinance – Promoting Pro-Poor Rural Development through Microfinance** to be financed by IFAD’s subordinated loan of USD 5 million under IFAD Non Sovereign Operations (NSO) facility. AMK will leverage up to 5 times the initial IFAD contribution to address the financial needs of rural women, youth and poor smallholder farmers and Agriculture Small and Middle-sized Companies (Agri-SMEs) development in all Cambodian provinces in the wake of COVID-19, fostering productivity improvement, increased income and job-creation in rural areas. Through this project, a line of credit for smallholder farmers to purchase solar pumps is being planned for a total amount of USD 500,000.
- In addition to close coordination with the above three projects, **IFAD’s Inclusive Green Financing initiative (IGREENFIN)** for climate resilient and low emission smallholder agriculture is an “IFAD-green finance brand” and the first Green Climate Fund (GCF) lending regional programme to be implemented at scale in five West African countries across Green Great Wall (GGW) 4 and beyond. This project with a total financing envelope of USD 155 million will be good source of best practices and lessons learned for CREA. The project seeks to improve access to financing and further promote the adoption of climate resilient and low emission agriculture practices and solar energy systems throughout agricultural value chains to reduce GHG emissions.
- The **Cambodia-Australia Partnership for Resilient Economic Development (CAP-RED)** will provide a total USD 107 million grant from 2022 to 2030 to recover from the consequences of the Covid-19 outbreak. The programme has three strategic components: capacity building in the public health sector to respond to potential future outbreaks, a stability component including assistance on policymaking for social security, education, improved public governance, and inclusiveness of women and vulnerable groups, and an economic recovery component. The latter includes “efforts to boost agricultural production, diversify crops and increase value addition” and “alternative financial services tailored for women in rural areas”, as well as efforts to “link smallholder farmers to markets”.

[1] World Bank database, 2022.

[2] *Asian Development Outlook 2022*, ADB, 2022.

[3] University of Notre-Dame, 2022.

[4] *Third National Communication to the UNFCCC*, NCSD, 2022.

[5] *Climate Change Country Profile: Cambodia*, WB, ADB, 2021.

[6] *Climate Change Information for Regional Impact and for Risk Assessment* in the *Sixth Assessment Report*, IPCC, 2021.

[7] National Bank of Cambodia, 2021.

[8] *Cambodia Inter-Censal Agriculture Survey*, NIS, 2019.

[9] MAFF, 2022.

[10] UNDP, 2020.

[11] *Cambodia’s Agri-Food Trade: Structure, New Emerging Potentials, Challenges, and Impacts of COVID-19*, Sok, Yang & Houn, 2021.

[12] IFAD.

[13] *Third NDC update*, RGC, 2020.

[14] *Third National Communication to the UNFCCC*, NCSD, 2022.

[15] Ministry of Water Resources and Meteorology's register.

[16] See for example 'Learning for Adopting: Technology Adoption in Developing Country Agriculture', Alain De Janvry, Karen Macours Elisabeth Sadoulet, 2017.

[17] HEKS, 2022.

[18] *Innovative Agricultural SME Finance Models*, IFC, GPFI, funded by WB, 2012.

[19] *Third NDC update*, RGC, 2020.

[20] *Third National Communication to the UNFCCC*, NCSD, 2022.

[21] *Third National Communication to the UNFCCC*, NCSD, 2022.

[22] *Cambodia Inter-Censal Agriculture Survey 2019*, NIS, 2019.

[23] *Cambodia Inter-Censal Agriculture Survey 2019*, NIS, 2019.

[24] CPSA, 2019.

[25] Accelerating Inclusive Markets for Smallholders (AIMS).

B. PROJECT DESCRIPTION

Project Description

This section asks for a theory of change as part of a joined-up description of the project as a whole. The project description is expected to cover the key elements of good project design in an integrated way. It is also expected to meet the GEF's policy requirements on gender, stakeholders, private sector, and knowledge management and learning (see section D). This section should be a narrative that reads like a joined-up story and not independent elements that answer the guiding questions contained in the PIF guidance document. (Approximately 3-5 pages) see guidance here

The Climate Resilience Enhancement for Building Adaptive Capacity in Agri-Value Chains in Cambodia (CREA) project builds on the learnings and achievements of the Building Adaptive Capacity through the Scaling-Up of Renewable Energy Technologies in Rural Cambodia (S-RET) project, financed by the Special Climate Change Fund for Technology Transfer (SCCF-B) for a total GEF grant of USD 5.2 million. S-RET began implementation in October 2016 and reached completion in June 2022^[1]. The project scaled up its activities from five target provinces to nationwide coverage in close coordination with IFAD's loan investment programme, Agricultural Services Programme for Innovation, Resilience, Extension (ASPIRE).

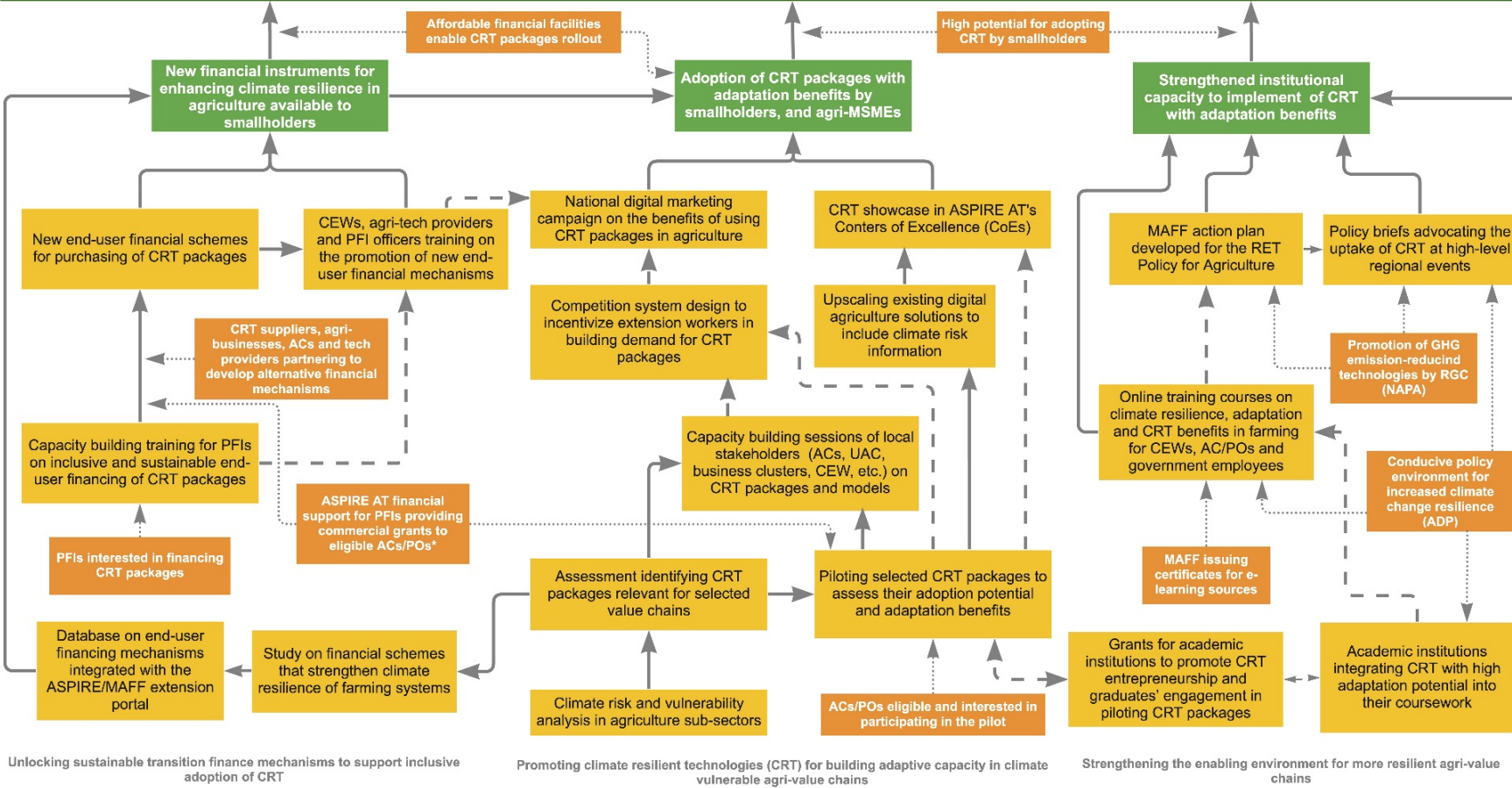
Anchoring itself to IFAD's ASPIRE-AT, CREA seeks to support and unlock the deployment of suitable climate resilient technologies up to the point where proven models can be demonstrated for scale to enhance the adaptive capacity of the Cambodian agriculture sector.

In the proposed alternative (with project) scenario, the large-scale adoption of climate resilient technologies will be supported by 1) developing and scaling up suitable CRT packages, then raising awareness and provide capacity-building around climate adaptation and CRT in the agriculture sector: 2) developing sustainable and inclusive financial schemes to facilitate the access to CRT for smallholder farmers and 3) strengthening the institutional and academic ecosystem of CRT. A combination of technical, research, market, and policy solutions to address the main barriers mentioned above will be deployed.

The following theory of change describes how the proposed interventions would achieve their intended outcomes and goal:

FIGURE 1. THEORY OF CHANGE DIAGRAM FOR THE CREA PROJECT

Strengthened farming systems and increased resilience of agri value chains to climate change effects



Smallholder farmers in Cambodia rely on value chains that are extremely vulnerable to increased temperatures, changes in rainfall patterns and spread of pests and diseases. These climate shocks negatively affect Cambodian domestic and export-oriented value chains leading to lack of competitiveness and lower incomes of smallholders. Substantial contributions to addressing these risks can be gained from integrating climate resilient technology (CRT) packages into the agri-value chains. CRT can provide blended adaptation and mitigation benefits to increase agricultural productivity and resilience of smallholder farmers. However, limited awareness of the climate adaptation benefits, lack of inclusive financial schemes, and inadequate institutional capacity hamper the demand for CRT in Cambodia.



*ASPIRE AT outcomes 1.1.1 and 1.1.2 aim to provide financial support to PO/smallholders with bankable investment proposals in productive and resilient assets

The theory of change presented above represents the intervention logic of the CREA project. Starting from the top of the diagram (dark green box) describes the intended impact the CREA project aims to support. Following that, the outcomes (green boxes) represent the proposed project intervention's long-term and immediate effects. The outputs (yellow) outline the planned results of the CREA project activities that will be achieved by the end of the project. The assumptions

throughout the diagram (orange) represent a number of testable hypotheses, which must hold true in order for the CREA project logic to work. The assumptions outlined were identified during the project identification stage and are built on top of the local context as well as previous and ongoing RET interventions in rural Cambodia. Lastly, the last section (red) summarizes the climate-related risks to food system stability in Cambodia and outlines key barriers to the adoption of climate resilient technologies.

CREA will work on increasing the resilience of agricultural value chains which are integrated into ASPIRE-AT and which have been assessed as highly vulnerable to climate change in national strategies and frameworks. These value chains are the following:

- Export-oriented value chains: premium traceable rice, processed fruits and nuts (mango, longan, cashew), cassava.
- Domestic-oriented value chains (but with import substitution effects and potential for future export): vegetables, livestock.

All activities will target actors and address climate vulnerability from production to distribution. The scope will be refined during the detailed design phase.

Component 1: Promoting climate resilient technologies (CRT) for building adaptive capacity in climate vulnerable agri-value chains

Business-as-usual scenario:

Under the business-as-usual scenario, CRT will likely remain poorly disseminated within the agriculture sector. Their uptake will be limited by a still low demand from farmers and their representatives, as well as limited collaboration within the value chains to implement suitable solutions – especially with the AC/PO and business clusters, which involvement is critical to disseminate CRT amongst smallholder farmers.

As a result, farmers and agri-businesses will remain strongly exposed to the risks triggered by climate change due to a poor adaptive capacity. They will likely more and more suffer from a decrease of their productivity, lower yield, increased losses of production and affected supply chains. Ultimately, livelihoods of many farmers, competitiveness of the Cambodian agricultural value chains and even food safety will be durably affected.

Moreover, when CRT are being used, a technological-limited approach will likely remain predominant. More holistic approaches (CRT packages) taking into account the specific situation of the farmer, potentially combining a CRT, some climate resilient agricultural practices and including capacity building and other suitable services, will continue to be marginal. Therefore, adaptation and economic benefits of CRT will remain limited, or even sometimes counterproductive.

Additional Costs (Indicative): USD 2,300,000 of LDCF financing

Co-Financing (Indicative): USD 6,460,000 results-based grants through the ASPIRE AT project and in-kind contribution from beneficiaries/end-users purchasing climate resilient technologies

Adaptation scenario:

Expected Outputs: CRT packages with proven adaptation/economic benefits for farmers/agri-businesses disseminated nationwide.

Component 1 offers to develop a robust set of CRT packages with demonstrated benefits and support their rollout. In close collaboration with ASPIRE-AT partners, especially AC, UAC, business clusters and extension services, at the benefit of farmers and agri-businesses' adaptive capacity. The proposed component will ensure the improvement of support services and capacity building to crop production resilient to climate change by promoting research, trials and up-scaling climate-smart farming systems that increase resilience to climate change and extreme weather events. The proposed approach will be fine-tuned during detailed design phase as follows:

1. To identify suitable CRT packages which maximize the benefits of CRT for farmers and agri-businesses, a first assessment will be done during the detailed design phase of the CREA, based on interviews with representative AC/PO, CRT suppliers, finance providers and relevant climate adaptation experts. Three main criteria will be prioritized to select the CRT packages relevant for the value chains selected: potential gains in terms of resilience for the farmer/agri-business, economic sustainability (payback period, adoption potential and distribution capacity) and social benefits such as gender inclusion.
2. This assessment will require to be complemented during implementation to better assess the demand, adoption potential and constraints of CRT packages. To do so, a representative sample of smallholder farmers, (semi-)commercial MSMEs, AC/POs, agri-businesses and Business Clusters will be surveyed. This additional study will also help to understand their post-Covid financial situation (level of indebtedness, level of collateral, etc.), their purchasing behaviours, their understanding of the climate vulnerability, their capacity building requirements in terms of CRT adoption and preferences in terms of financing mechanisms. These learnings will be crucial to fully understand the technical and financial needs of the farmers and agribusinesses, identify, test and scale-up suitable CRT packages in Component 1 and promote appropriate financial mechanisms in Component 2.
3. CREA will then support the testing of 10 CRT packages through the implementation of 20 to 30 pilot projects selected using the criteria set out by the assessment to test and assess in real conditions: 1- the capacity for CRT providers to combine their technologies with, when relevant, climate smart agricultural practices, training and capacity building services and financial services, 2- the adoption potential of end-users; and 3- the adaptation and economic benefits of these suitable CRT packages.

Example: solar water pumps can reduce dependence on rainfed agriculture and store water during dry season, enabling off-season horticulture production. Combining them with drip irrigation can ensure better nutrient and soil management through adoption of a CRT integrated in the farming system. IoT and smart water management solutions can also be integrated. Such package would require the collaboration of a solar water pump supplier, an irrigation solutions supplier

and technical expertise (extension service providers, AC/PO if properly trained) to help implementing the solutions efficiently.

To select potential AC/POs beneficiaries of the pilot project, based on the CRT packages identified, a first list of relevant AC/POs (according to their members' agricultural activities) or Business Clusters will be established. An assessment of their respective level of development (according to their maturity level assessed by ASPIRE-AT), of the main socio-economic profiles of the members and of their interest to participate will then be conducted. The final selection of the partners will be based on a thorough and transparent process, with three objectives: 1) Guaranteeing that all categories of farmers – especially the smallholder farmers – and agri-businesses are covered in the pilot projects; 2) Involving advanced and less advanced AC/PO, considering that they will face different challenges which need to be assessed for further roll-out; 3) Triggering a gender lens within the POs, including a significant amount of partner organization who include women in key leading positions. Selected partner organizations will then be supported to identify and fine-tune the CRT packages, design the pilot, aggregate relevant partners, obtain the financing necessary and implement the sub-projects.

ASPIRE-AT assessment criteria will also be used to design of each pilot, i.e. (1) commercial, financial and technical viability; (2) investment readiness and management capacity of the POs; (3) strength of partnership arrangements including technical support from agri-business partners to farmers and POs; (4) social inclusiveness (benefits to poor households, opportunities for women and for youth, etc.); and (5) environmental, climate and social risks (including accessibility). Each pilot will be informed by a climate risk and vulnerability analysis to assess how they can help to better adapt to increased temperatures, pest and diseases outbreak, extreme weather events or changes in rainfall patterns with the ultimate goal to limit damages for the farmers.

The financial model of each pilot will also be carefully designed in collaboration with the POs. ASPIRE-AT plans to operate a credit line combined with a result-based grant mechanism. In brief, the grant can be used to provide partial collateral guarantees to PFIs, which in turn provide commercial loans backed by the credit line. Once the primary loan is repaid, the grant is released for the PO as a result-based reward. This mechanism will be leveraged when POs can afford a loan. Otherwise, relevant alternative financial schemes, identified in Component 2, will be used. In addition, to facilitate the development of the packages and lower the risk of the testing stage for the organisations involved, CREA will provide an additional grant to partly cover the service component of each package (capacity-building, consulting to the farmer, etc.). After the detailed design, the support for the launching of the pilot project, the project team will closely document, monitor, evaluate the results, identify the successes as well as help to solve the difficulties.

These pilots will have multiple benefits. They will generate ground evidence of the benefits of suitable CRT packages to be leveraged during the dissemination stage. They will enable to identify technical, organizational, economical or financial challenges to their roll-out during the next phases. They will also help to assess the potential of digital in support to CRT, as well as financial schemes. These results will enrich the work of ASPIRE-AT's Centers of Excellence, the service offer of both UAC (unions of agriculture cooperatives) and extension services. Finally, the pilots will enable to develop a first robust network of adopters and service providers around different relevant CRTs.

In parallel to the implementation of these pilots, CREA will create a Gender Council^[2]. This council will be composed of gender "champions", active across and at various stages of the different agricultural value chains as well as part of the agriculture ecosystem. These women will be recruited through a specific call of interest. This council will advise on how to better integrate a gender lens into all the activities of the program. Importantly, it will support the integration of a pragmatic and result oriented gender-based approach during the capacity-building and awareness raising activities to both identify relevant relays and tailor key

messages to disseminate knowledge about climate change adaptation and CRT during roll-out. Members of the council will also be involved as key stakeholders to themselves design and implement action plans to support dissemination of knowledge around climate change adaptation, after having followed a training program on climate change adaptation, on leadership and public speaking. The specific organization and workplan of the council will be built during the detailed design phase.

4. CREA will then support the roll-out of CRT packages and associated partnerships models. This will likely be done in three different stages:

- The development of a rollout strategy based on the results of the pilot phase, on the results of an assessment of the successful awareness raising and behaviour change campaigns on climate change in agriculture, and the detailed collaboration activities with ASPIRE-AT that would have been agreed on during the detailed design of CREA.
- A first set of awareness raising activities about climate change and capacity-building sessions on CRT packages and models will be conducted within the framework of ASPIRE-AT towards all relevant partners (AC, UAC, business clusters, extension services) who won't have participated to the pilot phase. The objective will be to build a strong network of organizations and individuals to disseminate CRT packages efficiently.

Using the knowledge coming from the Gender Council initiative will work with extension services providers, provincial departments of agriculture, forestry and fisheries (PDAFFs) and departments of agricultural engineering but also potentially commune-level entities such as the women and children group to build farmers' awareness and motivation to purchase packages of climate resilient technologies and successfully change their practices in a sustainable way. Training and capacity building of technical advisors at PDAFF level, but also at the District Agriculture Offices (DAO) level, involving CEWs, will be organized and specific to each package, to increase their knowledge in adapting production system to the operation of the selected technologies. The project will collaborate with local authorities, especially CEWs, to develop participatory farm-level engagement (e.g. Farmer Field Schools, field demonstrations, meetings with multiple stakeholders) to enhance pro-active learning and participatory management. The deployment of the well-trained extension agents to provide tailored advisory services could also be facilitated through the design of a competition system to incentivize extension workers themselves in building the demand for climate resilient technologies packages (for example, through a system similar to the highly successful Civil Champion program put in place in the WASH sector to reach Open Defecation Free Provinces). In addition, improvement of extension services to farmers will include the use and scale-up of existing digital platforms that already contain technical information that can be easily disseminated to farmers (e.g.: Chamka App, Khmer Agriculture Suite Platform under SAAMBAT Project), including weather and climate risks information. In parallel, CREA will also work with the UAC and CoE in ASPIRE-AT to train trainers (ToT) being able to do capacity-building activities around climate change and CRT packages within their network of ACs or clients.

- The roll-out strategy will then go nationwide. Knowledge about the mitigation and adaptation benefits is still limited among farmers, requiring more training and wider dissemination activities. This requires greater activities to raise their awareness of the benefits that people can gain from for their daily life and agriculture production.

This component will include a marketing campaign to present the benefits of climate resilient technologies packages that can strengthen the resilience of agricultural value chains from production, processing and postharvest handling activities. To generate the public interest, agriculture technical training institutions, departments and technical units shall develop materials to publicize climate resilient technologies via all available means and platforms (digital tools, TV, radio, leaflet, technical brochure or display at trade fair). Developing media content on climate resilient agriculture and communicate it as widely as possible

throughout the country by using all available tools, including website and the popular social media platform will be conducted through the project's public extension system, namely, CEWS and PDAFFs whom will continue to play an active role in strengthening knowledge dissemination channels from national to provincial and village levels.

In addition, climate resilient technologies promoted in ASPIRE AT's Centers of Excellence (CoE) will enable demonstrating a wide range of technologies and become "neutral knowledge platforms" to guide farmers' investment choices in production and postharvest technologies. CoEs will seek to complement the national digital marketing campaign and offer a perfect opportunity to showcase benefits to farmers and inform their purchasing decision. Awareness raising will be coupled with capacity-building activities towards local authorities, CRT suppliers, donors, NGOs working in the sector on both climate resilience, CRT packages and sustainable and inclusive finance key learnings obtained in Component 2.

ASPIRE has developed innovative M&E systems and user feedback loops that directly informed the project interventions to reach the intended targets as set out in the ASPIRE Logical Framework. Programme budgeting performance measurement system, collected by CEW and directly feeding into the ASPIRE MIS system allowed for real-time interaction with representatives of beneficiaries and front-line extension workers on the ground. In addition, S-RET MIS system developed an online interactive map and online database with exact GPS location of all technology installations (including the ASPIRE business clusters). Such ICT based monitoring functions could be mainstreamed throughout the new interventions.

Component 2: Unlocking sustainable microfinance products to support inclusive adoption of CRT

Business-as-usual scenario:

The National Council for Sustainable Development (NCSD) estimated the adaptation finance gap in Cambodia up to USD300 million in the agriculture sector^[3]. In particular, there is a need for the private sector to step in and provide funding to address major climate risks in agricultural value chains^[4].

In the business-as-usual scenario, both smallholder farmers and more commercial actor such as (semi-) commercial and agri-businesses won't be able to afford CRT packages, mainly due to the high upfront costs. They will have a limited capacity to borrow since their profile will continue to be assessed highly risky by financial institutions active in agriculture (mostly MFIs, ARDB, Acleda) – either because their incomes depend on activities increasingly vulnerable to climate change and dependent on climate sensitive factors (water, soil, etc.), or existing debt/lack of collateral, or just because of lack of understanding of their risk profiles. If they eventually manage to take a direct loan to acquire CRT or CRT packages, they may be struggling to repay it, should their financial solvability be overestimated and/or any unexpected event occur, hindering repayment capacity (e.g. floods resulting in production losses, medical issues, etc.). With a quasi-absence of safeguards such as guarantee mechanisms and insurance schemes, initiatives originally oriented towards increased resilience farmers through the acquisition of CRT would then have the opposite effect to add financial vulnerability on top of climate vulnerability, in a vicious cycle which has recently been documented^[5].

In parallel, other financing options will likely remain limited due to the poor development of alternative mechanisms to direct lending to acquire CRT packages, such as leasing, wholesale lending, PAYGO, fee-for-service, contract farming, etc. and the limited collaborations between CRT suppliers, financial institutions/fintechs and agriculture organizations (AC, UAC, Business clusters, extension services). Ultimately, CRT will be largely restricted to strong (semi-)commercial farmers and agri-businesses.

Additional Costs (Indicative): USD 1,644,000 of LDCF financing

Co-Financing (Indicative): USD 5,000,000 in blended finance with contributions from Partner Financial Institution (PFI) and IFAD line of credit from ASPIRE AT components 1.1 and 2.1

Adaptation scenario:

Expected Outcome: Existing or innovative financial instruments used to enhance climate resilience in agriculture

CRT packages rollout requires to rely on large-scale financial facilities to be affordable for smallholder farmers. Recent initiatives to develop such facilities in Cambodia and preparatory interviews have revealed a series of bottlenecks (deficit of knowledge and tools in the MFI sector, low links between suppliers and AC, etc.) which CREA proposes to overcome through direct collaboration with partner financial institutions (PFI), CRT suppliers and agriculture organizations. The end-goal is to unlock sustainable and inclusive finance to support the large-scale adoption of CRT packages through concrete project financing.

1. As a first stage, relevant data will be compiled to orientate the activities of Component 2. The results of both the needs assessment and pilots in Component 1 will be leveraged to identify relevant alternative mechanisms to lending to be developed/scaled-up through CREA. Existing offers provided by the financial sector will also be compiled to map potential gaps in the financial supply, to be filled with PFIs. A comprehensive database of loan conditions, payment terms and local PFI branches, end-user financing mechanisms, will be developed for further dissemination to key stakeholders. The database will be integrated in the extension portal of the MAFF/ASPIRE website^[6].

2. To develop and sustain financial options on the market, technical assistance to ASPIRE-AT's FIs (but not only), and especially MFIs, will be provided. MFIs play a more and more critical role in the financing of agriculture investments. Still, increased concerns around their contribution to over-indebtedness situations in rural areas of Cambodia call for a careful selection of the financial partners. A Call for Expressions of Interest will enable to identify high-potential financial partners willing to reinforce their activity in agriculture climate adaptation, with their compliance with ESG standards and sustainability of existing practices will be verified. As described below, financial partners will receive financial support (through blended finance) coupled with technical support. During the preparation

phase of this concept note, several MFIs such as Chamroeun already expressed interest in receiving support to better understand the market potential for climate resilient technologies, strengthening their capability to undertake climate risks and vulnerability assessments and develop more suitable products. The call will likely be opened to fintechs, as companies such as Boost Capital can provide interesting solutions to reach out to farmers.

The support to PFIs will focus on both developing their activity in climate adaptation of agriculture and guaranteeing the sustainability of these developments, taking into consideration their different level of maturity on these topics. Recent surveys have shown that if FIs are willing to engage more into the financing of CRT, they lack deep knowledge on climate adaptation challenges, agriculture market data and a clear vision of the implications of climate adaptation and related solutions on their existing operations. Therefore, this technical assistance to financial partners will aim to leverage private investment towards CRT through: 1) Deciphering the challenges related to climate change and its consequences for the adaptation of the agricultural value chains; 2) Understanding CRT and CRT packages' economics and market potential; 3) Understanding agricultural organizations (AC, UAC, business clusters) and working modalities with such partners; 4) Understanding CRT suppliers and CRT supply chain; 5) Adapting/securing due diligence processes and other loan procedures to better integrate climate risks and CRT. As situations of over indebtedness can result from a wrong risk assessment during due diligence, a specific support will be oriented towards loan officers and local branches to help them better decipher farmers' profiles and investment plans in the field of climate adaptation. Ultimately, PFIs would be supported to develop new products such as wholesale lending to agricultural cooperatives, financial leasing targeting CRT investments and climate insurance. These products are often more adapted to smallholder farmers as they significantly reduce the potential financial burden while lowering credit risk. Still, limited or no options exist on the market despite increased interest from FIs.

Collaboration will also be explored with one of the leading MFIs, AMK, given it has been selected as partner to IFAD's Non-Sovereign Operations (NSO) project with plans to develop a line of credit worth USD 500,000 for climate adaptive irrigation. Further consultations will be required to better understand AMK's bottlenecks and real potential in the field of CRT. Other financial institutions such as LOLC, ARDB or SME Bank will also be important stakeholders because of their outreach capacity in the rural areas or towards the agri-MSMEs.

In parallel, the project will broker partnerships between technology providers, interested PFIs and other relevant partners such as agriculture organizations to design and test alternative financial mechanisms to direct lending.

Example, Tropicam Fruit and Vegetables, a Cambodian manufacturer, processor and exporter of local fruits and vegetables, has launched a contract farming mechanism with partner agricultural cooperatives to equip smallholder farmers with nethouses and drip irrigation. The company supports them through technical advice to maximize the benefits of these CRT.

These types of high-potential schemes, with vertical or horizontal integration, are only at their infancy in Cambodia. The Call of Expression of Interest mentioned above will be opened to innovative financial partnerships towards the adoption of CRT packages by smallholder farmers. Applicants will likely be CRT suppliers, agri-businesses or AC/business clusters directly. Such finance schemes will not solely cover technology upfront costs but will address general financing needs related to the adoption of climate-resilient practices supported by RET (potential development, transition and maintenance costs). A climate risk and vulnerability analysis, integration of adaptation measures and specifications of climate resilient practices will inform selection of investments. Several high-potential transition

schemes might be explored such as contract farming, fee-for-service, PAYGO, value chain financing or Fintech solutions. Operationalizing these schemes will enable to better understand their potential and limitations in the Cambodian context, select the most interesting in terms of climate adaptation depending on the type of beneficiaries and identify key success factors for their scaling up.

3. Alongside working on sustainable financing schemes, CREA will also work with applicants to ASPIRE-AT result-based grant mechanism to integrate a CRT component. They will be supported to assess if adding one or several CRT packages to their initial project can make sense economically and bring adaptation benefits. Complementary to the other activities mentioned above, which will enhance the financial sustainability of the sector in the mid-longer term, it will leverage concrete short-term opportunities to increase the adoption of CRT within ASPIRE-AT. It will also strengthen the projects applying to the grant mechanism, at the benefit of the ASPIRE-AT program and the end beneficiaries, the farmers and agro-businesses. Learnings from the demonstration pilots will enrich this activity, which will be leveraged as well to enrich the pilots.

4. Finally, CREA will aim at a large-scale adoption of the sustainable financing practices and schemes tested above. Through blended finance approaches (line of credit, risk sharing agreement, guarantees, results based financing etc.), the aim will be to provide more confidence to PFIs in order to expand their loan portfolio to integrate CRT packages and amplify local private investment towards climate adaptation in agriculture. An awareness raising campaign will be carried on in close coordination with the campaign in Component 1 to maximize synergies. The messages will be built on the key messages extracted from the work conducted with PFIs and other stakeholders on the development of sustainable financial solutions. It will mainly be focused on financial challenges to access to CRT, financial literacy around CRT investment and the potential of alternative mechanisms. It will establish a strong basis for these financial practices and innovations, contributing to unlocking the adoption of CRT packages at a large scale.

Component 3: Strengthening the enabling environment for more resilient agri-value chains

Business-as-usual scenario:

In the business-as-usual scenario, the ecosystem around CRT in agriculture will not be strong enough to promote a long-lasting adoption of these technologies in Cambodian agriculture. In particular:

1- Even with a strong emphasis on adaptation in Cambodian strategies and action plans, the regulatory environment will likely remain non conducive to the usage of CRT, especially solar, for productive usage in agriculture in the next 5 to 10 years. Experts interviewed for this concept note are expecting some positive changes for the garment industry, under the joint pressure of its main stakeholders, but it will be a long way to go without any collective policy dialogue initiatives in the agriculture sector.

2- Human resource development will continue to be weak, due to the absence of curriculum bridging agriculture and CRT packages. Struggling to recruit suitable profiles, CRT suppliers, extension services and ACs will face difficulties to maintain and develop a skilled workforce.

3- R&D will remain limited, with only limited resources provided towards innovation in the sector of climate resilience technologies. Also, connections between the academic sphere and the private sector (major CRT suppliers, AC/PO's, BCs etc.) may remain weak, limiting technology collaborations and transfers.

These three bottlenecks will hamper the development of a strong offer and rollout of CRT packages in the short and longer term.

Additional Costs (Indicative): USD 379,000 of LDCF financing

Co-Financing (Indicative): USD 100,000 in-kind contribution from beneficiaries and academic institutions promoting research into RET

Adaptation scenario:

Expected Outcome: Institutional and human capacities strengthened to identify and implement climate resilient technologies with adaptation benefits

Component 3 aims at improving policy dialogue and capacity building of public institutions on climate resilient technologies in the agriculture sector in Cambodia. The need to put a stronger emphasis on institutions and the inclusion of the public sector emerged as a key lesson learnt from the S-RET project, whose engagement of MAFF and PDAFFs, through the Technical Working Group on Climate Change, Agriculture, Forestry and Fisheries (TWG-CCAFF) lacked in efficiency and impact. The TWG-CCAFF is a body providing coordination between the Ministry of Agriculture, Forestry and Fisheries and development partners with mission relating to agriculture and environment. This working group is led by MAFF's Secretary of State, who is also deputy chairperson of the National Council on Sustainable Development (NCSD) chaired by Ministry of Environment. Representatives of Ministry of Environment are also present in this technical working group.

The policy component builds on the baseline scenario supported through S-RET that currently there is a large unmet potential for adoption of climate resilient technologies by Cambodian smallholders, and a policy environment that, while generally favourable, does not fully reflect the potential adaptation benefits of promoting climate resilient technologies and most specifically those powered by renewable energy through better engagement and linkage with private sector entities and PFIs.

Given the importance of climate resilient technologies in agricultural value chains, MAFF will play the leading role with support from the following bodies:

1. Royal University of Agriculture, Prek Leap Agriculture Institute, and National Institute of Agriculture in Kampong Cham, all of which are public institutions;
2. Department of Agriculture Engineering of General Department of Agriculture;

3. Department of Agricultural Extension, Forestry and Fisheries shall take the lead in the outreach campaign, through multiple platforms, in order to encourage a wider use by small, medium and large-scale farmers across Cambodia.

4. Cambodian Agricultural Research and Development Institute (CARDI) and Institute of Technology of Cambodia (ITC) contribute to RET research and development in terms of means, materials and tools in order to enable modernization of agriculture production and processing.

These institutions should be granted greater duties to do CRT research, including designing and developing machinery, accessories and equipment for use in agriculture production and processing that constitute the core aspects for enhancing development of the sector.

Training courses will be developed for relevant government agencies at national and provincial levels to support awareness raising and capacity building on climate resilience in the agriculture sector, thereby complementing aforementioned efforts of awareness raising for ASPIRE partners, FIs and end-users to build awareness at all levels. The growing internet usage and the willingness of the government of Cambodia to strengthen digital literacy create an opportunity for lowering the costs for capacity building activities through Massive Open Online Courses (MOOCs). While MOOCs are slowly being adopted among Cambodian university students for self-directed learning through platforms like Coursera and Khan Academy (Corrado et al., 2021), the Covid-19 pandemic has extended the trend of distance learning to the agriculture sector.

Through the support of the ASPIRE programme, Prek Leap National Institute of Agriculture (PLNIA) developed and implemented instructor-led online courses for CEWs. As a public higher education institution established by MAFF, PLNIA was able to issue government-approved certificates to CEWs upon course completion. This component will expand collaboration with other academic institutions to support the inclusion of CRT and CRT packages in respective curriculum of leading universities (e.g. Royal University of Agriculture, Kampong Cham National School of Agriculture, and PLNIA). At present, curriculums in energy engineering and agronomy fail in teaching students about the opportunity that climate resilient agriculture can represent in the agriculture sector. E-learning modules will thus be created on their use in the agriculture sector, which would ideally be considered as certifying by MAFF and the Ministry of Education. The project will work with universities in the integration of these modules in their existing curriculum, to build a cadre of youth with technical skills and capacities in the water management, renewable energy, agriculture and agro-processing sectors.

To ensure that the knowledge of the climate adaptation benefits of climate resilient technologies in farming systems is extended and regularly updated towards ACs, POs, and CEWs, CREA will also explore the development of focused micro-courses by collaborating with civil society organizations such as IT Academy STEP. To that purpose, the CREA-developed syllabus could be adapted to fit the requirements of demand-driven mobile-focused learning. The micro-course's potential delivery through a Telegram chatbot will provide an opportunity to scale knowledge on climate resilience to CEWs, ACs and POs nationwide. Thanks to Telegram's widespread popularity in Cambodia, the micro-course could simultaneously serve as an awareness-raising tool, contributing to the digital awareness campaigns supported through Component 1.

In parallel, small R&D grants to academic institutions will be provided to support enhancing of facilities and laboratories, validate on the techno-commercial aspects of climate resilient technologies (quality assurance), promote business incubator initiatives to increase engagement in entrepreneurship or to offer apprenticeship opportunities for fresh graduates, especially if it linked to one of the pilot project or a concrete CRT adoption identified or implemented in

component 1. Applications of academic institutions will be solicited through a call for proposals. Each proposal will be reviewed against a developed standardized list of criteria, to define the grant amount allocated (up to USD 50,000 maximum), and which will vary depending on expected results. This mechanism will also likely be leveraged to conduct useful R&D developments with relevant academic, CRT suppliers, AC/POs and/or buyers to overcome bottlenecks identified during the pilots in Component 1.

In addition, the efforts under this component seek to continue strengthening the work under S-RET, which led to the development and endorsement by the MAFF Minister on the policy “Promoting the Use of Renewable Energy Technology in Agriculture 2021-2030”. CREA will continue to support this process by developing an action plan accompanying the RET policy which represents a tremendous opportunity in the current heavy regulatory barriers to the use of RET. Relevant line ministries, departments, and technical working groups will be brought together to address cross-sectoral issues linking agriculture, energy and poverty, income generation and youth employment. The project will continue strengthening technical and institutional capacities in conducting climate change impact assessments and climate change projections, and including climate change in sectoral and sub-sectoral development plans.

Outputs of component 3 include the development of an action plan for MAFF for the recently endorsed policy on RET in agriculture, the inclusion of climate resilient technologies with high adaptation potential in the course syllabus of 3 academic institutions in Cambodia, preparation of 2 policy briefs (or similar) advocating for policies to promote uptake of climate resilient technologies and their dissemination through high-level events and the completion of at least 5 training courses for relevant government agencies at national and provincial levels to raise awareness of climate change impacts, vulnerability and adaptation.

Monitoring & Evaluation

Additional costs (indicative): US\$306,000 of LDCF financing

Expected outcome: Project progress and results systematized to improve management, promote learning, and support upscaling of best practices

In the proposed CREA project, M&E has three purposes: (a) To provide the information needed by project management to ensure efficient and effective delivery of the project outputs; (b) To measure the progress towards the project objectives by measuring the indicators defined in the Logframe; and (c) To learn lessons from implementation in order to influence policy formulation and allow successful innovations to be scaled up. Monitoring of CREA components 1 and 2 will be linked with ASPIRE-AT’s M&E system. The TWG-CCAFF will be responsible to monitor and report on physical progress and results of Component 3. Outputs to this component include project progress and results systematized to improve management, promote learning, and support upscaling of best practices. Careful monitoring of technical performance, gender-disaggregated economic and adaptation impacts of CRTs and associated agriculture applications will be supported. An indicative budget of US\$306,000 has been proposed although some adjustments may be necessary based on the detailed implementation plan and M&E indicators, which will be developed during the PPG phase for measuring the impacts of project activities.

[1] *Building Adaptive Capacity through the Scaling-Up of Renewable Energy Technologies in Rural Cambodia selected as a [GEF Good Practice Brief](#)*

[2] Cambodia's updated Nationally Determined Contribution (NDC) highlight the importance of "women champions" as key to better tackle climate change. NDC priorities also include increase women's income generation while decreasing their work burden by improving agricultural practices and access to technology as well as fostering women's collective working groups. CRT benefits for women are important, for example: time saved from collecting natural resources, leading to increased productivity and improved incomes; increased food and nutrition security through home gardening; reduction in respiratory diseases and eye infections through adoption of biogas.

[3] Workshop on "Implication of the Development of Sustainable Capital Market in ASEAN to the Development of Sustainable bond Market in Cambodia", NCSD, 2022.

[4] *Annual Report 2021*, Global Facility for Disaster Reduction and Recovery (GFDRR), 2022.

[5] *Microfinance, over-indebtedness and climate adaptation, New evidences from rural Cambodia*, Royal Holloway, University of London, 2022.

[6] <https://aspirekh.org/>

Coordination and Cooperation with Ongoing Initiatives and Project.

Does the GEF Agency expect to play an execution role on this project? No

If so, please describe that role here. Also, please add a short explanation to describe cooperation with ongoing initiatives and projects, including potential for co-location and/or sharing of expertise/staffing

Other associated baseline projects that will cooperate with the proposed project include:

Accelerating Inclusive Markets for Smallholders (AIMS; 2017 – 2023). The project works with smallholder farmers and their producer groups or agricultural cooperatives, traders/agribusinesses, MSMEs, service enterprises and agro-processors/industry associations to promote agricultural value chain development. Its main focus is on commercialization of agricultural commodities and products. The value chains on which it has been working are vegetables, cassava, backyard/native chickens, rice and raw silk. In order to support these value chains, credit and matching grants are made available for various target groups. The additional value AIMS project brings to the proposed LDCF proposal is the market space it can create for technology providers through the approximately 500 POs with active contracts with buyers accounting for USD 57 million in sales. Many more such POs and contracts are in the pipeline spanning a range of key commodities: chicken, vegetables, cassava and premium traceable rice.

Sustainable Assets for Agriculture Markets, Business and Trade Project (SAAMBAT; 2019-2025). The development objective of SAAMBAT is to stimulate rural productivity and enterprise development. The project is implemented by the Ministry of Rural Development (MRD) and targets about 200,000 rural households to benefit from investments in value chain infrastructure (rural roads, rural markets, infrastructure facilities, water management schemes, etc.) and skills, technology and enterprise development (building technical skills for rural youth and supporting dissemination of digital technologies).

Cambodia Agricultural Sector Diversification Project (CASDP; 2019 -2025), implemented in 12 provinces by MAFF, MEF, MDR and MoWRAM. The project is supporting (i) agricultural value chain development of agricultural cooperatives/ producer organizations and small and medium agribusinesses by facilitating their partnership and building their business development capabilities; (ii) collective/public infrastructure and farm-to-market roads; and (iii) information

systems and food quality and safety control and management.

Climate Friendly Agribusiness Value Chains Sector Project (ADB; 2019 – 2025). The project is implemented in 4 provinces and focuses on four major agricultural value chains: rice, maize, cassava and mango. The project's support is directed towards (i) agricultural cooperatives/farmer organizations and agribusinesses in productivity improvement and diversification; (ii) food quality and safety control and management; and (iii) storage, processing and export capacity. It also supports climate resilient agriculture infrastructure; promotes the applications of solar energy and bioenergy; and enhances technical, institutional and policy capacity and environment that will contribute to the development of the four selected value chains.

Other Projects:

Baseline programme: The National Biodigester Programme (NBP) is a programme of MAFF with the Department of Animal Health and Production as the advisory and coordinating agency. The new vision under the Policy on Biodigester Development in Cambodia (2020-2025) sets to achieve 43,000 units by fiscal year 2025 with involvement of line-institutions, development partners, private and public sector. Following the strong collaboration with NBP under the S-RET project, involvement under CREA will be strengthened especially for semi-commercial biodigesters through introduction of larger models (20 – 120 m³) for waste management and/or energy production for agro-processing activities. The NBP provides a baseline to which additional value can be added through biogas construction agents (BCA). The approach relies on BCA sustainability to run biodigester installations including the appliances supply chain (stoves, heaters, machinery etc.).

UNEP's Women for Climate-Resilient Societies, EmPower (2018-2022). Implemented regionally across Asia and the Pacific in Bangladesh, Cambodia and Vietnam, the project supports 300 women entrepreneurs using renewable to improve productivity in existing value chains (powered water pumps to improve agriculture and horticulture in drought prone areas, solar energy for crop drying, agro-processing, handicraft making, poultry). The project also builds the capacity of women in sales and supply of solar and biomass technologies. EmPower's partner for agricultural training and capacity building for women entrepreneurs and small-scale businesses is the ASPIRE programme and the partner for market linkages is the AIMS project, both of which are CREA associated projects.

Switch to Solar (2020-2024) is an EU-funded project, promoting solar technologies in provinces around the Tonle Sap to improve the competitiveness and climate resilience of the agriculture and fishery sectors. This project is i) building connections between financial institutions and solar technology providers; and ii) establishing demonstration sites to test and monitor solar technologies and innovative financial mechanisms at a pilot scale.

Core Indicators

Project Core Indicators		Expected at PIF
1	Number of direct beneficiaries (sex disaggregated)	<ul style="list-style-type: none"> - 30,000 smallholder farmers/ (semi-) commercial farmers that are members of agricultural cooperatives (ACs) have more resilient physical and natural assets (15,000 men and 15,000 women) - 10,000 farmers are benefiting from CRT packages with diversified and strengthened livelihoods and sources of income (5,000 men and 5,000 women)
2	(a) Area of land managed for climate resilience (hectares)	<ul style="list-style-type: none"> - 20,000 hectares of agricultural land - 10 new adaptation technologies supported
3	Number of policies/plans/frameworks/institutions for to strengthen climate adaptation	<ul style="list-style-type: none"> - MAFF action plan for the Renewable Energy in Agriculture policy developed and strengthened to mainstream climate resilience at national and sub-national level - Three institutional partnerships established or strengthened with academic institutions to integrate modules on climate resilient technologies with high adaptation potential into their course syllabus. - 7 climate risk and vulnerability assessments conducted
4	Number of people trained or with awareness raised (sex disaggregated)	<ul style="list-style-type: none"> - 200,000 beneficiaries made aware of climate change impacts and appropriate adaptation responses with nation-wide digital marketing campaign (targeting both women and men) - - Relevant government agencies at national and provincial levels completed 5 training courses

		on climate change impacts, vulnerability and adaptation
5	Number of private sector enterprises engaged in climate change adaptation and resilience action	<ul style="list-style-type: none"> - 20 agri-MSMEs incubated/accelerated with technical assistance, financial matchmaking, and/or direct financing - 10 entrepreneurs supported for climate adaptation and resilience (sex disaggregated) - US\$500,000 total financial value of lines of credit and/or investment funds mobilized with selected financial institutions (FIs) / CRT providers

Meta Information - LDCF

LDCF **true**

SCCF-B (Window B) on technology transfer

false

SCCF-A (Window-A) on climate Change adaptation

false

Is this project LDCF SCCF challenge program?

false

This Project involves at least one small island developing State(SIDS).

false

This Project involves at least one fragile and conflict affected state.

false

This Project will provide direct adaptation benefits to the private sector.

true

This Project is explicitly related to the formulation and/or implementation of national adaptation plans (NAPs).

false

This project will collaborate with activities begin supported by other adaptation funds. If yes, please select below

Green Climate Fund

false

Adaptation Fund

false

Pilot Program for Climate Resilience (PPCR)

false

This Project has an urban focus.

false

This project will directly engage local communities in project design and implementation

true

This project will support South-South knowledge exchange

false

This Project covers the following sector(s)[the total should be 100%]:*

Agriculture	30.00%
Nature-based solutions	30.00%
Climate information services	0.00%
Coastal zone management	0.00%
Water resources management	0.00%
Disaster risk management	0.00%
Other infrastructure	0.00%
Tourism	0.00%
Health	0.00%
Other (Please specify comments)	
SME/Private sector	40.00%
Total	100%

This Project targets the following Climate change Exacerbated/introduced challenges:*

Sea level rise	Change in mean temperature	Increased climatic variability	Natural hazards
false	true	true	true
Land degradation	Coastal and/or Coral reef degradation	Groundwater quality/quantity	
false	false	true	

Core Indicators - LDCF

CORE INDICATOR 1	Total	Male	Female	% for Women
Total number of direct beneficiaries	40,000	20,000.00	20,000.00	50.00%
CORE INDICATOR 2				
(a) Area of land managed for climate	20,000.00			

resilience (ha)
(b) Coastal and
marine area
managed for climate
resilience (ha)

0.00

CORE INDICATOR 3

Number of
policies/plans/
frameworks/institutions
for to strengthen
climate adaptation

3.00

CORE INDICATOR 4

Number of people
trained or with
awareness raised

200,000

Male

100,000.00

Female

100,000.00

% for Women

50.00%

CORE INDICATOR 5

Number of private
sector enterprises
engaged in climate
change adaptation
and resilience

30.00

Risks to Project Preparation and Implementation

Summarize risks that might affect the project preparation and implementation phases and what are the mitigation strategies the project preparation process will undertake to address these (e.g. what alternatives may be considered during project preparation-such as in terms of consultations, role and choice of counterparts, delivery mechanisms, locations in country, flexible design elements, etc.). Identify any of the risks listed below that would call in question the viability of the project during its implementation. Please describe any possible mitigation measures needed. (The risks associated with project design and Theory of Change should be described in the "Project description" section above). The risk rating should reflect the overall risk to project outcomes considering the country setting and ambition of the project. The rating scale is: High, Substantial, Moderate, Low.

Risk Categories	Rating	Comments
Climate	High	The agriculture sector is particularly vulnerable to changes in weather patterns as it suffers from a low adaptive capacity. An increase in the frequency of very hot days (>35°C) is likely to limit water resources, increase soil erosion and reduce yields. Similarly, poor infrastructure would lead to high post-harvest losses. Climate resilience and competitiveness of the agricultural sector are also hampered by the current mix and use of energy.
Environment and Social	Moderate	Farmers will adopt climate resilient technologies, switching from traditional practices using conventional energy sources, if they can see positive benefits (e.g. convenience in term of usage, economic interest, etc.). Education, experience, and financial security are all part of the mix that allows the benefits to be evaluated against the risks. The project will address these needs through awareness raising, demonstration and capacity building activities aimed at equipping smallholder farmers with the required knowledge and skills needed to understand the full potential.
Political and Governance	Low	Risks associated with socio-political environment are judged to be low. Cambodia has achieved lower middle-income status in 2015 and is building towards achieving upper middle-income status by 2030 based on garment exports and tourism. The country achieved an average annual growth rate of 7.7 percent between 1998 and 2019, making it one of the fastest-growing economies in the world before being heavily affected by Covid-19 which negatively affected its three main economic sectors (tourism, manufacturing exports, and construction)

Macro-economic	Low	The CREA design will monitor potential risks and implications of the Ukraine war as it may have significant effects through increased fuel costs, disrupted global supply chains and, in the agriculture sector, fertiliser costs. Overall, a resurgence of Covid-19 could affect the project through domestic economic impacts or through impacts on export markets. International economic recession might also reduce potential market size for some export commodities. The project will partially mitigate trade-related macro risks by focusing on domestic value chains which are likely to be less severely affected and contributing toward green recovery. An updated assessment of this risk will be made at detailed project design. Most technology providers in Cambodia are at the development/growth stage. Thus, they are exposed to high risk with difficulties to access finance or challenges to structure themselves. This can hinder the development of an adequate supply of climate resilient technologies and its matching with local demand. The project will bring both technical and financial support to equip the developers and work on the added value of their offer. Capacity building in climate resilient agriculture will also be supported to contribute to the emergence of new valuable products and services on the market.
Strategies and Policies	Low	The policy environment is not particularly favourable to the development of climate resilient technologies, in particular solar. Still, ambitious targets have been set at a national level to tackle climate change, which could lead to positive changes in the future. Moreover, major stakeholders and industries such as the garment sector are currently calling for an easier environment to increase the uptake of solar energy in Cambodia. At its scale, the project will pay attention to regularly consult and involve relevant governmental bodies, as well as trigger policy dialogue with other countries in the Mekong region.
Technical design of project or program	Low	Cost-benefit analysis shows that the performance is directly correlated to the quality of the technology, its appropriate use by farmers and timely after-sales services. Yet, technical knowledge remains varied among different stakeholders, which could hinder the sustainable development in Cambodia. To tackle this challenge, specific activities of the project will be focusing on capacity building of technology providers and extension service agents, and direct support to the agri-MSMEs (through maintenance tools for example). The focus will be to improve the skills of the whole ecosystem.
Institutional capacity for implementation and sustainability	Moderate	The risk to the project outcomes stemming from changes in the national institutional framework and governance is judged low. Most technology providers in Cambodia are at the development/growth stage. Thus, they are exposed to high risk with difficulties to access finance or challenges to structure themselves. This can hinder the development of an adequate supply and its matching with local demand. The project will bring both technical and financial support to equip the developers and work on the added value of their offer. Capacity building in climate adaptation for agriculture will also be supported to contribute to the emergence of new valuable products and services on the market.
Fiduciary: Financial Management and Procurement	Low	On fiduciary aspects, project monitoring, cash management and financial reporting would be conducted by the relevant units of MAFF-PSU whom are familiar with the financial management and procurement aspects and therefore this risk is considered low.

Stakeholder Engagement	Low	<p>Innovative mechanisms are at the pilot stage in Cambodia. To overcome potential barriers to their dissemination, the project will work on a wide range of mechanisms and pay close attention to any legal or financial requirements. Their dissemination should be facilitated by the willingness of the technology providers and some major financial institutions to innovate in this sphere. Moreover, the post-Covid financial situation of the agri-MSMEs will be thoroughly assessed through the project to ensure that innovative financial solutions are implemented given that the Covid-19 pandemic has put additional pressure on agri-MSMEs, such as burdens of compliance, shortages of skilled labour and markets, as well as the lack of access to finance and supporting infrastructure.</p>
Other	Low	<p>COVID-19 Risk: Overall, Cambodia's agriculture sector has proved resilient during the Covid-19 pandemic. Agriculture sector growth, particularly based on increasing exports through formal channels and taking advantage of recent trade agreements, is a key element of GoKC's strategy for post-pandemic recovery. The country managed the Covid-19 pandemic well, with around 3,000 deaths reported, and about 81% of the population vaccinated. However, the pandemic led to a near halt in international tourism and heavily impacted domestic retail services. Many migrant workers lost employment and returned to Cambodia during 2020, resulting in increased unemployment and reduced incomes from remittances. According to the Ministry of Social Affairs, Veterans and Youth Rehabilitation, there were 496,771 households registered in the ID Poor system before the Covid-19 pandemic. During the pandemic, two hundred thousand new households have registered on the government's on-demand ID Poor system, corresponding to a 60% increase in less than a year (from May 2020 to March 2021). To mitigate these challenges, the government released social transfers, as support for ID Poor households through the national Covid-19 cash transfer emergency programmes for the most-affected families. The risks from Covid-19 have been incorporated into the design and aligned with mitigation strategies reflected in the Agriculture Development Policy (ADP) specifically for Recovery, Reform and Resilience (3R) to develop a more commercial and export-oriented agricultural sector. In addition, the CREA project will support climate adaptation and resilience benefits particularly in value chains (VCs) based on smallholder production, to achieve the scale and consistent quality of produce meeting the needs of export and domestic markets. Mitigation strategies incorporated into the design will include an emphasis on developing innovative financial instruments and taking advantage of the rapid impact of digitalization in the agricultural sector, especially in the context of the Covid-19 pandemic.</p>
Financial Risks for NGI projects		
Overall Risk Rating	Moderate	<p>The project will assess the technical/physical results and financial achievements of the project based on the contract agreements stipulated between MAFF and technology providers, including renewable energy companies, and including alignment with GEF policies and strategies, attainment and measurement of global environmental benefits and mobilisation of co-financing.</p>

C. ALIGNMENT WITH GEF-8 PROGRAMMING STRATEGIES AND COUNTRY/REGIONAL PRIORITIES

Describe how the proposed interventions are aligned with GEF- 8 programming strategies and country and regional priorities, including how these country strategies and plans relate to the multilateral environmental agreements.

Confirm if any country policies that might contradict with intended outcomes of the project have been identified, and how the project will address this.(max. 500 words, approximately 1 page)

Cambodia is a signatory country of the United Nations Framework Convention on Climate Change (UNFCCC) since 1996. In 2020, Cambodia submitted an updated Nationally Determined Contribution (NDC) and has identified agriculture as one of the most vulnerable sectors along with water resources, forestry, coastal zones, and human health. The overarching policy document guiding the strategy of the Royal Government of Cambodia (RGC) is the Rectangular Strategy for Growth, Employment, Equity and Efficiency, currently in its fourth phase for 2019-2023 (RS-IV). The RS-IV places promotion of the agriculture sector and rural development including strengthening of the agro-processing industry, promotion of vegetable production to substitute for imports, promoting exports, improved land management and investment in irrigation systems. All these areas can benefit from linkages with climate change and accelerating the transition to a climate-resilient, low-carbon sustainable development.

The Agriculture Sector Master Plan (ASMP) 2030 was also identified as a policy priority in RS-IV and was prepared with assistance from the IFAD-ASPIRE project. The ASMP sets the development goal “to increase agricultural growth with high competitiveness and inclusivity by providing high quality products which result in food safety and nutrition by taking into account sustainable land, forestry and fisheries resource management”. One of the ASMP objectives is to enhance agricultural value chains and their competitiveness. The Policy on Agriculture Extension in Cambodia (PAEC), recently updated with support from IFAD-ASPIRE commits Cambodia to developing a pluralistic extension service and this is consistent with CREA’s implementation modalities, which promote public private collaboration for providing extension services to farmers.

The proposed LDCF proposal is aligned to the GEF focal area on Climate Change. In particular, the CREA project strongly aligns with LDCF Priority Area 1 (Scaling Up Finance) and Priority Area 2 (Strengthening Innovation and Private Sector Engagement) within the priority Theme 1: Agriculture, Food Security, and Health. The project also has relevance with priority Area 3 (Fostering Partnership for Inclusion and Whole-of-Society Approach) of the new Adaptation programming strategy for GEF-8^[1]. Alignment with GEF-8 programming strategies will be further elaborated at the PPG stage.

Other key national priority documents include: (i) the Cambodia Climate Change Strategic Plan (CCCSP 2014-2023); (ii) National Adaption Programme of Action (NAPA) and Nationally Appropriate Mitigation Actions (NAMA); (iii) National Policy on Green Growth and; (iv) Policy on Biodigester Development in Cambodia (2016-2025). There are two main ongoing policies proposed and being implemented by the RGC in response to climate change issues. The CCCSP and Cambodia’s INDCs represent the most prominent action plans and documents outlining key national efforts in climate change adaptation and mitigation.

The CCCSP (2014-2030) is the first-ever strategic plan produced by the Royal Government of Cambodia to mainstream climate change policies into the National Strategic Development Plan (NSDP) coordinated through MoE’s NCSD. The Cambodia Climate Change Strategic Plan 2014 – 2023 vision is “Cambodia develops towards a green, low-carbon, climate-resilient, equitable, sustainable and knowledge-based society”. The CCCSP lays out eight strategic objectives:

1. Promote climate resilience through improving food, water, and energy security;

2. Reduce sectoral, regional, and gender vulnerability to climate change impacts, and minimize risks to health;
3. Ensure the climate resilience of critical ecosystems (the Tonle Sap, the Mekong River, coastal ecosystems, and highlands, etc.), biodiversity, protected areas and cultural heritage sites;
4. Promote low-carbon planning and technologies to support sustainable development;
5. Improve capacities, knowledge and awareness for climate change responses;
6. Promote adaptive social protection and participatory approaches in reducing losses and damage due to climate change;
7. Strengthen institutions and coordination frameworks for national climate change responses; and
8. Strengthen collaboration and active participation in regional and global climate change processes.

The proposed LDCF project supports Cambodia's NDCs, in particular concerning climate adaptation the document proposes priority action in the following areas:

- Promoting and improving the adaptive capacity of communities, especially through community-based adaptation action, and restoring natural ecological systems to respond to climate change;
- Increasing the use of mobile and permanent pumping stations in response to droughts, and promoting groundwater research in response to drought and climate risk;
- Strengthening technical and institutional capacities in conducting climate change impact assessments and climate change projections, and including climate change in sectoral and sub-sectoral development plans.

There are several other policies related to sustainable agriculture that will be aligned with the proposed LDCF proposal including:

- The National Green Growth Roadmap with the goal to stimulate the economy through low carbon options, creating jobs, protecting vulnerable groups, and improving environmental sustainability.
- Master Plan for Crop Production in Cambodia 2030: A plan to transition to modern agricultural system capable of generating higher economic value in the rural and urban economy through the development of agroindustry, agribusiness, and sustainable agriculture.
- Agricultural Sector Strategic Development Plan, 2019-2023 includes the enhancement of agricultural productivity, diversification, and commercialization through different means such as climate-proof agriculture systems for adapting to changes in water variability to enhance crop yields and scaling-up of climate-smart farming systems.
- Cambodia Climate Change Financing Framework (2014): It promotes a common approach to define climate finance and assess its current level as well as prospecting for future financing schemes.
- Cambodia National Adaptation Plan (NAP): A medium and long-term approach to reduce vulnerability of the effects of climate change, while facilitating the integration of adaptation into relevant new and existing policies, strategies, programs and activities.

[1] <https://www.thegef.org/council-meeting-documents/gef-ldcf-sccf-32-04-rev-01>

D. POLICY REQUIREMENTS

Gender Equality and Women's Empowerment:

We confirm that gender dimensions relevant to the project have been addressed as per GEF Policy and are clearly articulated in the Project Description (Section B).

Yes

Stakeholder Engagement

We confirm that key stakeholders were consulted during PIF development as required per GEF policy, their relevant roles to project outcomes and plan to develop a Stakeholder Engagement Plan before CEO endorsement has been clearly articulated in the Project Description (Section B).

Yes

Were the following stakeholders consulted during project identification phase:

Indigenous Peoples and Local Communities: Yes

Civil Society Organizations:

Private Sector: Yes

Provide a brief summary and list of names and dates of consultations

(i) Project identification - Relevant stakeholders were largely consulted during this phase. Relevant Governmental Ministries and bodies were met (Ministry of Agriculture, Forestry and Fisheries, General Directorate of Agriculture, Ministry of Environment, Ministry of Commerce, Ministry of Mines and Energy, etc.) to align with national policies and programs. Academic institutes and support organizations (Royal University of Cambodia, PLNIA, Cambodia Farmer and Nature Net) advised on the project design and its contextualization. Private sector entities: CRT suppliers (SOGE, Pteah Baitong, Khmer Cold Chain, some of them providing innovative end-user financial mechanisms) and service providers (Amru Rice, Techno startup center, Bronx Technology), were able to give their insights on the challenges and needs of the MSMEs in the agriculture and RET sectors, building on and updating the results of S-RET. Local financial institutions were also met to design the financial activities (CGCC, organization representatives such as CMA and CAFT, MFIs such as Chamroeun and LOLC, banks such as ARDB and SME Bank). Finally, development partners were also consulted (Nexus for Development, UNIDO, WFP, FAO, ADB, AIIB, WB, USAID, EU, EIB) to have a comprehensive overview of the ongoing development programs as well as their perspectives. Development partners implementing programmes that foster competitive and resilient agriculture market system development and promoting market-based opportunities (such as USAID through the Feed the Future Cambodia Agriculture Partnership Hub, or UNIDO through the CAPFISH Capture Project, among others) will be the ones CREA will most likely seek synergies and collaboration with.

(ii) Project preparation – These different stakeholders will be also engaged during preparation through consultations and workshops, with the objective to contribute to data collection and methodological design. Representatives of smallholder farmers will also be consulted individually, through agricultural cooperatives, and be invited to the workshops to ensure the validity of the methodological approach, in particular the selection of adequate means and tools to be deployed for market intelligence and to validate main assumptions and bring complementary insights about their current situation and productive use of CRT at farm level.

(iii) Project implementation – Local private sector actors, mostly AC/PO, UAC, business clusters, CRT companies, financial institutions and extension services, will be engaged through Components 1 and 2, which aim to promote suitable CRT packages and build sustainable and inclusive financial solutions. This will include data sharing, networking facilitation, capacity building and experimentation between these different stakeholders. They will also be involved through collaboration with academic institutions and R&D to improve the quality of the CRT supply and work on human resource development in Component 3. Close interaction will be maintained with these stakeholders throughout the project through digital channels, individual meetings and collective sessions. Smallholder farmers will also be engaged in awareness raising and capacity-building sessions throughout the program.

(Please upload to the portal documents tab any stakeholder engagement plan or assessments that have been done during the PIF development phase.)

Private Sector

Will there be private sector engagement in the project?

Yes

And if so, has its role been described and justified in the section B project description?

Yes

Environmental and Social Safeguard (ESS) Risks

We confirm that we have provided indicative information regarding Environmental and Social risks associated with the proposed project or program and any measures to address such risks and impacts (this information should be presented in Annex D).

Yes

Overall Project/Program Risk Classification

PIF CEO Endorsement/Approval MTR TE

Medium/Moderate

E. OTHER REQUIREMENTS

Knowledge management

We confirm that an approach to Knowledge Management and Learning has been clearly described in the Project Description (Section B)

Yes

ANNEX A: FINANCING TABLES

GEF Financing Table

Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	Grant / Non-Grant	GEF Project Grant(\$)	Agency Fee(\$)	Total GEF Financing(\$)
IFAD	LDCF	Cambodia	Climate Change	LDCF Country allocation	Grant	4,860,000	437,000	5,297,000.00
Total GEF Resources(\$)						4,860,000.00	437,000.00	5,297,000.00

Project Preparation Grant (PPG)

Is Project Preparation Grant requested? true

PPG Amount (\$)

150,000

PPG Agency Fee (\$)

14,250

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	Grant / Non-Grant	PPG(\$)	Agency Fee(\$)	Total PPG Funding(\$)
IFAD	LDCF	Cambodia	Climate Change	LDCF Country allocation	Grant	150,000	14,250	164,250.00
Total PPG Amount						150,000.00	14,250.00	164,250.00

Indicative Focal Area Elements

Programming Directions	Trust Fund	GEF Project Financing(\$)	Co-financing(\$)
CCA-1-1	LDCF	4,370,000.00	10,860,000.00
CCA-1-3	LDCF	490,000.00	700,000.00
Total Project Cost (\$)		4,860,000.00	11,560,000.00

Indicative Co-financing

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount(\$)
Recipient Country Government	Royal Government of Cambodia	In-kind	Recurrent expenditures	1,200,000.00
Recipient Country Government	Royal Government of Cambodia	Other	Investment mobilized	5,200,000.00

Private Sector	Partner Financial Institution (PFI)	Guarantee	Investment mobilized	500,000.00
Beneficiaries	Beneficiaries RET end-users	In-kind	Recurrent expenditures	4,560,000.00
Others	Academic institutions	In-kind	Recurrent expenditures	100,000.00
			Total Co-financing(\$)	11,560,000.00

Describe how any "Investment Mobilized" was identified


Through a line of credit and results-based grants supported by the ASPIRE AT project, blended finance with contributions from Partner Financial Institution (PFI), and in-kind contribution from beneficiaries/end-users purchasing climate resilient technologies.

ANNEX B: ENDORSEMENTS

GEF Agency(ies) Certification

GEF Agency Type	Name	Date	Project Contact Person	Phone	Email
GEF Agency Coordinator	Mr Tom Anyonge	9/16/2022	Director, a.i., Environment, Climate, Gender and Social Inclusion Division (ECG)		ecgmailbox@ifad.org
GEF Agency Coordinator	Ms Janie Rioux	9/16/2022	Senior Technical Specialist (climate change) - (ECG)		j.rioux@ifad.org

Record of Endorsement of GEF Operational Focal Point (s) on Behalf of the Government(s):

Name	Position	Ministry	Date
H.E. Tin Ponlok	Secretary of State of the Ministry of Environment and GEF National focal Point	Ministry of Environment	8/30/2022 

ANNEX C: PROJECT LOCATION

Please provide geo-referenced information and map where the project interventions will take place





ANNEX D: ENVIRONMENTAL AND SOCIAL SAFEGUARDS SCREEN AND RATING

(PIF level) Attach agency safeguard screen form including rating of risk types and overall risk rating.

Title

Copy of Offline SECAP ESC Screening



ANNEX E: RIO MARKERS

Climate Change Mitigation	Climate Change Adaptation	Biodiversity	Land Degradation
Significant Objective 1	Significant Objective 1	No Contribution 0	No Contribution 0

ANNEX F: TAXONOMY WORKSHEET

Level 1	Level 2	Level 3	Level 4
Influencing Models	Demonstrate innovative approaches		
Stakeholders	Private sector	SME	
Capacity, Knowledge and Research	Knowledge generation and exchange	Innovation	
Gender Equality	Gender results area	Sex-disaggregated indicators	
Focal Area/Theme	Climate Change	Climate Change Adaptation	Renewable Energy