ADAPTATION FUND

PRE-CONCEPT FOR A REGIONAL PROJECT/PROGRAMME

PART I: PROJECT/PROGRAMME INFORMATION

Title of Project/Programme:	Enhancing cross-sectoral climate resilience of the agro-fuel supply chain through regional cooperation and technology transfer in Lower Mekong Region
Countries:	Thailand, Cambodia and Lao PDR
Thematic Focal Area[1]:	Innovation in adaptation finance
Type of Implementing Entity:	Multilateral Implementing Entity (MIE)
Implementing Entity:	United Nations Industrial Development Organization (UNIDO)
Executing Entities:	Ministry of Agriculture, Forestry and Fisheries (MAFF), Cambodia, Ministry of Energy and Mines (MEM), Lao PDR and National Science and Technology Development Agency (NSTDA) under Ministry of Higher Education, Science, Research and Innovation (MHSRI), Thailand

Amount of Financing Requested: 14,000,000 (in U.S Dollars equivalent)

Project / Programme Background and Context:

Thailand, Cambodia, and Lao People's Democratic Republic (PDR), situated in the Lower Mekong River Basin (LMB) region, are vulnerable to climate change-induced natural calamities including excessive and unseasonal rainfall and floods, landslides and cyclones. Annual floods in Cambodia alone cause economic damages, valuing around USD 170 million[2]. In Lao PDR, the economic loss during the 2018 flood was estimated to be around USD 371 million, leaving over 600,000 people in distress[3]. The project countries rely highly on imported petroleum products (for example, Cambodia and Lao PDR import 100% of their petroleum products from the neighbouring countries) whose supply is subjected to international price, logistic and political risks. Expansion, installation and maintenance of oil & gas processing, storage and transfer facilities near coastal and river basins face the challenges of frequent storms, flood induced landslides, etc., including the devastating risk of oil spills in ocean/rivers[4].

Agriculture, residential, and transport sectors are the most affected sectors due to climate change in the LMB region. The impact is being felt significantly by the communities/population along the agro-product supply chains. Firstly, most agro-communities (about 62%[5] in Cambodia and 90%[6] in Lao PDR) depend on unsustainably harvested forest based firewood and charcoal for cooking. The supply of dry firewood is considerably reduced during wet seasons, floods, etc., causing market price variations affecting affordability of low-income rural and agricultural households. Secondly, firewood & charcoal-based cooking causes indoor air pollution (IAP), affecting the health of women & children leading to life-threatening diseases and reduced quality of life. Thirdly, the continued exploitation of forests/woodlands for firewood and charcoal accelerates deforestation[7] increasing the stress on natural resources & biodiversity in the region aggravating climate change. Finally, supply chain disruptions due to floods, landslides and cyclones lead to loss of income from the destruction of crops/products and isolation from essential supplies for livelihood, farming or business[8], thus worsening the sufferings of vulnerable communities. The climate risk simulations of Lao PDR and Cambodia show that the frequency and intensity of these natural calamities will increase in the future proportionate to global climate change[9]. This will lead to reduced crop yields/loss of harvest, loss of income/job opportunities and more people being pushed to extreme poverty. The prevailing socio-economic risks such as gender inequality, limited ability to diversify income sources and exploitation of natural resources further aggravate climate risks over the long term, especially on farmers, women and youth.

Fragmented approaches in addressing the above-mentioned issues can aggravate long-term sustainability risks. For example, increasing crop yields without developing downstream market demand would adversely affect farmers' profitability. Thus, addressing climate risks and building resilience in communities for agro-product supply chains needs a holistic approach to long-term climate change resilience. The proposed project intends to engage vulnerable farming communities, including women and youth in developing local agro-fuel supply chains, who will benefit from (i) reduced dependency on firewood, charcoal and oil, as their supply being sensitive to climate change, and which are substituted through locally produced agro-

[1] Thematic areas are Food security; Disaster risk reduction and early warning systems; Transboundary water management; Innovation in adaptation finance.
[2] https://reliefweb.int/sites/reliefweb.int/files/resources/68230_1cambodiaupdaed16oct2019.pdf
[3] https://climateknowledgeportal.worldbank.org/country/laos/vulnerability
[4] Energy sector vulnerability to climate change: A review 2012 (https://www.researchgate.net/publication/257176174)
[5] https://documents1.worldbank.org/curated/en/141011521693254478/pdf/Cambodia-Beyond-connections-energy-access-diagnostic-report-based-on-the-multi-tier-framework.pdf
[6] Lao PDR market assessment, USAID https://www.cleancookingalliance.org/resources_files/laos-market-assessment-sector-mapping.pdf
[7] Climate Change Action Plan for Energy Sector 2021 – 2023, Ministry of Mines and Energy, Cambodia
[8] Such as firewood for cooking/heating requirements and fuel for transport of harvests, raw materials and goods
[9] https://climateknowledgeportal.worldbank.org/country-profiles

fuels and (ii) improved income diversification opportunities[10] which will improve resilience to recover from negative climate change impacts. Agro-fuels will be extracted from economic crops such as cassava[11] and sugarcane (molasses), produced in Thailand, Cambodia and Lao PDR. Thus, the development of the agro-fuel supply chain without affecting/risking its food value serving both the cooking and transportation sectors will boost the economic profitability of agro-fuels. Furthermore, the promotion of local agro-fuel processing/production units will provide employment opportunities to women and youth, which increases income generation, skills, women empowerment, as well as create a stable local market and improve the livelihood of farming communities in the project areas. Overall, the replacement of unsustainably exploited forest based fuel wood and charcoal through agro-fuels produced from agro-feedstock (not competing with food crops) will support conservation of biodiversity and improve climate resilience of the communities in the region. The value chain of agro-feedstock will be reinforced by climate change adaptation techniques in the farming to processing and supply systems accordingly.

The proposed adaptation project is built upon the results and lessons learnt from the GEF regional project (GEF ID4037, 2012-2018), which used a comprehensive approach to overcome agro-fuels policy, market and technical barriers through South-South technology transfer from Thailand to Vietnam and Lao PDR. The project succeeded in consolidating experience of agro-fuels in the region, improving awareness on conducive policy frameworks and gaining technical acceptance of technology by farmers, technicians, researchers, entrepreneurs and government officials through demonstration plants (a 200 litres per day (lpd) micro-distillery unit in an existing facility in Thailand & a new 50 lpd unit in Vietnam). One of the key lessons learnt from the project was that it is pertinent for solutions fighting climate change in developing countries to build adaptation capacity of the underlying agricultural sector[12] to foster long-term sustainability.

The experience gained and lessons learnt from the UNIDO-GEF project (following top-down approach through enabling policies) would be replicated in Lao PDR and Cambodia to develop an supply chain under the proposed project (following a bottom-up approach through direct engagement with farmers). However, Cambodia and Lao PDR have significant potential for adopting agro-fuels and creation of economic development opportunities for vulnerable communities, the development is hindered by [13]:

(i) Inadequate awareness on sustainable agro-feedstock farming practices;
(ii) Limited access to skills development and income diversification opportunities in the agriculture sector, especially for vulnerable communities, including farmers, women and youth;
(iii) Limited access to adaptation finance for farmers, women and youth to access technologies and equipment to participate in the agro-fuel supply chain;
(iv) Low affordability and insufficient awareness on benefits of agro-fuel use;
(v) Inadequate knowledge for agro-fuels;
(vi) Insufficient enabling measures to accelerate cross-sectoral adoption;
(vii) Inadequate climate-resilient measures in the agro-fuel supply chain.

Project / Programme Objectives:

The proposed project aims to enhance the climate resilience of targeted communities (including farmers, women, youth and people engaged in agro-fuel processing and its marketing) through the adoption of agro-fuels and the establishment of a related local supply chain infrastructure in Cambodia and Lao PDR. In order to reduce the impact of climate-related shocks (on fuelwood, charcoal and oil supply) and simultaneously address future climate vulnerabilities in the LMB region. Since Thailand is more advanced in agro-fuel related policy & pricing instruments, improved financing opportunities, training modules and database, efficient technology to cultivate agro-feedstock (for higher productivity & reduced resource use), etc., within the LMB region, the project intends to transfer identified best practices/technologies and lessons learnt to target communities/localities[14] in Cambodia and Lao PDR under the UNIDO's South-South cooperation modality. Thailand will provide the necessary technical expertise and support for the planned activities. The project will create awareness, build skills and capacities, enable income diversification, improve access to finance and functionalize agro-fuel supply chain across agriculture, cooking and transport sectors in Cambodia and Lao PDR, thereby enabling capacity to overcome climate related shocks, reducing the stress & dependence on the natural resources and fossil fuels, improving the public health of the targeted communities in the long term.

[10] Refer annex 1 for more details
[11] Cassava is not a stable food of Cambodia and Lao PDR. They are cultivated as cash crops and exported to neighboring countries for ethanol and starch production
[12] Recommendations page 50, Independent Terminal Evaluation, Overcoming policy, market and technological barriers to support technical innovation and south-south technology transfer: The pilot case of ethanol production from cassava, July 2019 link
[13] Refer Annex 2 for more details
[14] Exact target geographical locations and communities will be identified at the concept stage and finalized based on stakeholder consultations and an impact assessment in compliance with the Adaptation Funds' Environmental and Social Policy (ESP) and Gender Policy (GP)

Project / Programme Components and Financing:

Project/Programme Components	Expected Outcomes	Expected Outputs	Countries	Amount (USD)
1. Building institutional and community capacity for the development of climate-resilient agro-fuel supply chains	1.1 Increased South-South cooperation, technology and knowledge transfer from Thailand to Cambodia and Lao PDR	1.1.1 Establishment of regional platform lead by Thailand for agro-fuel supply chain development in the LMB region 1.1.2 Development of competency centres (one each) in Cambodia and Lao PDR 1.1.3 Five (5) regional workshops for national stakeholders for knowledge transfer from Thailand to Cambodia and Lao PDR	Thailand, Cambodia and Lao PDR	3,000,000
	1.2 Improved regulatory measures and increased adaptive capacity at the national, provincial & community level	1.2.1 Local vulnerability assessment and gap analysis in facilitating agro-fuel supply chain in Cambodia and Lao PDR 1.2.2 Development of policy and related standards for sustainable agro-fuel supply chain in Cambodia and Lao PDR 1.2.3 Development of six master plans (two national, two provincial and two community levels) on climate change adaptation in agro-fuel supply chain 1.2.4. Farmers, small producers, women, youth (at community level) and government staff (at the national and provincial level) trained on climate-change risk management, adaptation strategies and gender empowerment in agro-fuel supply chains: At least 80 per cent of targeted communities trained, of which at least half are women; at least 30 government staff (including at national and provincial level) trained in each country (Cambodia & Lao PDR).	Cambodia and Lao PDR	
2. Creating climate adaptation and income diversification strategies along agro-fuel supply chains	2.1 Increased acceptance of climate change adaptation measures and technologies	2.1.1 Deployment of best practices and integrating contract farming models in around 2,000 ha cumulative from Cambodia and Lao PDR 2.1.2 Demonstration of best available technologies and resilience measures for post-harvest management in 100 farmer communities	Cambodia and Lao PDR	7,437,000
	2.2 Expanded financial inclusion to vulnerable communities along the agro-fuel supply chain	2.2.1 Development of appropriate financial mechanism and credit guarantee services for farmer communities, women and youth 2.2.2 Facilitation of 20 adaptation investment project proposals within target communities through a community grant mechanism	Cambodia and Lao PDR	
	2.3 Improved multi-sector linkages for shifting towards agro-fuels	2.3.1 Climate responsive agro-fuel supply chain delivery models made available reducing indoor air pollution (IAP) in 10,000 households and offering 6,000 litres/day of locally produced agro-fuel to the transport sector (approx. 2.2 million litres per annum)		
3. Knowledge management	3.1 Improved capacity on climate vulnerability and scaling-up adaptation measures	3.1.1 Knowledge management on climate vulnerability and adaptive measures in the agro-fuel supply chain under the regional platform 3.1.2. Training on climate change risk-management, adaptation strategies in agro-feedstock cultivation for farmers, small-farm holders, entrepreneurs, etc. (10,000 beneficiaries) 3.1.3 Training programs (including gender mainstreaming) developing necessary technical and managerial skills to support the agro-fuel production/processing & end-use, access to adaptation finance for income generation among farmers, small-farm holders, women and youths (10,000 beneficiaries) 3.1.4 Strengthen the production performance and sustainability and prepare documentation for scaling up to other parts in Cambodia and Lao PDR	Thailand, Cambodia and Lao PDR	1,313,000
4. Project/Programme Execution cost				1,200,000
5. Total Project/Programme Cost				12,950,000
6. Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)				1,050,000
Amount of Financing Requested				14,000,000

Project Duration: *5 Years (60 months)*

PART II: PROJECT / PROGRAMME JUSTIFICATION

Component 1: Building institutional and community capacity for the development of climate-resilient agro-fuel supply chains

Through the proposed project, a regional platform will be established under the existing centre for biofuel development at King Mongkut's University of Technology (KMUTT), Thailand, acting as a centre of excellence for the agro-fuel development LMB region. This regional platform will share all the necessary knowledge and lessons learnt. Technology transfer to Cambodia and Lao PDR, the LMB region and beyond, with support from The National Centre for Genetic Engineering and Biotechnology (BIOTEC)[15] and also will help in building the capacity of competency centres[16] for agro-fuel development - one each in Cambodia and Lao PDR through UNIDO's South-South cooperation modality. Furthermore, the regional platform will foster the exchange of knowledge and best-practise examples through annual forums, online resource sharing and the design of thematic training courses. Moreover, it will provide knowledge sources compiling the recent developments in understanding climate data and tackling climate risks in the region. The platform will also initiate appropriate modalities to disseminate this knowledge to the vulnerable communities through policy makers, researchers/academia, local authorities/departments, and civil society. In addition to supporting these measures, the Cambodia and Lao PDR competency centres will provide helpline services to farmers on agro-feedstock cultivation and publicly disclose information on the agro-fuel supply chain. Furthermore, an educational channel will be made available through media such as radio and/or television in the local language to benefit relevant stakeholders.

A minimum of five regional workshops (on an annual basis) will be carried out through the regional platform covering different aspects of sustainable agro-fuel supply chain development. To improve the awareness and provide capacity building to the policymakers, farmers, agro-business entities and other relevant stakeholders from Thailand, Cambodia and Lao PDR. Technical assistance will be provided to the concerned authorities to develop appropriate policies and quality standards for operationalizing the sustainable agro-fuel supply chain at different levels. Study tours will be conducted for the key stakeholders at the regional level to help them understand climate risks in cooking, transport and agricultural sectors and available climate-resilient practices for the project countries.

A local vulnerability assessment and gap analysis will be conducted to adopt climate smart agro-fuel cultivation practices and facilitate agro-fuel supply chain to cooking, transport, and other possible applications, focusing on income diversification opportunities. To address the identified vulnerabilities & gaps, technical assistance will be offered to the relevant authorities to develop national/provincial/community level master plans for climate change adaptation through agro-fuel use. Building on these capacities and initiatives, it is planned to develop at least six adaptation plans (i.e., two national, two provincial and two community-level plans) for adaptation measures in agro-fuel development. The regional experts will train farmers, small producers, women, youth (at community level) and government (at national and provincial level) staff on climate-change risk management, adaptation strategies and gender empowerment in agro-fuel supply chains. At least 80 per cent of targeted communities will be trained, of which at least half are women. At the governmental level, this activity will aim to train at least 30 staff each in Cambodia and Lao PDR (including at the national and provincial level).

Component 2: Creating climate adaptation and income diversification strategies along agro-fuel supply chains

The project will demonstrate climate-resilient and efficient practices accommodating traditional knowledge across the agro-fuel supply chain. Under this component, existing farmer cooperatives will be strengthened, and new cooperatives will be supported with adequate training and advisory support from the regional experts through regional platform/competency centres. It will help their members adopt climate-smart agricultural practices in cultivating fuel crops, increasing productivity, storage, sale of produce, and if possible, value addition through the processing of agro-fuel. The suitability of the contract farming approach will be studied and implemented to increase income, reduce market price risks and improve the socio-economic condition of the farmers. The best practices in Thailand on agro-fuel cultivation would include the use of climate-resilient seeds (such as Rayong-7, KU50 cassava variety, etc.), smart agricultural practices (such as site-specific cassava fertilizer use, best planting practice, etc.), efficient water irrigation techniques (such as drip irrigation) and soil conservation measures (such as intercropping) and efficient agro-fuel processing techniques[17]. Implementing suitable best practices and integrating contract-farming models will target improved productivity in around 2,000 ha of agro-feedstock cultivation cumulative from Cambodia and Lao PDR. For this purpose, the targeted communities including farmers, women and youth will be identified through the competency centres in close cooperation with local authorities, agricultural agencies and civil societies. The network developed from previous UNIDO-GEF projects will also be utilized as much as possible. Skills of women, youth and farmers will be developed to integrate innovative solutions such as drip irrigations methods, natural compost production, post-harvest management, soil and resource assessment for suitability of agro-feedstock cultivation, efficient land use, renting of farm equipment, etc. The approach will develop linkages within the targeted communities to boost local and distributed economic development and reduce dependency on support, inputs or solutions from outside the province/country/region. This approach of engaging and allowing farmers, women and youth to attain self-reliance will be at

[15] One of the key research and development centres under National Science and Technology Development Agency (NSTDA), Thailand
[16] Upgrade the existing learning centre from previous UNIDO-GEF, as appropriate
[17] Like Very High Density – Simultaneous Saccharification and Fermentation (VHD – SSF) technology developed by BIOTEC and KMUTT, Thailand

the centre of all activities under this proposed project. Feedstock cultivation in the degraded lands will be evaluated and encouraged to regenerate soil conditions and avoid conflict with the existing food crop farming lands[18]. The target farmer communities will be carefully assessed, and 100 farmer communities will be selected for further training/implementation support to demonstrate the best available technologies and resilience measures for post-harvest management (such as environmentally friendly storage facilities to withstand floods & rainfall, efficient supply chain management practices to reduce post-harvest losses, etc.),

The project will establish an agro-fuel adaptation fund[19] in collaboration with the identified financial institutions from Cambodia and Lao PDR to serve two key purposes to address the financial barriers. Firstly, part of the fund will provide risk guarantees to different financial agencies such as financial institutional (FIs) and/or micro-finance institutions (MFIs) for lending concessional loans to implement resilient climate initiatives. Such as setting up storage/warehouses for the harvested yields, establishing farmer cooperatives, offering credits to women self-help groups, setting up women-headed agro-fuel business enterprises, etc. This will be achieved by direct engagement with the target communities or through non-governmental organizations (NGOs), community service organizations (CSOs) and government agricultural development agencies. Secondly, the fund will support the formulation of appropriate financial instruments and mechanisms (such as community grant schemes, incentives for adopting practices, discounted prices for agricultural inputs, etc.). To make the adaptation practices affordable to the target communities (farmers, women entrepreneurs, household women for purchase of clean cooking solutions, vendors engaged in marketing/supply, entrepreneurs (especially women-headed) setting up micro-distilleries, etc.) in the agro-fuel supply chain. The project envisages facilitating 20 adaptation investment project proposals through community grant schemes to accelerate the adaptation measures at the community level. Technical and financial assistance will be provided to the financial institutions, MFIs, and other relevant stakeholders on the establishment of appropriate measures and schemes for increasing climate-responsive & sustainable practices in agro-fuel producing and consuming business entities/sectors.

Furthermore, the climate-responsive and sustainable technology & infrastructure required for processing, packaging, storage, transfer and distribution of 15,000 litres/day of agro-fuels would be addressed through the engagement of farmer cooperatives, local enterprises and micro, small and medium scale enterprises (MSMEs). These activities will open up huge job opportunities, especially for women entrepreneurs, at each level of the agro-fuel supply chain. At the community level, awareness will be created among the households, particularly women, on the benefits of agro-fuel based cooking and among end-users of agro-fuels in the transport sector in the target communities such as vehicle operators within the supply chain on environmental benefits of agro-fuels. As an overall impact, climate-responsive agro-fuel supply chain delivery models will be made available thereby reducing IAP in at least 10,000 households and offering a minimum of 6,000 litres/day of locally produced agro-fuel to the transport sector (approx. 2.2 million litres per annum)[20]. All the above initiatives will be developed to raise gender equality and inclusive growth while ensuring the participation of the most vulnerable group within the target communities.

Component 3: Knowledge Management

Under this project component, the outcomes, results, best practise examples and case studies, as well as challenges faced and the key lessons learnt under the south-south cooperation modality, i.e. knowledge transfer from Thailand for replication and scale-up in Cambodia and Lao PDR, will be documented for sustainability, replicability and scale-up across the LMB region and beyond. The documents prepared on climate vulnerability, adaptive measures, and lessons learnt while establishing an agro-fuel supply chain will be regularly shared with the relevant stakeholders. The competency centres set up in Cambodia and Lao PDR will act as knowledge hubs, disseminating the technology information and highlighting the technology and best practices being implemented. Specialized assistance and skill development trainings on climate change risk-management, adaptation strategies in agro-feedstock cultivation for farmers, small-farm holders, entrepreneurs, etc. will be provided to the selected communities with potential for future scale-up. Training programs (including gender mainstreaming) will be developed and delivered to provide the necessary technical and managerial skills to farmers, small-farm holders, women and youths to support the agro-fuel production/processing & end-use, access to adaptation finance, etc., for income generation. To carry out these trainings, around 50 technical staff will be trained who will further deliver training to at least 20,000 beneficiaries during the project period. The regional platform and competency centres will play an important role in these activities. In addition, documentation for scaling up to other parts of the region will be developed. Furthermore, by raising awareness and training a wide diversity of actors ranging from academia to private and public sectors, the project will foster a conducive environment for the uptake of agro-fuel in the region. Public awareness will be raised to increase switching towards agro-fuels.

In summary, through the implementation of the project, the climate-resilient practices would increase the yield of agro-feedstock, which in turn increases the income of the farmers/small farm holders and locally producing agro-fuel facilities would

[18] For example, Cassava cultivation is carried out as a cash crop and dried cassava chips exported to Vietnam, China and Thailand

[19] The agro-fuel adaptation fund will be innovatively designed to offer risk guarantee to financial products and incentivize investments that aim at embedding climate adaptive measures in agro-fuel supply chain and improve climate resilience of target communities for faster recovery from climate shocks and continue its services even after end of the project. The more detailed conditions of this fund will be carried out at the PFG stage in consultation with relevant stakeholders.

[20] Based on 27 ton/ha of cassava yield from 2,000 ha and 0.0073 litre ethanol production per ton of cassava. Conservative estimate of target beneficiaries assuming 50% of ethanol produced in cooking and rest 50% in transport sector

generate employment opportunities for women and youth, which will result in improved socio-economic condition in the project areas. The consumption of agro-fuel would reduce the households' firewood consumption, leading to reduced deforestation in the project countries and building resilience to climate change and its impacts on fuel and wood supply chains. Similarly, the consumption of agro-fuel in transportation would reduce the dependence on oil products & increase the resilience to international oil price fluctuations and climate-related logistic risks. In addition, the air pollution due to the consumption of oil products such as diesel/gasoline in vehicles would be reduced, improving the project countries' environmental condition. Therefore, the proposed project will not negatively affect the marginalized and vulnerable groups, including farmers, women & children and the environment, i.e., project will only reduce the impact on the vulnerable communities and build resilience to climate change. Any potential negative impact anticipated during the operation of the project will be identified, and appropriate mitigation procedures and measures will be formulated in accordance with the Environmental and Social Policy (ESP) as well as Gender Policy (GP) of the Adaptation fund. The project will also coordinate with other ongoing initiatives in the project countries relevant to adaptation in agriculture and clean cooking sectors[21].

Justification for funding requested

The climate, landscape and land use in project countries depend on the Mekong River. Thus, they traditionally exchange the agricultural practices as well as share the climate risks in the LMB region[22]. To accelerate adaptation to climate change, the project countries will have to increase funding and efforts to adequately respond to the changes, which has been an important barrier. Cambodia and Lao PDR are the least developed countries and substantially depend on international funding support to build climate resilience and achieve their ambitious NDC targets. In addition, the global pandemic has slowed down these countries' economies, so it is difficult for them to mobilize funds for adaptation measures. In practical conditions, the use of available resources towards attending to immediate economic damages by climate hazards and recovery (as discussed in the background section) takes government priority to save the lives of vulnerable communities and existing infrastructure rather than on long-term adaptation measures. In such context, these proposed interventions would not be materialized by the project country governments without the support from international funds such as Adaptation Fund. The exact project interventions will be carefully designed based on infrastructure built by previous and ongoing climate projects in this sector and development differences among the project countries during the concept note stage. The project will lead to the paradigm shift towards climate-resilient sustainable development in the LMB region (especially Cambodia and Lao PDR) as presented in figure 1 below. The project will undertake stakeholder consultations in line with the requirements of Adaptation Funds' Environmental Safeguard Policy (ESP) and Gender Policy (GP) emphasizing that any of its activities will not increase the vulnerability of beneficiaries or others (non-project-beneficiaries), nor reduce their capacity to adapt to climate change. Overall, the central outcome will be to improve income diversification through job opportunities along the agro-fuel supply chain by building adaptive capacity of targeted communities.

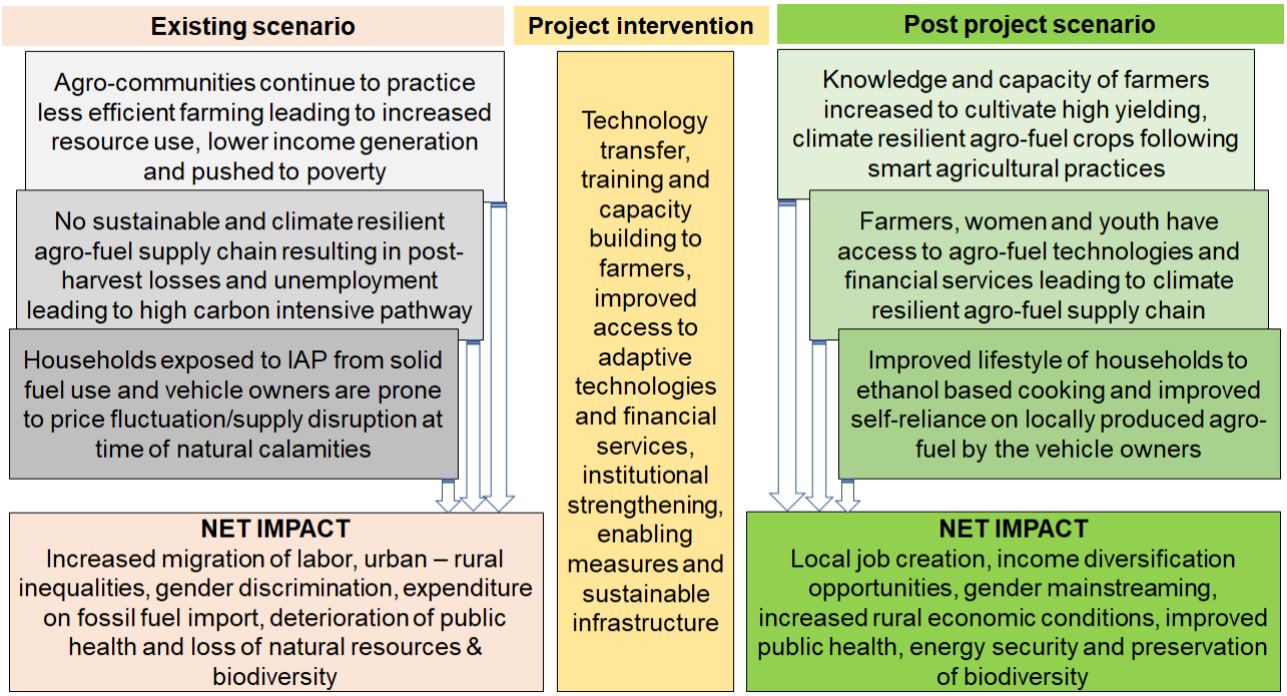

Figure 1. Paradigm shift facilitated by project intervention

[21] Some of the on-going initiatives include GCF, World Bank and ADB funded projects
[22] More of this will be studied at concept note stage

The project will lead to the following economic, social and environmental benefits directly and indirectly through its different interventions:

- *Reduced migration:* The project will increase income generation to the farmers/rural communities and create number of new job opportunities in the agro-processing businesses and the agro-fuel supply chain. This will decelerate migration of labour from rural communities to urban regions.
- *Increased financial inclusion:* The climate adaptation fund for agro-fuel supply along with and other enabling measures proposed under the project will extend the financial services to remote communities and vulnerable groups, especially women, through self-help groups, farmer cooperatives, micro-finance institutions, etc., thereby increasing the local/regional economy.
- *Reduced gender inequality:* The project will help upgrade the skills of women to gain reliable employment and income opportunities in the agro-fuel supply chain. It will ensure gender mainstreaming at all levels in project management and implementation.
- *Biodiversity conservation:* The target communities will become more aware of their eco-system and the need for its preservation to fight climate change. This will help in the judicious use of forest/natural resources for farming practices and build measures to improve these resources over time.

Cost effectiveness: The proven agro-fuel technology and best practices in supply chain networks that are already successfully implemented in Thailand will be transferred, reducing resource/time on such research and development. Since the project enhances the knowledge and resource sharing, it would reduce the time and efforts of the individual country counterparts/stakeholders for effective and faster dissemination/adoption by vulnerable communities and improve the economic relations in the region. The regional cross-sectoral approach also helps in the mutual exchange of know-how on climate risks and opportunities that could complement each other target countries.

Innovation: The project boosts access to financial services directly targeted towards the vulnerable communities as one of the key enabling measures help them switch to agro-fuel production and use. This access to financial service is linked to adherence or uptake of climate change adaptation practices promoted by the project. Thus, the project is innovative in design and implementation of adaptation linked climate finance at the grass-root level, encouraging community participation in the due process.

Sustainability: Promoting economic development based on local and regenerative resources is one of the key principles of sustainable development, and the project objective is in complete alignment with this. Through the adoption of climate-resilient practices, the farmers would be able to increase the yield of the feedstocks, which in turn increases their income, and they will be able to sustain the cultivation/harvests during the flood and/or excessive rainfall. By empowering women and youth along the agro-fuel supply chain, the project envisages that the impacts of other socio-economic risks such as gender inequality over and above the climate risks are lessened, leading to long term sustainability. The project components are designed to create a sustained, climate adaptive and long-term market for agro-fuels focussing on both supply and demand-side measures. The strengthening of knowledge at the institutional (including through the competency centres in Lao and Cambodia) and community level will ensure that the future economic development plans or activities or initiatives undertaken in the region or targeted communities will accommodate appropriate adaptation measures ensuring the sustainability of project results. Also, the technology, best practices and lessons learnt from the project would be helpful in replicating and scaling up of agro-fuel to the other regions with the support of other development funds in future.

Consultation process: Initial discussions were carried out with executing entities from Thailand, Cambodia and Lao PDR on the potential adaptation project following the earlier UNIDO-GEF projects. A detailed consultation at the regional level with the national executing entities will be carried out to determine the environmental & social impact risk for the project. Similarly, a consultation at the community level/vulnerable groups, i.e., with the farmers, small-farm holders, women self-help groups, etc. will be carried out, and the suggestions/comments will be documented, and appropriate actions will be taken if any. This consultation process will be conducted and documented in accordance with the ESP and GP of the Adaptation Fund.

Alignment with country NDCs: The NDC adaptation assessment of Lao PDR identified that prioritizing the use of domestically available regenerative resources can help communities become less dependent on international value chains sensitive to climate change impacts. The long-term adaptation objectives of the energy sector propose to use new and innovative climate-resilient technologies[23] , which the project intends to deliver. The project components are also in line with Thailand[24]and Cambodia[25] NDC commitments and national adaptation plan (NAP)[2627], which aim to build adaptive capacity and climate resilience in various priority sectors[28], including Agriculture. The NAP of Thailand states that support will be

[23] Table 6. Long-term adaptation objectives in key sectors, Updated NDC of Lao PDR, Marcin key sectors, Updated NDC of Lao PDR, March 2021
[24] Page 5, Thailand updated NDC, October 2020
[25] Cambodia NDC, December 2020
[26] National Adaptation Plan, 2018, ONEP, Thailand
[27] https://www.greengrowthknowledge.org/sites/default/files/downloads/policy-database/Cambodia%20NAP%20Financing%20Framework.pdf
[28] Water resources management, agriculture and food security, tourism, public health, natural resources management, human settlements and security sector.

required for the promotion of innovation, development and transfer of technology in the prioritized sectors, which is in line with the objectives of the establishment of a regional platform under this project. In Cambodia, the project offers adaptive and sustainable solutions to the disruptions in logistics and agricultural supply chains due to natural calamities. The project serves the national target of different sectors – with significant contributions in agriculture, natural resources, energy security and human settlement.

PART III: IMPLEMENTATION ARRANGEMENTS

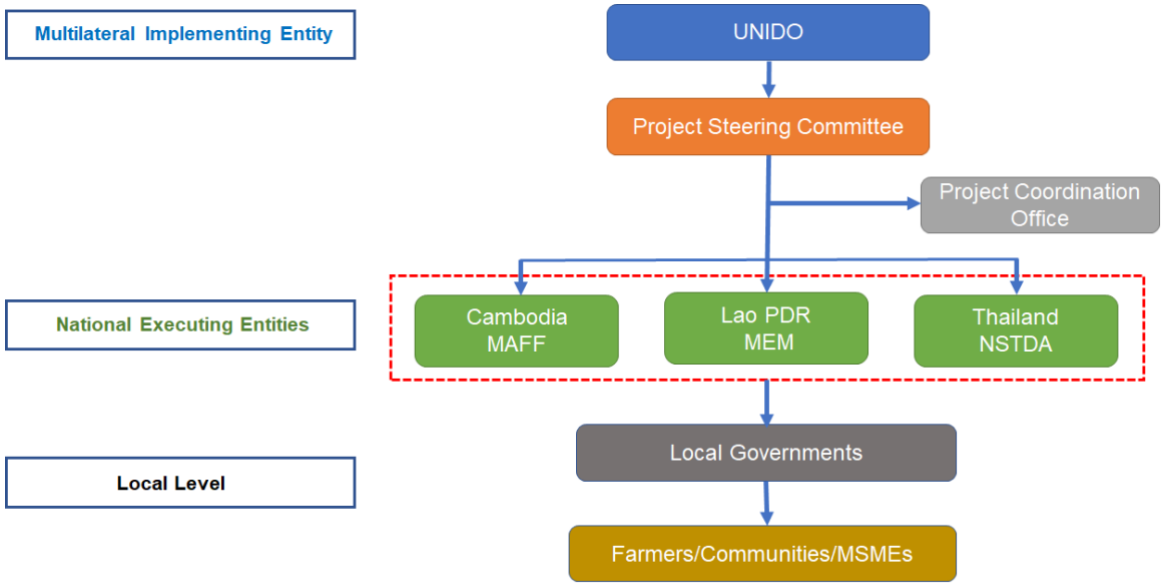

Figure 2. Implementation arrangement

Figure 2 shows the implementation arrangement of the project at various level. The United Nations Industrial Development Organization (UNIDO), a Multilateral Implementing Entity (MIE), will implement the project. A project steering committee (PSC) comprising key stakeholders from Thailand, Cambodia, and Lao PDR will provide strategic guidance on project execution. A Project Coordination Office (PCO) will be established, which will act as a secretariat to the PSC. The location and establishment of PCO will be decided during the stakeholders' consultation process of the project proposal stage. The Ministry of Environment and Ministry of Agriculture, Forestry and Fisheries (MAFF) in Cambodia, Ministry of Energy and Mines (MEM) in Lao PDR and National Science and Technology Development Agency (NSTDA) under the Ministry of Higher Education, Science, Research and Innovation (MHSRI), Thailand will be the executing entities at the respective countries as indicated in the endorsement letters. A Project Management Unit (PMU) will be established under/within each executing entity for the day-to-day management of project activities in participating countries.[29]

[29] Key stakeholders identified so far from the Thailand include (i) King Mongkut's University of Technology Thonburi (KMUTT), (ii) Kasetsart University (KU), (iii) Thai Tapioca Development Institute (TDRI), (iv) Thai Ethanol association and (v) Thai Biogas association. All relevant stakeholders from Thailand Cambodia and Lao PDR will be identified during the conceptual stage.

PART IV: ENDORSEMENT BY GOVERNMENTS AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government[27] *Provide the name and position of the government official and indicate date of endorsement for each country participating in the proposed project/programme. Add more lines as necessary. The endorsement letters should be attached as annexes to the project/programme proposal.*

(Tin Ponlok, Secretary of State, NCSD/Ministry of Environment, Cambodia)	Date: *(August, 12, 2021)*
(Syamphone Sengchandala, Director General, Department of Climate Change, Ministry of Natural Resources and Environment, Lao PDR)	Date: *(September, 8, 2021)*
(Jatuporn Buruspat, Permanent Secretary, Ministry of Natural Resources and Environment, Thailand)	Date: *(October, 12, 2021)*

B. Implementing Entity certification *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (**Cambodia** - *Updated NDC 2020, Cambodia Climate Change Strategic Plan (2014 – 2023), 2013, Cambodia National Adaptation Plan Financing Framework and Implementation Plan, August 2017, Cambodia's Road Map for Sustainable Development – The National Environment Strategy and Action Plan (NESAP) 2016 – 2023, 2018;* **Lao PDR** - *Updated NDC 2021, The 9th Five-Year National Socio-Economic Development Plan (2021 – 2025), Lao People's Democratic Republic Environmental Management Plan, 2020;* **Thailand** – *Updated NDC 2020, Climate Change Master Plan (CCMP) 2015 – 2050, Twelfth National Economic and Social Development Plan (2017 – 2021), Climate Risk Prevention: Thailand's National Adaptation Plan (Risk NAP) 2015 – 2021, Agriculture Strategic Plan on Climate Change (ASPCC) 2017 – 2021*) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
Mr. Akos Koszegvary Implementing Entity Coordinator	
Date: *January 5, 2022*	Tel. and email: +43 1 26026 4573 A.koeszegvary@unido.org
Project Contact Person: Mr. Jossy Thomas	
Tel. And Email: +43 1 26026 3727; J.Thomas@unido.org	

KINGDOM OF CAMBODIA
Nation Religion King

National Council for Sustainable Development

No: 028 NCSD

Letter of Endorsement by Government

Phnom Penh... 12 / August / 2021 ...

To: **The Adaptation Fund Board**
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Subject: Endorsement for a regional project/programme entitled "Enhancing cross-sectoral climate resilience of agro-fuel value chain through regional cooperation and technology transfer in Lower Mekong Region"

In my capacity as designated authority for the Adaptation Fund in Cambodia, I confirm that the above regional project/programme proposal is in accordance with the government's priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the country.

Accordingly, I am pleased to endorse the above project/programme proposal with support from the Adaptation Fund. If approved, the project/programme related to Cambodia will be implemented by the United Nations Industrial Development Organization (UNIDO) and executed by the Ministry of Agriculture, Forestry and Fisheries (MAFF) and line ministries in Cambodia.

Sincerely,

Tin Ponlok
Secretary of State
NCSD/Ministry of Environment

Cc: Mr. Sok Narin, UNIDO Country Representative in Cambodia

Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

Ministry of Natural Resources and Environment
Department of Climate Change

Vientiane Capital, Date: 8 September 2021

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptaion-Fund.org
Fax: 202 522 3240/5

Subject: Endorsement for a regional project/programme entitled "Enhancing Cross-Sectoral Climate Resilience of Agro-fuel Value Chain through Regional Cooperation and Technology Transfer in Lower Mekong Region"

In my capacity as designated authority for the Adaptation Fund in Lao PDR, I confirm that the above regional project/programme proposal is in accordance with government's national priorities and regional in implementing adaptation activities to reduce adverse impact of, and risk, posed by climate change in the Lower Mekong basin.

Accordingly, I am pleased to endorse the above project/programme proposal with support from the Adaptation Fund. If approved, the project/programme will be implemented by the United Nations Industrial Development Organization (UNIDO) and executed by Ministry of Energy and Mine, and line ministries in Lao PDR.

Sincerely,

Syamphone Sengchandala

Director General,
Department of Climate Change,
Ministry of Natural Resources and Environment.

Designated Authority for Lao PDR

No 1007.4/ 2523

Ministry of Natural Resources
and Environment
92 Soi Phohol Yothin 7,
Phohol Yothin Road, Phaya Thai,
Bangkok 10400 Thailand
Tel./Fax +66 2 265 6692

12 October B.E. 2564 (2021)

Sir/Madam,

Subject: Endorsement for Enhancing cross-sectoral climate resilience of agro-fuel value chain through regional cooperation and technology transfer in Lower Mekong Region

In my capacity, as designated authority for the Adaptation Fund in the Kingdom of Thailand, I confirm that the above regional concept note is in accordance with the government's national and sub-regional priorities in implementing adaptation activities to create awareness, build capacity and functionalize agro-fuel supply chain serving the households and vehicle, increase collaboration network within Thailand and among Mekong river countries, and support Thailand's National Adaptation Plan implementation on energy sector, transport sector and agriculture and food security sector.

Accordingly, I am pleased to endorse the above concept note for your consideration. If approved, the project will be implemented by United Nations Industrial Development Organization and executed by National Science and Technology Development Agency (NSTDA), Thailand.

Yours sincerely,

Jatuporn Buruspat

(Mr. Jatuporn Buruspat)
Permanent Secretary
Ministry of Natural Resources and Environment

Adaptation Fund Board Secretariat
c/o Global Environment Facility
1818 H Street NW, Washington DC 20433, USA

Project Formulation Grant (PFG)

Submission Date: 10 January 2022

Adaptation Fund Project ID:
Country/ies: Thailand, Cambodia and Lao PDR
Title of Project/Programme: Enhancing cross-sectoral climate resilience of agro-fuel supply chain through regional cooperation and technology transfer in Lower Mekong Region
Type of IE (NIE/MIE): Multilateral Implementing Entity
Implementing Entity: United Nations Industrial Development Organization (UNIDO)
Executing Entity/ies: Ministry of Agriculture, Forestry and Fisheries (MAFF), Cambodia, Ministry of Energy and Mines (MEM), Lao PDR and Ministry of Higher Education, Science, Research and Innovation (MHSRI), Thailand

A. Project Preparation Timeframe

Start date of PFG	April 2022
Completion date of PFG	September 2022

B. Proposed Project Preparation Activities ($)

Describe the PFG activities and justifications:

List of Proposed Project Preparation Activities	Output of the PFG Activities	USD Amount
Resource assessment study for agro-fuel production in Cambodia and Lao PDR. The study will focus on the identification of suitable land area in selected provinces, climate resilient agro-feedstock and farming practices.	This activity will identify the potential agro-fuel feedstock available in countries, the current practices, the scale of cultivation and market potential for scaling up the production volume. It will also take into account the readiness of the farmer communities, land use/availability, relevant government policies and possible challenges or risk of food-fuel competition. Also, this activity will help in identifying the climate smart agricultural techniques and best practices (mainly from Thailand and also from the region) as applicable for agro-feedstock farming, post-harvest management that are to be promoted by the project in compliance with	10,000

List of Proposed Project Preparation Activities	Output of the PFG Activities	USD Amount
	Environmental and Safeguards Policy of Adaptation Fund.	
Initial climate vulnerability assessment in Cambodia and Lao PDR	The study will collect available data on vulnerability of the target communities (farmers, women and youth) to key climate risks (flood, rainfall, landslide, etc.), linkages to the other socio-economic issues like gender inequality, provincial differences on this impact. The output will be used for identification of locations of target communities to be focused by project and will also offer inputs/basis for detailed local vulnerability study and gap analysis to be carried out during project implementation.	4,000
Stakeholder consultation	The activity will focus on detailed consultations with relevant and key stakeholders to identify and consult with the vulnerable communities in the participating countries. Also, the consultation process will be documented to ensure knowledge management and sustainability of the project.	6,000
Total Project Formulation Grant		**20,000**

C. Implementing Entity

This request has been prepared in accordance with the Adaptation Fund Board's procedures and meets the Adaptation Fund's criteria for project identification and formulation

Implementing Entity Coordinator, IE Name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
Mr. Akos Koszegvary		*January 5, 2022*	Mr. Jossy Thomas	+43 1 26026 3727	J.Thomas@unido.org

Annex 1. Tentative income diversification opportunities along agro-fuel supply chain

No.	Key stakeholders	Approach for income diversification
1	Farmers (including women labourers)	• Cultivation of feedstock as cash crop along with other food crops to reduce risk of market demand & price • Promotion of multiple feedstock cultivation options to manage harvest risks • Generation of agro-fuel through micro-distilleries (under farmer cooperatives) and revenue from sale of the same for cooking and transport use
2	Rural households (especially women and children)	• Savings in time and labour from traditional cooking to agro-fuel based cooking that can be put to use for other productive purposes (education, rural businesses, etc.) • Improved job opportunities along the agro-fuel supply chain such as agro-processing business entities, MSMEs, etc.
3	Vehicle operators	• Improved opportunities in agro-feedstock and agro-fuel logistics • Switch to agro-fuel based transport for reliable fuel supply, cost savings and improved profitability
4	Agro-processing businesses (including set up by women self-groups)	Expansion of processing units by setting up micro-distillers for agro-fuel production and supply to the market
5	Micro, small and medium scale enterprises (MSMEs) (including women headed enterprises)	Improved opportunities in delivering technologies for climate adaptive farming, clean cooking devices, equipment supply for micro-distillers, etc.
6	Other vendors in supply chain	Improved opportunities in marketing and sale of clean cooking devices and agro-fuel for cooking and transport purposes

Annex 2. Barriers in switching to climate adaptive practices in agro-fuel supply chain

No.	Key barriers	Target communities (within selected geographical regions)					
		Farmers	Rural households	Vehicle operators	Agro-processing businesses	Micro, small and medium scale enterprises (MSMEs)	Other vendors in supply chain
1	Inadequate awareness on sustainable agro-feedstock farming practices	X					
2	Inadequate knowledge and technical standards for agro-fuels				X		
3	Limited skilled personnel and training facilities				X	X	
4	Insufficient enabling measures to accelerate cross-sectoral adoption		X	X	X	X	X
5	Inadequate climate-resilient measures in the agro-fuel supply chain		X	X	X	X	X
6	Limited access to adaptation finance	X	X	X	X	X	X
7	Low affordability and insufficient awareness on benefits of agro-fuel use		X	X			