FINAL PROJECT REPORT

Reporting Period:
01 January 2019 – 30 June 2021

ProDoc Project name	Towards Environmental Sustainability in Cambodia
Project Name	Building an Enabling Environment for Sustainable Development (BESD)
Project ID:	00093203
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Duration:	01 January 2019-30 June 2021
Component (Strategic Plan):	Solutions scaled up for sustainable management of natural resources, including sustainable commodities and green and inclusive value chains
Total Budget	US$ 3,221,078.84
Implementing Partners/Responsible parties	National Council for Sustainable Development, Ministry of Environment, Ministry of Mine and Energy, National Committee for Sub-National Democratic Development

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Acronyms

ADB	Asian Development Bank
CBNRM	Community Based Natural Resource Management
EAC	Electricity Authority of Cambodia
EDC	Electricité Du Cambodge
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
GDEP	General Directorate of Environmental Education
GDLC	General Directorate of Local Community
GDANCP	General Department of Administration for Nature Conservation and Protection, MoE
GEF	Global Environnent Facility
GHG	Greenhouse Gas
GSSD	General Secretariat for Sustainable Development
INRM	Integrated Natural Resources Management
MEF	Ministry of Economy and Finance
MME	Ministry of Mines and Energy (formerly MIME)
MoC	Ministry of Commerce
MoIH	Ministry of Industry and Handicraft
MLMUPC	Ministry of Land Management, Urban Planning and Construction
MoE	Ministry of Environment
MoI	Ministry of Interior
MoT	Ministry of Tourism
MoWRAM	Ministry of Water Resources and Meteorology
NCDDS	National Committee for Sub-National Democratic Development
NCSD	National Council for Sustainable Development
NGO	Non-Governmental Organisation
NPASMP	National Protected Areas Strategic Management Plan
NRM	Natural Resource Management
PA	Protected Area
PDOE	Provincial Department of Environment
PES	Payment for Ecosystem Services
PPA	Power purchasing agreement
PPP	Public Private Partnership
PV	Photovoltaics
RGC	Royal Government of Cambodia
RUPP	Royal University of Phnom Penh
SDG	Sustainable Development Goal
SHS	Solar Home System
SME	Small and Medium Enterprise
SIDA	Swedish International Development Cooperation Agency
SREP	Scaling-up Renewable Energy for Low Income Countries Programme
SWM	Sustainable Waste Management
ToR	Terms of Reference
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UN-REDD	United Nations REDD Programme
USAID	United States Agency for International Development
WB	World Bank

Executive summary

The Building an Enabling Environment for Sustainable Development (BESD) project was designed to address three sets of environmental challenges, which emerged due to the country's rapid economic and population growth. The problems to be addressed were 1) degradation of natural resources; 2) growing volume of waste; and 3) limited access to affordable, sustainable, and clean energy among the poor. To achieve this objective, the project designed and tested *innovative* environmentally sustainable models in the targeted areas through public and private partnerships, with a view to attaining the following three outputs:

- **Output 1 (Natural Resources Management)**: CBNRM institutions strengthened, and financial resources mobilised for sustainable NRM
- **Output 2 (Circular Economy):** Waste reduced, recycled and reused through application of circular economy models
- **Output 3 (Energy):** Improved access to clean, affordable, and sustainable energy for the rural poor

Overall, the project served as a "pioneer" initiative that introduced numerous new concepts and innovative solutions to Cambodia. The project demonstrated the tangible environmental and economic benefits of these new concepts and innovative solutions, which the project had furthermore sought to mainstream for the target stakeholders as explained below.

Output 1: Natural Resource Management

The project sought to 1) strengthen the role of local communities in managing natural resources and ecosystem services and 2) mobilize sustainable financing of PAs through PES.

To strengthen the role of local communities in managing PAs, the project provided trainings for communities and their networks. The project also supported the boundary demarcation of the Community Protected Area to strengthen their tenure rights of natural resources and provided alternative livelihood options to alleviate the pressure on the protected area.

The project provided an additional rapid Covid-19 response fund, to engage 2,810 affected people in Pursat and Siem Reap provinces in tree planning as part of a cash for work programme. At least US$ 196,084 was paid to the affected communities, including 513 women-headed households. A total of 147,800 seedlings were planted, covering a total area of 181.93 ha.

The project also played an important role in building an enabling environment for PES to mobilise sustainable financing for PA management. This was done by awareness raising of the PES concept, by designing schemes for two PES pilot sites, and by developing a draft national PES roadmap (2021-2031), which defined an overall vision, priority actions, and a plan for upscaling PES pilots to the national level.

Output 2: Circular Economy (CE)

The project sought to introduce and mainstream "Circular Economy (CE)" as a solution to the problems of waste management with a particular focus on plastic waste. Since the concept of CE was new to the country, to successfully initiate a transition towards a CE and to effective plastic management, the project implemented an integrated approach.

The project started with a series of research initiatives aiming to identify barriers and opportunities for CE. Drawing on the research findings, the project supported the MoE and NCSD in developing an enabling policy and regulatory framework for relevant stakeholders. This resulted in the National CE Strategy and Action Plan (2021-2035) and a draft sub-decree on plastic management.

The project also promoted awareness raising through dissemination of information materials and through a plastic-free campaign conducted in partnership with two universities and Cambodian celebrities. This campaign had more than 10 million social media views.

In addition, the project promoted active engagement of the private sector with a view to adopting CE measures. The project developed a CE Private Sector Platform to disseminate information about those measures. In partnership with H&M, the project also assessed Waste to Energy options for the garment sector, the largest industry in Cambodia. This joint assessment was used to recommend appropriate Waste to Energy measures to minimize environmental hazards.

With the aim to develop a CE model applicable to smaller towns, the project supported CE pilot activities in Kep province. This included formulating a proposal for simple waste separation, designing adequate incentives in support of waste separation at source, and devising viable business models for waste depot investment and governance structure mechanisms. The project also provided equipment such as waste bins and depots.

Output 3: Energy

The project sought to mainstream solar energy as a clean, sustainable, affordable and reliable energy for off-grid vulnerable communities and to promote energy efficiency as one of the most cost-effective ways to meet the growing electricity demand.

The project played an important role in demonstrating the viability of solar PV- especially its comparative advantages for providing affordable energy to off-grid rural poor households. In order to convince high-level decision-makers about the potentials and benefits of solar PV, the project provided solid scientific and economic evidence through the 1) De-risking Renewable Energy Investment study and the 2) “Economics of Solar” study. The project also disseminated various communication materials to improve the understanding of solar. The project further tested and showcased the viability of solar through the Clean Energy and Incubation Program and via solar PV mini-grids to off-grid communities in Kampong Chhnang and Ratanakiri provinces. A total of 225 households gained access to electricity.

During the last 6 months, the project promoted energy efficiency initiatives aimed at the highly energy-intensive building sector, through the development of the Energy Efficiency Design Guideline for Residential and Commercial Buildings, installation of energy efficiency measures at the General Department of Energy, and development of awareness raising materials.

Lessons learned

The project played a crucial role in building an enabling regulatory and policy framework and in testing, piloting, and demonstrating the environmental and economic aims, purposes, and benefits of these new concepts. This was in part due to assignments of senior level technical experts from both the government and UNDP who provided timely, high-quality technical assistance. Another key reason is the adaptive management, which enabled the project to effectively respond to challenges faced by the outbreak of COVID-19.

Despite these measures, the difficulty in conducting field missions due to Covid-19 affected the operationalisation of policy designs that depended on results from pilots. Also, the project had many ambitious goals, which meant that project stakeholders had to prioritize their engagements over others. Furthermore, the diversity of project components (NRM, CE and energy) made integration challenging.

This offers some important lessons for future projects. It is imperative to design projects with a realistic set of activities in consideration of project resource and project duration. Second, future projects must focus on ways to ensure an integrated approach across components.

I. Context

Whereas Cambodia has attained impressive economic growth over the last 20 years, it faces a new set of developmental challenges regarding its environment. These include 1) degradation of natural resources; 2) growing volume of waste, and 3) limited access to affordable, sustainable and clean energy among the poor.

To address these environmental challenges, the BESD project sought to strategically position Cambodia's path towards achieving the Sustainable Development Goals (SDGs) related to *1) Natural Resources Management (NRM); 2) Circular Economy (CE); and 3) clean, affordable and sustainable energy.*

To achieve this objective, the project designed and tested *innovative* environmentally sustainable models in the targeted areas through public and private partnerships. The project sought to attain the following three outputs:

- **Output 1 (NRM)**: CBNRM institutions strengthened, and financial resources mobilised for sustainable NRM
- **Output 2 (CE)**: Waste reduced, recycled and reused through application of circular economy models
- **Output 3 (Energy):** Improved access to clean, affordable, and sustainable energy for the rural poor

The project sought to make contributions to the UNDAF, 2019-2023 Outcome 3– "Planet: By 2023, women and men in Cambodia, in particular the marginalized and vulnerable, live in a safer, healthier, more secure and ecologically balanced environment with improved livelihoods, and are resilient to natural and climate change related trends and shocks."

The project results also sought to contribute to the attainment of the following outputs of the UNDP County Programme Document (CPD 2019-2023)

- Output 2.1: "Targeted cities and urban centres prepare and operationalize solid waste management plan to reduce environmental pollution impact from solid waste" and
- Output 2.3: "Rules and regulations formulated and adopted for forest/natural resource management and market solutions developed for conservation and renewable energy."

Targeted provinces for pilot and demonstration activities included Siem Reap and Preah Sihanouk (for PES), Pursat and Siem Reap (for cash for work programme), Kep (for circular economy), and Kampong Chhnang and Ratanakiri (for energy).

Target stakeholders included Civil society organizations, the private sector, academic institutions, local communities, indigenous peoples and women, with particular attention to the rights of socially marginalized groups.

II. Performance review

Progress review

1. Overall progress towards the UNDAF outcome

The project made tangible contributions to the UNDAF, 2019-2023 Outcome 3– "Planet: By 2023, women and men in Cambodia, in particular the marginalized and vulnerable, live in a safer, healthier, more secure and ecologically balanced environment with improved livelihoods, and are resilient to natural and climate change related trends and shocks."

NRM project activities aimed to improve the livelihoods and resilience of rural communities in targeted areas. There was a particular focus on strengthening the skills, rights and networks of people involved in managing Phnom Kulen National Park. The project also engaged a total of Covid-19 affected 2,810 people through a cash for work programme for planting trees with the aim to restore over 181 hectares of degraded lands in protected areas. The project further developed a national PES roadmap as an enabling policy framework to mobilise sustainable financing for protected areas. Project activities related to circular economy sought to support a clean and environmentally sustainable environment via policy and regulatory measures to reduce, reuse, and recycle plastic waste. Project activities related to energy sought to provide a clean, affordable and sustainable energy to 225 off-grid rural poor households that previously lacked such access (See the section III project results summary for more information).

2. Overall progress towards the CPD output(s) relating to your project

The project results also contributed to the attainment of the following outputs of the UNDP County Programme Document (CPD 2019-2023)

- Output 2.1: "Targeted cities and urban centres prepare and operationalize solid waste management plan to reduce environmental pollution impact from solid waste" and
- Output 2.3: "Rules and regulations formulated and adopted for forest/natural resource management and market solutions developed for conservation and renewable energy."

For output 2.1, the project supported the Kep administration to draft and update their solid waste management plan, which will be used to enable waste separation at source and recycling. For output 2.3, the project formulated new policy and regulatory measures for effective management of natural resources, waste and energy. These included a national PES roadmap, CE Strategy and Action Plan, a draft sub-decree on plastic management, and Energy Efficiency guidelines for commercial and residential buildings (See the section III for details for how these policies and regulations will be used).

3. Capacity development

The project contributed to improved national-level capacity through building an enabling policy and regulatory framework for attaining sustainable development in the target areas. For instance, the project developed a national roadmap for PES as a sustainable financing option for managing protected areas. For waste management, the project developed a national CE Strategy and Action Plan. Like the PES roadmap, this strategy set the overall vision and priority activities for the country to transition from a linear to a circular economy. Project activities related to energy played a pivotal role because they provided robust evidence on the comparative advantages of solar energy and opened for mainstreaming.

In all of these activities, both senior and technical level government officers took active roles in design and implementation. This contributed to the enhancement of their overall capacities in terms of technical knowledge, coordination skills, and the ability to steer relevant policies, regulations and plans to next steps.

Through the project implementation, they acquired high level of technical knowledge related to NRM, CE and Energy. For instance, the NCSD/MoE and line ministries learned about new concepts and benefits of PES and CE. The project also helped the Ministry of Environment (MoE) technical officers to identify possible environmental impacts of waste to energy measures and develop a guideline to minimize such impacts. It also helped the Ministry of Mine and Energy (MME) technical officers to learn about the new technology of solar mini-grids that enable energy provision for off-grid households.

Moreover, the project ensured the active roles of the government officers in coordinating and navigating discussions on and implementation of relevant policies and regulations. This, for instance, resulted in the successful development of enabling policy and regulatory frameworks such as national PES roadmap, policy recommendations for PES fund management, and the successful endorsement of the national CE Strategy and Action plan.

4. Gender marker

According to the BESD result framework, the project was listed as gender-marker 2 (gender equality is not the main objective of the expected output, but output promotes gender equality in a significant and consistent way).

The project design incorporated measures to support equal opportunities for women to participate in the activities. For instance, the project results framework disaggregated numbers by gender to monitor and evaluate equal participation in project interventions. While the project sought to promote gender equality by ensuing the equal participation of both women and men in decision making and implementation for all the activities, the terminal evaluation report highlighted the need for additional actions to achieve more fundamental changes. The recommended actions included a gender-gap assessment, a plan of action for interventions, and additional focus on tracking the extent to which the gender gap is narrowing.

5. Impact on direct and indirect beneficiaries

In light of the primary goal to create an enabling environment for sustainable development, a majority of project activities centered upon developing enabling frameworks (e.g., national PES roadmap, national CE Strategy and Action Plan, and development of Energy Efficiency guidelines for buildings). Through these activities, beneficiaries such as citizens, local communities and the private sector indirectly benefited from an improved environment for sustainable NRM, circular economy, and sustainable energy.

The project also had specific outreach components for beneficiaries on the ground. They included activities to strengthen the tenure rights of local communities living in the national park of Phnom Kulen in Siem Reap province, through the placing over 100 boundary posts to protect community protected areas and a 900 ha of watershed of Klah Khmum village. From mid-2020 to May 2021, the project provided rapid Covid-19 response funds to support income-generation opportunities through tree-planting for residents in select areas of Siem Reap and Pursat, who were among the most affected by Covid-19. A total of 2,810 people from 1,915 families joined tree planting activities and received US$196,084 in total. The project also provided solar energy through solar mini grids to off-grid rural poor households who previously had no access to energy. As a result, a total of 225 households gained access to electricity. This included 140 households with 1245 people in three villages in Kampong Chhnang province, and 85 households with 341 people from a Jarai indigenous village in Ratanakiri province.

Implementation strategy review

1. Participatory/consultative processes

At the design stage, the project assessed challenges and opportunities in NRM, waste and energy. Based on the assessment, the project identified areas for priority interventions together with the Ministry of Environment (MoE), National Council for Sustainable Development (NCSD) and the Ministry of Mines and Energy (MME). To attain the project overall objective to "build an enabling environment for sustainable development" in target areas of work, the project supported 1) research, 2) testing innovative approaches on the ground, 3) development of enabling policies and regulatory instruments, and 4) raising awareness about new approaches.

For all the activities, "meaningful stakeholder consultation and participation" was promoted as a key guiding principle. For PES work, for instance, the project organized a National Dialogue on PES, which brought together 160 people to share the state of knowledge related to PES and collectively define priorities for PES in Cambodia. For CE works, the project engaged relevant line ministries, the private sector, development partners, and civil societies for consultation meetings on proposed objectives and priorities in order to effectively incorporate their views.

In addition to engaging stakeholders in consultations and policy discussions, the project sought to ensure that nobody would be left behind during field level pilot activities. The project paid special attention to the most vulnerable, such as the poor, women, and people with disabilities. For example, the cash for work programme applied measures to identify potential households and to ensure equal participation of both women and men in joining and benefiting from the income generation opportunities. At least US$ 196,084 was paid to the affected communities, including 513 women-headed households. The solar mini-grids work conducted rapid assessment to identify 30 female headed households and 10 households with disability or elders to be included among the beneficiaries.

2. Quality of partnerships

The project engaged various partners for the project implementation.

On the government side, the project engaged all relevant line ministries and subnational administrations in defining policy priorities and implementing pilot activities related to NRM, circular economy and energy. The project also coordinated with other UN agencies, donors, NGOs and civil society. For the work on PES, the project jointly organized the National Dialogue on PES with the Food and Agriculture Organization (FAO). For the pilot implementation, the project worked closely with the NGO Archaeology & Development Foundation (ADF), which had existing networks and activities in Kulen Mountain, to ensure effective implementation of the activities. Under the CE related activities, the project further coordinated a series of CE learning sessions, which invited partners including development partners, NGOs and research institutions to share the state of knowledge related to waste management. The project also mobilized youth groups through engagement with the Royal University of Phnom Penh and the National University of Management in youth-led plastics campaigns on social media.

In addition, the project promoted active engagement of the private sector to initiate and advance the shift towards a circular economy. The project designed and launched a CE private sector platform to disseminate information about priority CE measures, which can be adopted for different types of businesses. A handbook on how to transform hotel businesses to be environmentally sustainable was also produced.

3. National ownership

According to the final project evaluation report, the overall quality of implementation by both Implementing Partner and UNDP was "highly satisfactory". The report describes national ownership as "evident," noting the keen interest and engagement of senior level government and officials in implementation of project activities. Please also refer to the section: *progress review, 3. capacity development* for the information about how the government partners took a lead in designing and implementing key project activities.

In terms of involvement of national counterparts in project activities, the project followed the National Implementation Modality (NIM) with the National Council for Sustainable Development (NCSD) as the project Implementing Partner (IP). The NCSD has led the processes of design and implementation of project activities. The Project Management Unit (PMU) under the NCSD played a central role in preparing and updating annual work plans, organizing project-related meetings, including the board meetings, and managing day-to-day operations of the activities. These activities were supported by the UNDP project manager and technical experts on NRM, circular economy and energy, as well as a group of national and international consultants. Project implementation and quality was monitored by the UNDP country office.

To ensure effective implementation of the project activities, the NCSD also provided the project with co-financing of US$160,800 as in-kind contribution. Senior management of the NCSD took an active role in providing overall guidance on project directions and activities.

4. Sustainability

To ensure the sustainability of project results, several strategies were deployed, focusing on creating an enabling environment and on developing capacities.

The first strategy was to build upon existing government interests and needs. The project sought to address the government interests in creating an enabling environment in support of sustainable development approaches in the areas of NRM, waste and energy. The resulting framework, PES, circular economy, and energy efficiency were thus well aligned with government priorities and well-integrated into national priorities for future actions. Another sustainability strategy was to ensure national ownership and leadership in implementing the activities. Project implementation was led mainly by key ministries involved in each component. Their active involvement throughout the project duration contributed to enhancing capacities and knowledge related to technical subjects and it contributed to effective integration of proposed measures into institutional priorities. Likewise, the project promoted a learning-by-doing approach for all other target stakeholders including NGOs and local communities, which allowed them to acquire knowledge and skills through implementing activities.

Overall, these strategies were successful in building and institutionalizing enabling regulatory frameworks, and disseminate knowledge and skills among government and stakeholders, which significantly increased the likelihood that activities and results will be sustained beyond the project duration. The NCSD/MoE also set project sustainability as a key government priority. For example, for PES, NCSD/MoE has developed related plans covering the following key actions:

- Enhance capacity of government institutions, partners and relevant stakeholders to implement PES's roadmap, instruments, and legislation/policy;
- Integrate PES modality into landscape planning, ecotourism program, REDD+ and other relevant existing projects such as Cambodia Sustainable Landscape and Ecotourism Projects;
- Support sustainable financing mechanism and implement resources mobilization action plan for PAs management; and
- Engage stakeholders, especially private sectors, and research institutions to participate and implement of PES program and resource mobilization strategy and action plan.

Management effectiveness review

1. Quality of monitoring

According to the final evaluation report, the overall quality of monitoring and evaluation was "highly satisfactory." The project management team regularly monitored implementation and reported on activities. The UNDP CO provided active support to the PMU for preparing project annual progress reports and annual work plans in line with the UNDP guidelines, for following up on financial payments and transactions, and for implementing project activities. The project team also regularly updated the Embassy of Sweden on implementation progress and results as well as issues which required management attention and guidance. This was done through project board meetings, technical level meetings and field monitoring visits to project sites and meet with communities and stakeholders who are part of the project activities

Both UNDP CO and PMU closely monitored the quality of project delivery and its efficiency. For example, while the project document requires only annual project board meetings, the project conducted more frequent project board reviews as needed. The project also made timely course corrections including repurposing activities to swiftly address challenges, for example, due to the Covid outbreak. The UNDP CO also made field visits whenever possible to monitor field level implementation and meet with project stakeholders including communities and partners for effective implementation.

2. Timely delivery of outputs

Overall, project outputs were delivered in accordance with the schedule set up in the initial project results framework. However, the outbreak of the Pandemic significantly impacted the ability to move forward with activities as planned. For obvious reasons, the most affected activities were physical meetings, field level activities, and consultations. In response, the project applied an adaptable management approach. The project team reviewed all activities impacted by COVID-19 and proposed alternative measures, notably on-line meetings. When necessary, alternative activities that would contribute to the overall project objectives were adopted. For example, the budget planned for outreach events related to energy efficiency was reallocated in support of the establishment of solar mini-grids in more off-grid communities. By the end of the project, the project had achieved a majority of the planned outputs, with the aforementioned exception of activities that required field level implementation and consultations (See the section III project results result summary and Annex 1 for more information)

3. Resources allocation and Cost-efficiency

The project allocated resources effectively. The proportion of staff costs was above 30 % of the total project budget. The main reason was to meet the project goal to build a high-level enabling environment for sustainable development. A team of senior level experts was involved in providing timely and quality support for each of the quite different technical components. A SB5 level national project manager (with 80 % of his time) oversaw the overall project management and provided specific technical advice for 1) NRM and 2) Circular Economy. A P4 level international environmental policy specialist (30 % of her time) provided technical support for 1) NRM and 2) Circular Economy. A P5 level international energy adviser (40 % of his time) and SB4 level national energy officer (80 % of his time) provided technical support for 3) Energy. This team played a key role in providing support for developing a high-level policy and regulatory framework, but also identifying and testing innovative policies, ideas, and methods.

The project utilized 99.8 % of the total budget. The initial project budget was US$2,208,268 (2019-2020) of which US$ 1,848,268 was Sida grant and US$ 200,000 from UNDP co-financing. With 6 months cost extension, the final total budget increased to US$3,221,079, which included UNDP co-financing US$ 316,240.

4. Cost-effective use of inputs

In general, the project made effective use of staff time, inputs from international and national consultants, and equipment in order to produce intended results. Most targets were achieved by the end of the project. Yet, the ambitious design of the project, which entailed a large and diverse number of activities and targets created practical challenges related to the allocation of sufficient time for all the activities. Future design would benefit from more realistic assignations of staff time to ensure attainment of all project targets and from better prioritization of activities to maximize the impact and quality of results.

III. Project results summary

Output 1: Natural Resources Management

Background

As part of the effort to strengthen the national conservation agenda, Cambodia expanded its protected areas (PAs) to over 41% of the country (7.3 million ha of land) in 2016. These areas provide a range of ecosystem services, including clean water, air, carbon storage, and wildlife habitat, which are part of a nation's wealth, or "natural capital".

However, these protected areas have come under heavy pressure, with a loss of natural habitats and degradation of forests in many upstream watersheds. This has significantly impacted the recharge of groundwater, downstream fisheries as well as carbon sequestration capacities. It has also negatively impacted the livelihoods of many rural people, especially women and the poor, who are dependent on forests for subsistence and income. These worsening conditions are not least due to limited human and financial resources available to effectively manage the vast protected areas. At present, 7.3 million ha of protected landscapes are managed by just 1,260 Rangers (i.e. over 5,000 ha/Ranger). Moreover, the allocation of government budget to implement conservation efforts remains minimal for sustainably managing 41 % of Cambodia's total land area.

To improve the situation in terms of financial and human resources, the RGC has expanded opportunities for communities to engage in NRM, among other things by establishing new Community Protected Areas (CPAs). Additionally, in 2016, the RGC released an official order (*sochornor*) to advance dialogue on Payment for Ecosystem Services (PES) to mobilize additional financial resources for PA management. The RGC designated two locations: Phnom Kulen National Park (PKNP) in Siem Reap Province and Kbal Chhay in Preah Sihanouk Province, as pilot PA sites to test how PES would be able to support these watersheds, which play a vital role in providing clean water for tourism, a cornerstone of the national economy. Using lessons from these pilots, the Government planned to introduce a national payments policy.

Key objectives

In order to address human and financial resource challenges in managing protected areas, Output 1 activities sought to design and pilot innovative solutions to contribute to 1) strengthening the role of local communities and stakeholders in managing natural resources and ecosystem services and to 2) sustainable financing of PAs through operationalizing PES.

In late 2019, the outbreak of Covid-19 added another layer of problems to the management of protected areas. A significant number of migrant workers returned to rural areas after losing jobs in cities or neighbouring countries due to the Pandemic. In desperate search for money and food, many went to the forests to cut trees and hunt animals. In mid 2020, the Embassy of Sweden provided additional fund to offer income generation opportunities through tree-planting for those who were most affected by the Covid-19 in the areas of Siem Reap and Pursat.

Key results

Below the key results under this component are listed.

Expansion and strengthening of community based NRM (CBNRM)

The project supported CBNRM gender assessments, training workshops, provisions of alternative livelihood options, and boundary demarcation.

At the initial stage of project implementation, the project completed detailed gender assessments of CBNRM to enhance opportunities for women to participate in the management of Community Protected Areas (CPAs) inside Phnom Kulen National Park (PKNP). Its recommendations have been incorporated in awareness raising and training workshops facilitated for local villagers in PKNP.

The project also conducted a series of meetings and workshops to enhance the capacity of communities and the CPA network to effectively manage protected areas. The objectives of these activities were to support the effective operation of a CPA network and to clarify the roles and responsibilities of villagers with respect to setting by-law regulations and dealing with illegal activities. Enhanced opportunities for women to participate in the CPA management committees were also explored. Clear boundary demarcation of the National Park and CPAs located inside the Park was prerequisite to prevent illegal encroachments. The project facilitated the placing of over 100 marked and geo-referenced posts to protect CPAs and a 900-ha watershed of the Klah Khmum village. To alleviate the pressure on the protected area, the project provided alternative livelihood options to cashew nut plantation (a major driver of deforestation) for marginalized villagers in Po Pel village that manages one of the CPAs inside the Phnom Kulen National Park. As a part of this effort, the project built a water distribution system targeting 23 families (including 95 females and 100 children), along with the aim to alleviate the workloads of women in the village.

Cash for work through tree planting

As an emergency relief response to COVID-19, from September 2020 to May 2021, the project engaged a total of 2,810 people from 1,915 vulnerable families in Pursat and Siem Reap provinces, most affected by Covid-19 pandemic crisis for the tree planting activities.

Under this cash-for-work programme, at least US$ 196,084 was paid to the affected communities, including 513 women headed households. A total of 147,800 seedlings, including 97,800 seedlings of 14 local species and 50,000 seedlings (with five local species), were planted covering the total area of 181.93 hectares (ha). The survival rates of seedling varied depending on the implementing partner sites, ranging from 65% to 90%. During the maintenance period in 2020, 8,862 seedlings were planted to replace dead tree seedlings to ensure that the survival rate to reach 90%. The project also established a tree nursery equipped with a solar water pump to water the seedlings. This facility was handed over to the fishery community for future reforestation programme(s).

Operationalizing Payment for Ecosystems Services (PES) in Cambodia

To mobilize financing for protected area management the project sought to establish and operationalize PES. To achieve this objective, the project defined targets as part of the development of a national PES roadmap. They were based on testing and operationalization of two pilots in Kulen Mountain and Kbal Chhay and led to development of enabling regulations.

Development of a national PES roadmap: To enable PES operationalization, the project supported development of a draft National PES Roadmap (2021-2031). This roadmap defined an overall vision, priority actions and a plan for upscaling PES pilots to the national level. The short-term target (2021-2023) was to mobilize funding for the MoE and Provincial Department of Environment (PDOE) beyond allocations from the National Budget to ensure the effective implementation of priority actions in existing PA Management Plans). Over the long term (2024-2031), the roadmap seeks put in place a national payment scheme for environmental services to benefit conservation and collaborative management efforts across PAs in Cambodia.

Awareness raising on PES: The concept of PES was relatively new to Cambodia. Hence, the project also focused on raising awareness through creating videos and posters targeted both at the general public and private sector. The project also organized a National Dialogue on

"Payment for Ecosystem Services in Cambodia" in September 2019 with over 160 participants from relevant line ministries, provincial governments, the private sector, NGOs and local communities. The dialogue included presentations of successful PES examples from other countries and in Cambodia, and proposals of short and medium-term interventions aimed at operationalizing PES.

Operationalization of two PES pilots: One of the key targets included in the national PES roadmap was to operationalize two PES pilots.

Seeking to identify appropriate options for PES operationalization, the project carried out PES feasibility studies in the two pilot sites which focused on 1) assessment of possible impacts of deforestation in Kulen Mountain on water supply in downstream Siem Reap town and 2) an assessment of "Willingness-to-Pay" (WTP) of visitors to the park and the tourism industry for Phnom Kulen. The first assessment highlighted that deforestation will likely have negative impacts on long term water availability and focused attention on the urgent need to protect the forests in Kulen Mountain. The second study confirmed the feasibility of collecting fees from tourists for the protection of watersheds.

These research findings served to confirm both the urgency and overall feasibility of PES. This information was used in the project to develop a set of practical operational recommendations to the MoE. The recommendations included 1) allocation of a portion of the already existing Environmental and Social Fund (ESF) to finance urgently needed priority actions; 2) a draft operational guideline and mechanism to mobilize funds from the tourism and industry sectors (initially on a voluntary basis with the intention to make payments compulsory later on); and 3) establishment of institutional arrangements including a multi-stakeholder PES management committee to manage and oversee the PES Fund.

These recommendations put in place the foundation for operationalizing the research findings from the PES pilots. However, due to the COVID-19 outbreak, the project was unable to fully accomplish this goal, since field level consultations with target stakeholders became impossible. Since COVID-19 moreover hit the tourism sector badly, mobilizing payments became an infeasible option in the short term. Hence, the project had to look for other options.

Full operationalization of PES pilots will require the follow-up actions listed below, which will be pursued by ongoing projects and initiatives supported by UNDP including the Sida Global Programme, the Bio-financing initiative and the Cambodia Sustainable Landscape and Ecotourism project.

- Development of a Management Plan for PES for Kbal Chhay to define key priority actions and viable funding sources for PES fee collection:
- Further refining the roles of different government agencies and other stakeholders on revenue collection, disbursement and monitoring of fund management.
- Completing negotiations between the supply and demand sides to reach agreement on the types and sizes of initial investments in the protection of the PKNP and KCMUA; and
- Overseeing transparency and accountability in revenue collection and disbursement.

Output 2: Circular Economy

Background

The combination of rapid population growth and economic development in Cambodia has led to an exponential surge in the volume of municipal and industrial solid waste. This has become significant challenge for waste management.

Current rates of solid waste disposal in municipal landfills are expected to double by 2029, reaching 2.1 million tons per year. This will likely exceed the capacity of all existing landfills in Cambodia. The situation is particularly alarming in major cities such as Phnom Penh and Siem Reap. In Phnom Penh, around 3,000 tons of municipal waste is generated every day. More than 80 % of this waste consists of recyclable materials (e.g. organic 52%, plastic 21%). However, present waste management practices focus mainly on collection and disposal at landfills and private companies do not sort, recycle, or reuse waste materials. A minimal volume is collected informally by people who gather waste from landfills and households and sell recovered valuables to intermediaries, usually destined for Thailand or Vietnam for further processing.

These informal garbage collectors face health risks because of their direct exposure to toxic substances and accidents on landfill sites. At the same time, the large amount of untreated waste exposes the general population to numerous risks such as water pollution, the spread of disease, odour nuisances and air pollution from burning garbage. It also contributes to GHG emissions.

Key objectives and main activities

In response to these challenges, output 2 activities sought to introduce and mainstream "Circular Economy (CE)" as a solution to the problems of waste management and treatment. The key goal of the output 2 activities is to test and promote viable CE options to ensure sustainable management of resources and waste with a particular focus on plastic waste.

When this project was initially introduced, there was limited awareness about circular economy and its benefits for stakeholders and country as a whole. There was also limited awareness about plastic pollution and how different stakeholders might be involved in providing solutions.

On this background, initiating a transition towards a circular economy and effective plastic management required an integrated approach, which built on the following sets of interventions: 1) research to identify existing CE barriers and opportunities, 2) development of an enabling policy and regulatory framework for CE, 3) raising awareness, 4) engaging the private sector, and 5) piloting a CE model in a municipality.

Key achievements

Research to identify existing CE barriers and opportunities

In order to identify viable CE options, in cooperation with the UNDP Policy and Innovation unit, the project conducted various kinds of background research. They included 1) rapid review of single-use plastic regulations in countries across the world, recommendations for Cambodia, and research on 2a) plastic waste recycling, 2b) organic waste recycling and 2c) Waste to Energy (WtE) options to identify the state of practice, existing barriers and opportunities for promoting CEs. These research findings were incorporated into a recommendation not only for a CE Strategy and Action Plan and the Plastic Taskforce and a draft sub decree on plastic management as discussed below.

Developing an enabling policy and regulatory framework for CE

Drawing on the research findings, the project supported the MoE in developing an enabling policy and regulatory framework for relevant stakeholders to begin a CE transition.

A key component of this framework was **the National Circular Economy (CE) Strategy and Action Plan (2021 to 2035).** The CE Strategy set the overall visions and roadmap for the country to transition from a linear to circular economy model. The CE strategy defined closing the loop of the entire value chain (production, distribution, consumption, waste generation, and waste treatment) as a national goal. The plan also outlined a clear roadmap, along with short-, medium-, and long-term priority actions to enable Cambodia's transition to a circular economy. The roles of different ministries, private sector, development partners, adamic and civil societies were clearly defined for the proposed actions.

To ensure national ownership and effectiveness of the proposed actions, the project involved all concerned ministries and development partners in a series of consultation meetings. This was also to raise awareness about circular economy and clarify what concrete actions each ministry and relevant actors would be able to take in the short, medium, and long terms.

Another key component was **a draft sub-decree on plastic management.** Over the last 2.5 years, plastic pollution became increasingly visible in Cambodia along with the country's rapid economic development and population growth.

In 2019, the project supported the MoE and NCSD in establishing a Special Taskforce on Plastic. The Taskforce focused on three priority areas for interventions: 1) Policy and regulation, 2) Communication and outreach, and 3) Business development with the objective to promote the 4 Rs (Refuse, Reduce, Reuse, and Recycle) of plastic. From 2019 to 2021, the project supported the MoE in implementing a new guideline to internally implement 4 Rs to ban the use of plastic bottles on their offices.

The project also supported the MoE in developing a draft sub-decree on plastic management. This sub-decree included a full range of measures to reduce and minimize the production, the use and consumption of plastic items, and to ensure proper management of plastic waste through reuse, recycling, and energy recovery. Economic and regulatory measures for single use plastic items (straws, bottles, packaging materials) were also included as initial proposal for further consideration.

Raising awareness about CE and the urgency to take actions against plastic pollution

Based on the understanding that the effectiveness of new policies and regulations depends on improved awareness and behavioural change among stakeholders including both citizens and the private sector, the project promoted awareness raising among all relevant stakeholders. These stakeholders included NGOs, universities, celebrities, and development partners,

Besides developing posters, a booklet, and website content for both MoE and UNDP, and social media messages to raise awareness about circular economy, and plastic problems, the project supported **a youth-led plastic-free campaign with the Royal University of Phnom Penh (RUPP)**. This campaign involved over 300 students and included a competition where students created videos to raise awareness and promote behavioural change.

To enable wider outreach, the project further conducted joint campaigns against plastic waste with Cambodian celebrities. The campaign entailed launching a cartoon video featuring a plastic monster, and two music videos and a TV commercial on the topic of plastic. The campaign also involved a three-day concert to raise awareness of plastic issues, which was held during the Water Festival. This campaign gained more than 10 million social media views. A TV commercial on 4Rs (Refuse, Reduce, Reuse, and Recycle) reached 1.3 million viewers.

Engaging the private sector in piloting and adopting CE measures

The private sector's active engagement is crucial in adopting sustainable energy and resources, improving energy and resource efficiency, introducing alternatives to single-use items, promoting reuse, repair, and recycling, and operating Waste to Energy businesses. While there was growing interest and support among the private sector for more environmentally friendly practices, information on how to implement these actions is still limited and not easily accessible.

As an initial step towards enabling the private sector to adopt CE practices in Cambodia, the NCSD and MOE developed a CE Private Sector Platform. This platform's objective was to disseminate information on CE measures and support the private sector with information about CE adoption.

In partnership with the company H&M, the project assessed CE options for the garment sector, which is the largest industry in Cambodia. This assessment was in response to two of the company's major environmental challenges. They are reliant mainly on fuelwood as the main energy source for boilers and generation of a large volume of textile waste. The garment sector had been exploring options such as a small-scale on-site Waste to Energy (WtE) solution to turn textile waste into energy and a large-scale WtE solution involving a cement kiln for co-processing waste. The joint assessment showed that while this on-site WtE solution successfully reduced the use of fuelwood, burning textile created another environment risk, of air pollution unless properly operated. Thus, the project provided recommendations for appropriate measures to minimize environmental and public hazards as well as operating manuals and guidelines.

Piloting CE approach in a municipality

The project sought to design a small-scale CE pilot scheme for Kep in order to develop a model applicable to smaller towns with limited access to infrastructure and technology.

This included formulating a proposal for simple waste separation requirements (e.g. into organic and non-organic), designing adequate incentives in support of waste separation at source, and devising viable business models for waste depot investment as well as governance structure mechanism. The project also worked to operationalize the CE model by engaging stakeholders including the subnational government, private sector, and households. Initially the project intention was to work with the major hotels and markets to sort waste for separate collection and treatment, and then later on with households. The project also planned to support recycling industries and social enterprises to be able to treat sorted waste. However, due to the outbreak of COVID-19, the implementation of the planned activities was delayed and could not be delivered. Instead, the project focused on feasible options given the circumstance by contributing to 1) incorporation of a CE into its five-year development plan and 3-year rolling plan for Kep province for 2020 and 2) drafting two municipal level regulations for waste collection pricing and on the establishment of a municipal solid waste management unit at the Kep municipality.

Development of scaling-up strategies including programming and new partnership

The project formed strategic partnerships to advance CE dialogues with relevant institutions and initiatives, including existing UNDP projects such as Cambodia Climate Change Alliance, the World Bank (on plastic interventions), EU Switch Asia Programme (on sustainable consumption and production) and Global Green Growth Institute (GGGI) (on the Kep pilot). The UNDP Policy and Innovation unit also explored additional funding opportunities to complement and leverage the impacts of the BESD interventions, including the combatting marine plastic litter project funded by the Embassy of Japan.

Output 3: Energy

Background

As of 2018, out of Cambodia's 16.5 million population, 4.87 million[1] had no access to grid electricity and rely on car batteries, wood, and other traditional fuel sources for energy[2].

On the supply side, Cambodia significantly increased the capacity of electricity generation over the last decade, from 584 MW in 2010 to 2,756 MW in 2019. In 2019, the total power generation capacity consisted of 1,330 MW (48%) from hydro power, 675 MW (24%) from thermal power (mainly coal), 227 MW (8%) from fuel oil-based generation, 124 MW (4%) from renewable energy, and captive power of 400 MW (15%) to meet power demand during the dry season[3]. As these numbers indicate, the share of clean and sustainable energy such as solar remained minimal. Moreover, an estimated 1,037 villages, mostly located in remote islands, and highly vulnerable to climate change remained without grid connection.

On the demand side, the residential and commercial building sector consumed an estimate of 52% equivalent to 3.5 Mtoe[4] in 2017, making it the most energy consuming sector. Since 2000, 43,136 construction projects have been approved for a total land area of 114 million m^2. This rapid growth poses increasingly severe challenges in terms of electricity demand and was a major cause of the power shortages during the dry season in 2019.[5]

Key objectives and main activities

In response to this situation, the objective of output 3 was to mainstream solar energy as a clean and sustainable renewable energy and an affordable and reliable energy for off-grid vulnerable communities.

Another objective was to promote energy efficiency in residential and commercial buildings as one of the most cost-effective ways to meet the growing electricity demand, to boost competitiveness and welfare, and to reduce the environmental footprint of the energy system.

Key achievements

Mainstreaming solar energy into the national energy mix

While Cambodia has very favourable natural conditions for solar energy (e.g. ample sunshine and long period of sunny days), the promotion of solar faced significant challenges. This was mainly due to dominant, powerful interests in support for coal-based energy.

This meant that successful promotion of solar would depend on the creation of an equally powerful network of support from high-level decision-makers. In turn, this required building a case of solid scientific and economic evidence to convince the relevant decision-makers about the potentials and benefits of solar PV. Opening the door for solar energy to be mainstreamed as

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1 Data from Cambodia's Voluntary National Review 2019 on the implementation of the 2030 Agenda for Sustainable Development https://www.kh.undp.org/content/cambodia/en/home/library/environment_energy/cambodia_s-voluntary-national-review-2019.html

2 "Cambodia Energy Sector Assessment, Strategy, and Road Map" December 2018, available at https://www.adb.org/sites/default/files/institutional-document/479941/cambodia-energy-assessment-road-map.pdf

3 https://eac.gov.kh/uploads/salient_feature/english/salient_feature_2019_en.pdf

4 Million Tonnes of Oil Equivalent

5 https://asia.nikkei.com/Economy/Chinese-construction-rush-aggravates-Cambodia-s-electricity-shortage

a part of the national energy mix also entailed demonstrations of the viability and success of solar PV in providing energy access to off-grid poor rural communities. Furthermore, widespread adoption of solar energy required increasing awareness about and interest in renewable energy among diverse stakeholders as well as building the capacity of technicians in the areas of solar installation, operation and maintenance.

Against this background, in collaboration with MME, NCSD and the Policy and Innovation Unit of the UNDP Cambodia, the project contributed to the development of two evidence-based research related to solar: 1) De-risking Renewable Energy Investment (DREI) study and 2) "Economics of Solar" study.

The DREI report included a comprehensive assessment of regulatory, financial, and technical barriers of introducing solar PV energy in different sectors and recommended measures to remove those barriers. The Economics of Solar study assessed the costs and benefits of solar PV in comparison with other types of energy. It further demonstrated how solar energy could boost the economic efficiency by diversifying Cambodia's sources of energy generation. Both studies played an important role in informing key decision-makers at MoE, NCSD, MEF, and MME to advance further policy and institutional planning on solar PV.

Besides these studies, the project developed and disseminated various communication materials such as videos in order to improve the understanding of solar, and a leaflet on Solar Home System (SHS) for suppliers and end-users. With a view to enhance technical capacities, the project developed an SHS guideline (approved by MME) and conducted a training session for 20 engineers/technicians on SHS design, installation and maintenance for off-grid solar energy.

The project also sought to test and showcase the viability of solar through demonstration activities on the ground. This was done through the Clean Energy and Incubation Program and via solar PV mini-grids to off-grid communities in Kampong Chhnang and Ratanakiri provinces.

The Clean Energy and Incubation Program identified and tested viable business models to provide solar PV technologies to rural communities. This programme provided seed grants to three winning teams (Cricket House, Sunla, and Green Farmer Community), and supported 63 direct and indirect jobs, including 47 for women. Cricket House used solar-powered technology to raise micro-livestock as an alternative livelihood opportunity for marginalized farmers and supported their connection to relevant markets. Sunla (Bong Snacks) used solar drying technology to combat post-harvest income loss for rural farmers. Green Farmer Community used solar-powered incubators to hatch eggs and as part of environmentally friendly production.

As noted, the project supported **the building of solar mini-grids to provide energy to off-grid remote rural communities**. This work started with the assessment and identification of appropriate off-grid solar technologies, including SHSs, direct current (DC) or alternating current (AC) mini-grids, solar water pumping, and other productive use applications for rural communities.[6]After evaluating the technological options, the project selected implementation of both DC and AC mini-grids as an innovative approach, and are flexible in meeting the needs of the villages.

As a result, a total of 225 households gained access to electricity. These include 140 households with 1,245 people in three villages in Kampong Chhnang province and 85 households with 341 people from a Jarai indigenous village in Ratanakiri province. For the household selection, priorities were given to women-headed households and families with disabilities. About 30 women-headed households and 10 households with disability or elders were included among the beneficiaries. 55 households in Ta Daok village have been upgraded to more than

[6] Refer to https://seveaasso.sharepoint.com/:f:/s/SeveaOneDrive/EmCJlWkhp_5CgvNzWQVg2LwBkyK8nQ_gfILG8asOY9NQGA?e=S9WbgW

750Wh/day because of increase in their electricity consumption and provided them with 600 W inverters. Also installed streetlighting to improve safe mobility and security for women and girls at night. All these mini-grids are owned and managed by village development committees. For documentation, a video was produced featuring life with electricity from solar mini-grids.

Overall, the project played an important role in demonstrating the viability of solar PV- especially its comparative advantages for providing affordable energy to off-grid rural poor households and meeting energy needs in rural areas.

Promoting energy efficiency for buildings (January to June 2021)

During the last 6 months, the project focused on energy efficiency initiatives aimed at the highly energy-intensive building sector.

In January 2020, Cambodia's Law on Construction was enacted. This Law defines the general principles, with the requirement of a building technical regulation (BTR), the rules, and procedures for construction sector. One of the considerations is energy efficiency. Accordingly, the project sought to develop and integrate an Energy Efficiency Guidelines for Residential and Commercial Buildings into the regulation.

By the end of the project, the project had finalized the Energy Efficiency Design Guideline for Residential and Commercial Buildings by working closely with the General Department of Construction, Ministry of Land Management, Urban Planning and Construction. The guideline included the following parameters and standards:

- Overall Thermal Transfer Value, <50W/m^2
- Roof Thermal Transfer Value, <50W/m^2
- Lighting Power Density, <12 to 18 W/m^2 (depending on building type)
- Air Conditioning, Ventilation.

To showcase the efficiency benefits, the project implemented energy efficiency measures at two Buildings of General Department of Energy. The project also produced a video to demonstrate energy efficiency in practice. Because of COVID-19 community outbreak in February 2021, the project was unable to organize originally planned events such as an exhibition, business talks, and consultative workshops. Instead, funds were used to establish solar mini-grid at Pa Tang village in Ratanakiri province.

Development of scaling-up strategies including programming and new partnership

To sustain and scale up operations of solar and energy efficiency would require follow up actions. These include 1) further refinement of the business model for mini-grids to meet the energy demands of vulnerable communities, 2) working with financial institutions, in support for delivering a viable mini-grid business model that expands energy access and 3) wider application of energy efficiency measures in the building sector. These activities will be supported by the Sida Global programme, which has energy as one of its top priorities and scale up of solar mini-grids initiative in "hard to reach" off-grid villages (in pipeline).

IV. Implementation challenges

At the project formulation stage, potential risks were examined and recorded in the project Document, along with mitigation strategies and assumptions.

The biggest implementation challenge, which the project faced during the implementation, was the COVID-19 pandemic, which was not foreseen in the project design. During the initial period of the pandemic, several organizations, including government and UN agencies, enforced work-from-home and 'no travel' measures to keep their employees safe. Related restrictions significantly affected project implementation and progress. At the time, project activities were delayed as travel and meetings had to be curtailed for safety and to contain the virus's spread.

In order to adequately respond to the risks, the project took the following actions.

For PES, the project changed its approach from physical meetings or workshops to use technology such as online platforms for knowledge sharing and dialogues and videos on the importance of the PES initiative in Kbal Chhay and Phnom Kulen Protected Areas.

For waste management, the project changed is approach from direct trainings with subnational administration on plastic management to producing two videos on (1) Circular Economy concept and waste management and (2) methods for 5R (refuse, reduce, reuse, recycle, remind), and production of billboards and waste bins to raise public awareness.

For energy, the project changed the activities related to energy efficiency events such as an exhibition, business talks, and consultative workshops to cover the costs to establish additional DC mini grids in Ratanakiri province.

Despite these measures, implementation challenges remained for activities which due to the inability to directly meet with stakeholders and follow up on activities in person. For example, the project was unable to fully accomplish its goal to operationalise PES since field level consultations with target stakeholders became impossible.

The project also worked to operationalize the CE model in Kep province by engaging stakeholders including the subnational government, private sector, and households. Initially the project intention was to work with the major hotels and markets to sort waste for separate collection and treatment, and then later on with households. The project also planned to support recycling industries and social enterprises to be able to treat sorted waste. However, due to the outbreak of COVID-19, the project implementation of the planned activities was delayed and could not be delivered as planned. Instead, the project focused on feasible options given the circumstance by contributing to 1) incorporation of a CE into its five-year development plan and 3-year rolling plan for Kep province for 2020 and 2) drafting two municipal level regulations for waste collection pricing and on the establishment of a municipal solid waste management unit at the Kep municipality.

(See annex 2 and 3 for the updated risk log and project issues and actions)

V. Lessons learnt and next steps

This project can be considered as a "pioneer" initiative. It introduced numerous new concepts, ideas and innovative solutions, which were not present in Cambodia at the time of inception. Among those were the concept of payments for ecosystem services, circular economy, solar mini-grids for off-grid remote communities, and energy efficiency for buildings.

This project was also unique in terms of its design and scope, since three projects were effectively packaged into one. Because the components and themes of these three projects were distinct and only partly overlapping, specific sets of interventions addressing the particular challenges in each of the areas were needed.

The rationale behind this project design and scope was to respond to the urgent need to offer viable development solutions for priority environmental issues (NRM, waste and energy) in Cambodia. (The major issue of climate change is addressed through the Cambodia climate change alliance project, which is also supported by Sweden). Thus, the project supported: 1) robust research to identify "what solutions may work" for a specific subject, 2) testing and piloting of recommended solutions, 3) creating an enabling policy and regulatory framework to support wider application and scaling up of the proposed interventions and 4) raising awareness through strategic communication (See Annex 5 for a list of communication materials).

Despite this ambitious scope, the project succeeded in achieving a majority of project targets. The project played a crucial role in building an enabling regulatory and policy framework and testing and piloting these new concepts to demonstrate their aims and purposes, and their environmental and economic benefits. After 2.5 years of project operations, the project succeeded in demonstrating tangible environmental and economic benefits of the new concepts and solution, which the project sought to mainstream for the target stakeholders. For example, a growing number of industrial players came to use circular economy as a guiding principle for business operations. In the case of waste management, the government now shows a strong interest and commitment to explore CE options through promotion of measures of sustainable consumption and production, recycling, composting and waste to energy options. The project has also demonstrated the viability and success of solar to provide energy access to off-grid poor rural communications, and this has further opened the door for solar energy to be mainstreamed as a part of the national energy mix.

In part, the project was able to achieve these results because senior level technical experts from both the government and UNDP for each of technical areas were assigned to provide timely and high-quality technical assistance to project activities throughout. Another factor was due to the effective and adaptive management led by the PMU supported by the UNDP team. The outbreak of COVID-19 impacted the overall project implementation, as physical meetings/workshops and field missions became impossible for an extended period. The PMU took immediate action to repurpose and reprogramme initiatives to be able to deliver planned activities to the extent possible but without depending on physical meetings.

Despite these measures, the project faced numerous challenges in fully implementing piloting measures at the field level. The difficulty in conducting field missions due to the Covid-19 outbreak affected the operationalisation of policy designs that depended on results from pilots, as seen in the case of payments of ecosystem services. Another possible reason attributing to the inability to achieve some of the project was that the project had too many ambitious goals, which meant that project stakeholders had to prioritize their engagements. Another challenge (to which the final evaluation report also referred) was the limited integration among three project component activities (NRM, waste and energy). Since the three components of activities were

quite distinct, respective activities were implemented rather separately by different set of government partners and stakeholders.

These challenges offer important lessons for future projects. First, it is imperative to design projects with a realistic set of activities in consideration of project resource and project duration. This will make it possible to focus on high priority activities and maximize project impacts. Second, the project should focus on the ways to ensure an integrated and coherent approach across project components.

VI. Financial status and utilization

Financial status

Table 1: Contribution Overview (01 January 2019– 31 October 2021)

Donor Name	Contributions (USD)		Cumulative Expenditure	Balance
	Committed	Received		
Sweden	2,904,840.06	2,904,840.06	2,901,715.67	3,124.39
UNDP [TRAC]	316,238.78	316,238.78	313,020.20	3,218.58
Total	**3,221,078.84**	**3,221,078.84**	**3,214,735.87**	**6,342.97**

Notes: This expenditure included financial audit fee and final evaluation which were paid after 30 June 2021. The certified final financial statement to be submitted by 30 June of the year following the financial closing of the project.

Financial utilization

Table 2: Annual expenditure Report (01 January 2021-31 October 2021)

Activities - Description	Annual Budget (BREV/G05)	Cumulative Expenditure			Balance	Delivery [%]
		Gov't [Disbursed]	UNDP [Disbursed]	Total		
Output 1: CBNRM institutions strengthened and financial resources mobilized for sustainable NRM	261,668.67	147,779.82	132,365.86	280,145.68	(18,477.01)	107.06%
Output 2: Waste reduced, recycled and reused through the application of circular economy model.	294,241.58	206,613.66	101,060.38	307,674.04	(13,432.46)	104.57%
Output 3: Improved access to clean, affordable, and sustainable energy for the rural poor	290,166.84	53,570.73	249,124.81	302,695.54	(12,528.70)	104.32%
Project management (PMC)	134,108.17	48,727.79	88,922.56	137,650.35	(3,542.18)	102.64%
Total	**980,185.26**	**456,692.00**	**571,473.61**	**1,028,165.61**	**(47,980.35)**	**104.90%**

Notes: This expenditure period 01 January 2021- 31 October 2021 was included PO commitment amount USD 54,323.32 in 2020

Table 3: Cumulative Expenditure Report (01 January 2019– 31 October 2021)

Activities - Description	Total Budget (G05)	Cumulative Expenditure			Balance	Delivery [%]
	[2019-2021]	Gov't [Disbursed]	UNDP [Disbursed]	Total		
Output 1: CBNRM institutions strengthened and financial resources mobilized for sustainable NRM	1,104,878.68	516,784.56	603,727.87	1,120,512.43	(15,633.75)	101.41%
Output 2: Waste reduced, recycled and reused through the application of circular economy model.	852,540.47	307,357.62	553,514.87	860,872.49	(8,332.02)	100.98%
Output 3: Improved access to clean, affordable, and sustainable energy for the rural poor	832,961.30	218,707.38	581,752.42	800,459.80	32,501.50	96.10%
Project management (PMC)	430,698.38	146,549.05	286,342.10	432,891.15	(2,192.77)	100.51%
Total	**3,221,078.84**	**1,189,398.61**	**2,025,337.26**	**3,214,735.87**	**6,342.97**	**99.80%**

Annex 1: PROJECT RESULTS AGAINST INDICATORs

FOR THE PERIOD FROM 01 JANUARY 2019 – 30 JUNE 2021

Output Indicators	Baseline (2018)	Target (2021)	Status (Achievements and Challenges)
Output 1: CBNRM institutions strengthened and financial resources mobilized for sustainable NRM			
1.1. Extent to which CBNRM institutions are strengthened Measured on a three-point scale: 1= Some extent: 2= Moderate extent: 3=Great extent:	0	Target: 1 **Result: 2** (Achieved)	**Achieved exceeding the target.** Community institutions and networks were strengthened through engagement of hundreds of men and women working in CPA, community-based ecotourism, and water supply committees. Tenure rights of communities part of the project have improved with the expansion of CPA area by 1,598 ha. Some old cashew plantations were returned to the Kulen Natural Park and the ecosystem of Prasat Krahorm archeological site is expected to regenerate in the next five years.
1.2. Number of total and female headed households benefit from CBNRM	N/A	Target: 50 **Results: 513** women-headed households (Achieved)	**Achieved exceeding the target.** For instance, the cash-for-work tree planting benefited at least **513 women-headed households** in Pursat and Siem Reap to cope with their livelihood crise during the COVID-19 pandemic. In addition, the project also supported to build lifelong skills. These included animal raising and basket making skills are being practiced by many households in Kulen National Park, including 30 women. Adding the benefit from CPA expansion, some **other alternative livelihood activities, ecotourism,** were promoted for Po Pel community. Once the tourism recovers, ecotourism related activities from waterfalls and natural tracks are excepted to bring additional income for the community. In addition, a solar pump water supply is serving at least **37 households and 100 primary school children** in Po Pel village.
1.3. Extent to which pilot PES approaches are operationalised for Kulen Mountain Measured on a three-point scale as below: 1= Some extent: Initial fund collection and distribution mechanism agreed 2= Moderate extent: PES operational mechanisms (including fund	N/A	Target: 3 **Result: 2**	**Achieved below the target.** Operationalization of PES was envisaged to follow four steps: 1) diagnose, 2) design, 3) negotiation and implementation where PES is operationalized, tested and modified. During the project period, actual results of this output could reach Step 3 where PES implementation flameworked were developed and negation were begun. This was due to Covid-19 which impacted the tourism sector where the project originally targeted for PES financing source.. While three Prakas for establishing PES governance structures were drafted and waiting for an approval from the Minister, additional regulatory work would be required to operationalize PES.

Output Indicators	Baseline (2018)	Target (2021)	Status (Achievements and Challenges)
collection & management, implementation strategies and arrangements, and monitoring system) designed 3= Great extent: PES operational mechanisms implemented			
1.4 Extent to which pilot PES approaches are operationalized for Kbal Chay Measured on a three-point scale as above.	0	Target: 3 **Result: 2**	**Achieved below the target.** Similar to PES in Kulen, PES implementation framework was developed but financing options could not be operationalized due to Covid-19. Although operationalization was not able to implement, the fund mechanism and willingness-to-pay was fully assessed. After framework is officially endorsed by the Minister, the multi-stakeholder PES fund governance committees will be established to operationalize the pilot.
1.5 Extent to which a national PES policy is developed Measured on a three-point scale: 0= None: No initial drafts 1= Moderate extent: Initial assessment and analysis 2= Great extent: final draft of policy ready for endorsement	0	Target: 1 **Result: 2** (Achieved)	**Achieved exceeding the target.** A PES Mechanism for PES in PKNP and KCMUA is listed as below: • Three Prakas on PES governance structure were drafted and awaiting an approval from the Minister of Environment. Those include the governing board and its secretariate and at the national level and two PES Provincial Technical Working Groups are aimed to be established by the local governments of Siem Reap and Preah Sihanoukville provinces • Online surveys for wiliness to pay completed. Most of the respondents show their willingness to pay or contribute if a well function governance system is in place. • National PES Roadmap (2021-2030) drafted.
1.6 Extent to which gender concerns are integrated into the proposed policy measures Measured on a three-point scale: 1= Some extent: relevant policy documents refer to their possible impacts on men and women 2= Moderate extent: relevant policy documents refer to their possible impacts on men and women and include some measures to ensure positive impacts	0	Target: 2 **Result: 2** (Achieved)	**Achieved as the target.** A gender assessment was conducted to mainstream gender aspects in the project workplan. For example the project ensured equal participation of women and men to participate in and benefit from tree planting activities, including 513 women-headed households In CBNRM, the project empowered women groups in terms of management planning, decision making and management of CPA and equal opportunity to have access to livelihoods skills training courses, such as basket weaving, animal husbandry, and hospitality. For access to solar energy, female technician were trained and being played in important role in maintenance the community-based solar DC micro-grids in Stung Chrow. Some women has been benefiting from productive use of electricity in making face marks for sales.

Output Indicators	Baseline (2018)	Target (2021)	Status (Achievements and Challenges)
3=Great extent: relevant policy documents include full measures and budget to ensure positive impacts			In CE strategy included the gender-oriented policy in circular enterprises, innovation challenges and informal economy. In addition, youth has played a crucial role in fostering social change towards a new life style without reduction of single-use plastic consumption.
1.7 Volume of financial resources mobilized to support proposed measures, measured in USD	0	Target: USD 500K **Result: USD** 68,000 (under target)	**Achieved below the target.** The result is under target in terms of monetary value, but it leverages pollical support. First, the project could mobilize an additional fund of US$68,000, which is from GoAL-waters a sub-program under the Global UNDP-SIDA environmental framework program. This will strengthen the fresh water related work in Kbal Chhay where PES pilot is targeted. Secondly, MoE has adopted PES as one of the biodiversity financing options proposal Phase 2, which could sustain the PES operationalization work in the future. Moreover, some of the PES operationalization activates are also mainstreamed with other sustainable financing work for the Cambodia Sustainable Landscape and Ecotourism project and GEF-6 funded Integrated Natural Resource Management Project.
1.8 **Number of people with improved awareness on benefits of biodiversity and PES approach** Measured by the number of people outreached by communication materials	0	Target: NA **Results: 33,700 reaches**	**Achieved exceeding the target.** The number of social media reaches is only generated from the UNDP Facebook page when a post on conserving biodiversity to prevent future pandemic. **So far, 13 banners** on tree planting installed (ADF & GDLC) to raise public on the site about the ecosystem restoration areas and will remain visible for seral more years to come. Mover, the NCSD PES campaigns has reached **29,200** people, mostly journalists and over 30 news agencies have published PES and its financial, social and ecological benefits. This campaign helps equip those journals with important economic valuation of ecosystem service messaging with can be used for future advocacy to protect Kulen national park.
1.9.1 Number of families being enrolled in income generating activities such as tree-planting, maintenance of forest plantation and nursery development (activity 1.8)	0	Target: 1600 **Result: 1,915- Over target**	**Achieved exceeding the target.** This activity helped build community resilience during the pandemic time. Over 50% of women were benefiting from this economic response. 2,810 people of 1,915 families (**513 women-headed households)** in Pursat and Siem Reap as a COVID-19 Response benefited from generating activities which include tree planting, planted tree maintenance and flooded tree nursery development and maintenance.
1.9.2 Number of Hectares new tree-plantation and number of Ha maintained	0		**Achieved exceeding the target.** This sub-output was jointly carried out by a number of responsible partners, including DLC, ADF/Provincial DoE, TCO and Fishery Administration (FiA) and RECOFTC. The following are

Output Indicators	Baseline (2018)	Target (2021)	Status (Achievements and Challenges)
		Target: 140 ha **Result: 181.93 ha** - Over target	the combined results: • 147,800 seedlings which include 97,800 seedlings of 14 local species and 50,000 seedlings species were planted on 181.93 ha in 1) Phnom Kulen National Plark and Chankran Roy Forestry Community (54.43 ha); 2) The border of the Orchid center (22.5 ha); 3) Stueng Thmei Community Protected Area (55 ha); and 4) Flooded area of Tonle Sap Lake (50 ha). • The survival rate was monitored, and it varief depending on the implementing partner sites, ranging from 65% to 90%. To ensure the survival rate reaching 90%, **8,862 seedlings** were also planted to replace dead trees under the maintenance stage in early rainy season of 2021.
1.9.3 Dollars paid out as cash compensation for work under activity 1.8		Target: USD 210,000 **Result: USD 196,084** (under target)	**Achieved below the target.** During the project, **USD 196,084** was paid to vulnerable people/tree planting workers to restore ecosystem in the target sites. This is because the actual cost for planting and maintenance of the trees varied from one location to another, making the cash-for-work proportion was lower than the planned budget. In contrast, the cost of purchasing the seedlings and transportation were much higher than the planed budget because it reflected the actual market price, availability of a large amount of seedlings and road conditions to transport all seedlings to the restoration areas during the rainy seasons. Some of the labor costs were not excluded from the transportation cost which could be another reason. Nevertheless, the cash compensation was appreciated by all the tree planting workers, authorities and NGO partners.
Output 2: Waste reduced, recycled and reused through application of circular economy models			
2.1. Extent to which a pilot is designed and implemented (municipality) Measured on a three-point scale: 0= None extent: Pilot is not designed 1= Moderate extent: Business model for pilot is designed, proposed, and consulted on with stakeholders 2=Great extent: Pilot is designed and implemented, with a business model tested and resulting data collected.	0	Target: 1 **Result: 1**	**Achieved as the target.** Under the NCDDS section, there are a number of results achieved. These results help lay the foundation which needs to be in place for a circular economy model. • An exchange visit from Battambang waste management staff to learn how the municipal authority has played an important role in waste management • Five municipal waste separation depots in Kep were endorsed, including two permanent stations and three mobile waste stations. • Establishment of a Deka on waste pricing remains to be endorsed.

Output Indicators	Baseline (2018)	Target (2021)	Status (Achievements and Challenges)
2.2. **Extent to which a circular economy pilot is designed and implemented (industry)** *Measured scale as in 2.1 indicators & targets*	0	Target: 1 **Result: 1**	**Achieved as the target.** • Guidelines for on-site incinerators were drafted and under a consultation process to reflect the recommendations from the assessment of garment's on-site incinerators. • Conclusions and recommendations from emissions testing of air pollutants from small scale waste-to-energy boilers in garment sectors were shared with the EU Switch Asia project run by GERES, GGGI and GIZ working on sustainable development in the garment industry. Adding the knowledge about environmentally safe WTE operations into their training curriculum. • Training on air pollution control was conducted in collaboration Geres a to130 participants and over 70% of them from government factories.
2.3. Number of people outreached for raising awareness on appropriate waste management Measured by number	0	Target: 400 **Results:** **<u>DMC:</u> over 10 million viewers– Over target**	**Achieved exceeding the target.** Outreach campaigns were carried out with various responsible partners as below: • Under NCSD/MoE, the **Department of Green Economy (DGE) and the Department of Solid Waste Management (DoSWM),** the following points are some key results: o Two videos CE actions in Battambang and 5 Rs developed o Development of signboards, bins at the public roads and public gardens are under the design phase and will be installed in the next reporting period. 35 signboards with 5Rs were installed in several highly visible areas in seven touristed provinces, including Kep, Kampot, Battambang, and Preah Sihanouk. • **Department of Media and Communications (DMC), RUPP** The Clean and Green delivered the following results: o Over 300 students (206 females) actively participated in the information session, quiz and panelist discussion on impacts of plastic waste. o Over 10 groups of students teamed up and submitted their video competition concept notes on plastic. Five ideal video proposals (23 youth producers, 5 females) were selected for video production training. As a result, **three winning videos** on plastic campaigns received over 4,500 likes on Facebook o Under the plastic free campaigns, the followers of the Clean and Green Facebook page have increased its number from **1,000+ to over 6,790** in the last eight months. o In 2020-21, a second round of youth-led campaign was organised by 10 RE-FIVE team members, (5 females) including a series of vide educational videos, poem to

Output Indicators	Baseline (2018)	Target (2021)	Status (Achievements and Challenges)
			reduce plastic, photo competition, and digital posters. Their social media (RE-FIVE Facebook, YouTube, and Instagram) has reached over **381,000 views, mainly youth**. ○ **MoE Taskforce on Plastics:** • The following set of awareness raising/communication materials include: ○ Poster for MoE/NCSD to promote plastic actions ○ Action points including green procurement policies to lead by example ○ Media/website contents on plastic page was endorsed and published ○ Booklet and brochure of plastic pollution in English and Khmer ○ Animated infographic video concept for bidding ○ Mascot design for the plastic campaign competition In 2019, the Water Festival single use plastic reduction campaign awareness raising material included two animated videos, three days of a plastic conscious concert, one theme song, and one music video. As a result, the campaign reached over **10 million social media, one third are women.** • **National University of Management (NUM):** ○ Under this campaign, NUM is committed to increase two more buildings to become plastic bottle free. Together with Combatting Marine Plastic Project, a music video and animation on plastic waste were developed. This will be launched on 28 June 2021. • **UNDP** led circular economy campaigns • The link for plastic related research findings and advocacy for policy change is listed on the UNDP Cambodia's page (http://www.kh.undp.org/content/cambodia/en/home/projects/our-action-for-plastic-pollution-in-cambodia.html) • Plastic related campaigns data, the video requesting public to share their photos of plastic reached **138,332 audiences and more than 3,800 reactions**, comments and shares. This shows significant result from the Facebook campaign to widely spread the educational messages and engage the public with the campaign. • UNDP website contains all awareness raising material including 4R posters and commercial • Awareness raising materials were jointly developed with the Marine Plastic Project to

Output Indicators	Baseline (2018)	Target (2021)	Status (Achievements and Challenges)
			increase awareness on plastics impacts to human health, marine ecosystems and the economy. A music video and animation will be launched in June.
2.4. Extent to which enabling policy measures are developed for the support of circular economy Measured on a three-point scale: 0= None: 1= Moderate extent: an initial set of policy measures are proposed 2= Great extent: agreed set of measures receive government endorsement	0	Target: 1 **Result: 1 –** (Achieved)	**Achieved as the target.** • The Circular Economy Strategy and Action Plan (CESAP) in English and Khmer was finalized and publicly launched. • The department of solid waste management (DoSWM) has drafted a sub decree on plastic management.
2.5 Extent to which a private sector engagement strategy is designed and implemented Measured on a three-point scale: 0= none 1= Moderate extent: Strategy is designed but not implemented 2= Great extent: Strategy is operationalized including an online platform and pilot initiative		Target: 1 **Result: 1-** Achieved	**Achieved as the target.** ● Private sector platform was officially launched
2.6 Volume of financial resources mobilised to support proposed waste management measures, measured in USD	0	Target: US$500K **Result:** Over 3 millions Over target	**Achieved exceeding the target.** • The US$3,028,851 million Japan-funded Marine Plastics project (2021-2023) was approved to take up many of activities related to plastic management. • Medical waste proposal with a total budget of US$834,000 was also approved. • A CLEAN proposal to focus on organic waste management with UNICEF was submitted
Output 3: Improved access to clean, affordable, and sustainable energy for the rural poor			

Output Indicators	Baseline (2018)	Target (2021)	Status (Achievements and Challenges)
3.1 Solar PV energy business models or new technologies developed to provide electricity, incl. for productive use Measured by number of business models/technologies	0	Target: 2 Result: 1 technology for solar access; 1 business model and 4 business ideas selected – **Over target**	**Achieved exceeding the target.** ● Solar based DC microgrid equipped with Okra smart mesh-grid technology provided 24/7 clean energy to three villages in Kampong Chhnang province for productive appliances from refrigeration to electric cooking. Also demonstrated AC mini-grid in Pa Tang village in Ratanakiri Province. Overall, the project demonstrated both AC and DC mini-grids as potential options to electrify the remote off-grid communities. ● The incubation programme selected 3 teams (Cricket House, Sunla, and GFC), and supported 63 jobs (both direct and indirect), including 47 women impacted by the project. o Cricket House used solar powered technology to raise micro-livestock to create alternative livelihoods for marginalised farmers whilst connecting them to local and global markets. o Sunla (Bong Snacks) used solar dryer technology to combat post-harvest income loss for rural farmers. o Green Farmer Community (GFC) used solar **powered incubators for hatching eggs and environmentally friendly production techniques..**
3.2 Number of rural households benefit from solar PV system installed for access to energy incl. for productive use Measured by number households (male and female headed)	0	Target: 150 Result: Household: 225 (Men: 1270/ Women: 344, 697) – **over target**	**Achieved exceeding the target.** ● The DC microgrid electrified 140 households (**18 women headed households**) with a total population of 12,45 (Male:707, female: 344) across three villages, Kampong Preah Kokir commune, Boribour District, Kampong Chhnang (https://goo.gl/maps/CRGP5VfSrS2hVtm37). Fifty-five (55) households in Ta Daok Village have been upgraded their energy package from below 750Wh/day usage category to 750 Wh/day because of increase in their electricity consumption by providing them with 600 W inverters including streetlighting. The system is under the management of an elected community committee. Okra, a company supporting the maintenance of smart grid, has been working closely with the committee members through local maintenance agents. ● The average daily consumption has increased to almost 500Wh/day per household from around 250 Wh/day in December 2020. The households have started using more electric appliances for productive uses. For example, 48 households now use electric cookers, electric powered sewing machines, drills and power tools. ● Based on the success from Stung Chrow, another solar-based AC mini-grid was replicated to provide electricity to a Jarai indigenous community (85 households with 341 people **(168 females)** in Pa Tang Village, Se San Commune, Ou Ya Dav District, Ratanakiri (https://goo.gl/maps/5jbAbRHJuzJ6nmex9)

Output Indicators	Baseline (2018)	Target (2021)	Status (Achievements and Challenges)
			● Completed the installation of 32.64 kW solar off-grid system at Sre Ampil community, Teuk Pous District, Kampong Chhnang Province with newly procured off-grid inverters and battery storage (86.4kWh). When the transmission line is constructed, it will connect at least 60 households of this village.Location on google map https://goo.gl/maps/hPKkFPn3pjcHhkDq6 ● Installation of solar PV at Heng Samrin Chok High School benefiting 913 students **(520 females)** and 37 teachers **(9 women).**
3.3 Number of female headed households benefit from solar PV system installed for access to energy, water and productive use Measured by number of households (female headed only)	0	Target: 50 **Result: 19 – Under target**	**Achieved below the target.** ● This is the accumulated figure form the past: **19 female headed households** to benefit from DC based micro-grid in Kampong Chhnang province. In Pa Tang village, Ratanakiri, 2 female headed HHs benefited from the mini-grid and 23 HH (out of 85) are poor HH. ● In both mini grids, a total of **362 (out of 707) and 168 (out of 341) women** benefited from the Solar mini-grids in Stueng Chrow and Pa Tang, respectively..
3.4 Number of technicians with enhanced capacities to design, install and maintain solar PV as per installation standards/guidelines (to be prepared) Measured by number of male and female technicians	0	Target: 50 **Result: 73 (21 females) - Achieved**	**Achieved exceeding the target.** • Two 2-day technical training workshops on System Design, Installation, and Maintenance of Solar Home System (SHS) were delivered in February and November to solar technology suppliers, MME's technical staff, provincial departments of energy, and communities. Total participants of both the trainings were **73 including 21 females.** ● At the community, Okra as supplier and installer of microgrid trained one local youth community member on the maintenance and operation of the microgrid.
3.5 Number of community members with improved awareness on benefits of solar and appropriate use of solar technologies Measured by number of community members	0	Target: 60 **Result: 95 (34 females) – Over target**	**Achieved exceeding the target.** • In 2020, two awareness workshops were provided to local communities in with a total participation of **95 persons** including **34 females** from the target communities for piloting solar energy access. Topics in workshop were solar home system, application of clean energy technologies in agriculture, solar technologies and demonstration of SHS.
3.6 Number of National quality standards/guidelines for solar PV technologies developed Measured by national quality	0	Target: 1 **Result: 1 -**	**Achieved as the target.** ● SHS guideline was finalized and approved by MME. The guideline was endorsed by waiting to be published due to the Covid February 20 event.

Output Indicators	Baseline (2018)	Target (2021)	Status (Achievements and Challenges)
standards/guidelines		**Achieved**	● Energy efficiency design guideline is under development, led by GDE. The EE code is the design guideline for improving energy efficiency in building, that will be integrated in the building technical regulation being led by MLMUPC.
3.7 Studies and papers prepared to support RGC in evidence-based policy making towards a balanced, low-carbon intensive energy mix with a secure supply of power	0	Target: 4 **Result: achieved; four policy briefs**	**Achieved as the target.** ● As per the 2nd board meeting on 20th September 2019 indicator 3.7 was approved. ● Four policy briefs were completed and submitted to NCSD-MOE for internal circulation within the energy sector government bodies, i.e. MEF, MME, EAC, EDC. The topics are o Responding to Cambodia's power sector challenges and role of sustainable energy o Analysis and proposed adjustment of solar regulation o Evaluation of the potential excess supply of power from existing solar rooftop system in Cambodia
3.8 Localized energy efficiency design guidelines developed (Yes/No)	NA	Target: Yes **Result: Yes - Achieved**	**Achieved as the target.** ● Energy Efficiency Design Guideline for Residential and Commercial Buildings was finalised. This guideline shall be integrated into Building Technical Regulation (BTR). ● The guideline proposed parameters and standard: o Overall Thermal Transfer Value, <50W/m^2 o Roof Thermal Transfer Value, <50W/m^2 o Lighting Power Density, <12 to 18 W/m^2 (depending of building type) o Air Conditioning, Ventilation.
3.9: Extent to which EE solutions in public buildings are designed and implemented Measured on a three-point scale: 0= None extent: No solutions designed 1= Full extent: EE solutions designed, proposed, and implemented	NA	Target: 1 **Result: 1 - Achieved**	**Achieved as the target.** ● Implemented energy efficiency measure of reducing solar heat gain at two Buildings of General Department of Energy.

Output Indicators	Baseline (2018)	Target (2021)	Status (Achievements and Challenges)	
3.10 Number of people with improved awareness on energy efficiency Measured by the number of people outreached by communication materials a. 2 Videos b. 1 Factsheets c. 1 exhibition d. 1 business talk **e.** 2 consultative workshops	a. 0 b. 0 c. 0 d. 0 e. 0	a. 500 b. 500 c. 50 d. 50 e. 100 **- Achieved**	**Achieved as the target.** ● Two promotional videos were produced – one is on living with electricity from solar mini-grids (https://fb.watch/9pQKjKJIIH/, 5,500 people watched this so far) and Energy Efficiency Practice (https://fb.watch/9pQNCaGXHq/, 1,100 people watched this so far); ● Since the two videos have covered the achievements to a detailed extent in both energy access and energy efficiency, the project did not see the additionality of Factsheets. Instead, used the funds for mini-grid establishment at Pa Tang. ● Because of COVID-19 community outbreak on 20 February, the project could not organize events such as exhibition, business talk and consultative workshop. Instead, the funds were used for establishing mini-grid at Pa Tang village.	
Cross-cutting activity: Project Management Over this reporting period, the following results include: **The project board meeting** was not conducted, instead the e-mail approval was carried out for budget revision version (G05). **1) 11 March 2019: The first project board meeting** was conducted chaired by H.E. Dr. Tin Ponlok, the General Secretariat of the NCSD and the Project Director. The decision of the Board made as follows: • The Project Board and implementing partners agreed to approve the fund flow and workplan in principle, with the budget approval to be made via email. • Project Board meeting and Inception Workshop was proposed for mid-June. The project team followed up on this proposal and this workshop was moved to be combined with the next board to be more efficient including reviewing budget, workplan, and project progress. **2) 20 September 2019:** A second board meeting of 2019 was held. The Project Board and implementing partners agreed to approve the budget revisions as well as proposed changes to the Project Document • Changes include: • Support piloting grass straws as an alternative to plastic straws this year • Business challenges for organic composting and plastic recycling will be facilitated in 2020 rather than 2019 • Reduce the number of targeted households to be reached with solar system(s) under output 3.1, reduction from **200 to 100 households.** Also proposed changing the number of targeted female-headed households from 50 to 25. • On request of MME, it was proposed to include: "Preparation of a guideline on solar home systems" in output 3.4. Part of budget from output 3.5 will be allocated to this activity. • Unexpected power shortages during dry season 2019, increased interest in ways to mitigate shortages. More interest in "Economic Appraisal of the Potentials of Photovoltaic Solar Energy in Cambodia"-study and related policy work. The meeting was proposed to add an indicator 3.7 "Studies and papers prepared to support RGC in evidence-based policy making towards a balanced, low carbon intensive energy mix with a secure power supply.				f.

Output Indicators	Baseline (2018)	Target (2021)	Status (Achievements and Challenges)

Revision of Project Document and Budget. Several meetings were conducted between UNDP Project Team and Sweden to clarify the changes and rationality. All changes of target and budget reallocation written and agreed by Sweden and the Board. Final agreed budget is now used to track its progress as seen in the financial report Section below.

Regular update and communication with Sweden agreed. To increase the transparency and efficiency, all Sweden funded projects are suggested to provide a regular donor update monthly. The joint project meeting with Sweden on 23 May 2019 at the Embassy of Sweden, agreed on the following points:

- Annual meeting (or twice a year depending on the project)
- Documents to be shared 10 working days in advance
- Quarterly report or meetings to update the progress at technical level
- Technical level meeting prior to the board meeting
- Changes in the budget should be documented with a summary of explanations
- Budget revision with 10 % of tolerance can be done by manager. Beyond 10%, a board approval is needed via email or in person

3) 13 March 2020, chaired by H.E. Dr. Tin Ponlok, the General Secretariat of the NCSD and the Project Director. The decision of the Board made as follows:

- The Board and implementing partners agreed to approve the fund flow and workplan in principle, with the budget approval to be made via email. This followed by the e-mail approval in August, the board agreed the injection of additional fund for tree planting as a COVID response.
- The project team followed up on this proposal and this workshop was moved to be combined with the next board to be more efficient including reviewing budget, workplan, and project progress.

The board approved the following:

- The annual progress report and the reporting of expenditure for 2019
- The revised budget and annual work plan for 2020
- Risk and strategy of the project

4) 18 December 2020: A virtual board meeting conducted, and the board approved the following:

- The annual progress report and the reporting of expected expenditure for 2020
- The budget extension and annual work plan for 2021
- Risk and strategy of the project

On budget reallocation

- Recognizing that the project needs to achieve tangible results as a final year and considering the situation with Covid-19 that larger meetings may be less frequent, the board suggested that the implementing departments of these activities review their budgets for possible re-allocation from meetings, workshops, and study tours to on the ground activities piloting PES, circular economy in Kep as models to be replicated (for example investment in waste

Output Indicators	Baseline (2018)	Target (2021)	Status (Achievements and Challenges)
collection and sorting facilities), and second village for solar PV based micro-grid. • Larger re-allocations of budget should be submitted to the board in accordance with modalities in the project document agreement **5)** The final board meeting was conducted via online approval. The board reviewed a package of documents and decided: • Closed the project by 30 June 2021 • Endorsed the final evaluation report with management response. • Only cost associated with reporting, auditing, and evaluation can be spent after the project closure • Endorsed the asset transfer to responsible partners. **Project Monitoring and Evaluation** • At least two donor field missions were conducted to visit the progress of the project and discussed with challenges with beneficiary and key local actors. Tree planting, as a Covid socio-economic response was also featured for the last trip in February 2021. The project evaluation report shows that the project delivered satisfactory development results and the likelihood for sustaining the solutions are relatively acceptable. Some good example of replication all outputs were also apparent, and plastic waste programming was successfully carried forward under project funded by the Government of Japan. The PES framework for Kulen and Kbaly Chhay is one of the winning models for biodiversity financing.			

Annex 2: RISK LOG

#	Description	Date	Type	Impact & Probability	Countermeasures / Management response	Owner	Submitted updated by	Last Update	Status
1	Progress of activities to be implemented by SEAC is very slow. SEAC has difficulties in appointing new board members and recruiting the required staff. If no progress achieved by end of 2019.	02 Dec 2019	Organizational	P=3 I=4	The contract with SEAC might need to be terminated and unused fund needs to be reimbursed.	UNDP Energy Team	Visal Veng	P=2 I=2	Implemented
2	Impact of the COVID-19 Pandemic	March 2020	Others	P=1 I=5	Repurposed project activities that were impacted by the pandemic – activities such as study tours, workshops etc.	UNDP Energy Team	Butchaiah Gadde	P=1 I=3	Implemented
3	Impact of community transmission of COVID-19 in Nov 20	The 4 Nov event	Others	P=1 I=5	As above and conduct small groups (<20 pax) and virtual meetings	UNDP, NCSD, NCDDS and MME	PMU	P=1 I=3	Implemented
4	Impact of community transmission of COVID-19 in 20 February 2021	20 Feb 2021	Operational	P=2 I=5	Repurposed plans among IPs and RPs conducted and board approve the plan	UNDP, NCSD, NCDDS and MME	UNDP/PMU	P=1 I=3	Implemented
5	Unspent budget up to 80% with NCSD RPs	April 2021	Operational	P=2 I=4	Split the NEX advance in two tranches and keep monitoring NCSD's RPs to report Q1 expenditure Prepare Note To File for CO	UNDP/PMU	UNDP	P=1 I=3	Implemented
6	Rainy season is coming in Ratanakiri, which could cause difficulty to access to village to install solar	April 2021	Operational	P=3 I=3	Speed up the procurement and implementation	UNDP Energy Team	Vuthy and Butchaiah	P=2 I=2	Implemented
7	Consultants for Energy code and piloting EE	April	Operational	P=3 I=2	More follow-ups with consultants	UNDP Energy	Vuthy, Butch and	P=2 I=2	Implemented

#	Description	Date	Type	Impact & Probability	Countermeasures / Management response	Owner	Submitted updated by	Last Update	Status
	measure could not deliver result					Team	Sarasy		
8	During first quarter of the year 2021, it was very dry which would lead to more newly planted trees die	Jan 2021	Operational	P=4 I= 3	IPs should apply watering to sites where is critical and replaced the dead planted trees with new seedlings	Tree planting partners	Kunka and IP's on tree plantings	P=3 I=2	Implemented
9	The planting site of 20 ha in Portrey commune, Pouk district is a place where about a hundred of cows usually feed. The tree-planting activity may result in economic displacement for local families if they have to shift grazing area.	May 2021	Operational	P=3 I= 3	Poutrey Commune Council to issue an Deka (by law) or an announcement to inform those cows' owners not to feed their cows in the new tree plantation and other areas of CPA land and the others are available for the feeding, and Issuing agreements between cows' owners and Poutrey communal chief	Tree planting partners	Kunka and IP's on tree plantings	P=3 I=3	Implemented
10	There is a risk that local citizens, especially marginalized group do not have the capacity to claim their right to complain the quality of the waste station operation and maintenance.	May 2021	Operational	P=4 I= 2	NCDDS and UNDP project team will instruct Kep municipality administration to assure that marginalized groups of citizens be informed during the SWM awareness raising on how citizen can complain to the waste collection service providers. Moreover, the role of citizen office of the municipality and all Sangkats' accountability mechanism has to take citizen concerns into consideration firmly, especially the waste collection service quality.	UNDP/NCDDS	Kunka	P=4 I=2	Implemented
11	There possibly is a risk that the waste depots	May 2021	Operational	P=4 I= 2	NCDDS and UNDP project team will inform to PDoE and Kep	UNDP/NCDDS	Kunka	P=4 I=2	Implemented

#	Description	Date	Type	Impact & Probability	Countermeasures / Management response	Owner	Submitted updated by	Last Update	Status
	would create conflicts among citizen living nearby the depots' location due to unproper maintenance of the depots' operation and potential bad smell				administration as below. PDoE will provide regular oversight to ensure that the depots are technically operated and maintained properly by the waste collection service providers. PDoE will provide technical advice to Kep municipality administration in its monthly meeting in order to strengthen the waste depot operation and maintenance.				

Annex 3: PROJECT IMPLEMENATION ISSUES AND ACTIONS

Component	Issues	Action taken	By whom	By when	Status
1) NRM and PES	The revised workplan against COVID-19	• Followed up and take action in accordingly and repurposed budget and workplan was reflected in October and notified the board	PMU/NCSD	July-Nov 2020	Implemented
	The field monitoring/ donor visit to tree planting sites was planned to conduct for 23-26 February 2021 to Siem Reap and Pursat provinces. Because of the Covid-19 outbreak in the community (20 February Community Event), the visiting team could not finish and decided to finish the visit after completing activities on 24 February 2021.	• Further monitoring to the rest of the tree plantations • Keep close follow-up on the planting schedule of the flooded tree with an eye to ensure closure by project end date in June 2021	BESD project team BESD project team	30 March 2021 30 April 2021	Implemented Implemented
	PES Piloting should have more strong support from the ministerial level	• DBD has submitted the proposed PES mechanism and fee collection options, and governance structure to the minister of environment • Repurposed unimplementable fund from workshop/meetings to strategic media campaign in Kulen • Host Technical Working Group (TWG) on biodiversity to seek inputs for PES roadmap, PES fund governance mechanism, and fee structure.	Consultants and BESD project team	July 2020-May 2021	Implemented
	The additional tree activities require more institutional arrangements outside the existing BESD project	• Sought the BESD board members' endorsement of this virtually. • Coordinated with newly engaged partners via other UNDP contact persons from the REDD Project. • Transparently communicated with key implementing partner and mapping key implementation steps/solutions. • LOA and grant agreement co-signed and extended for 2021	PMU/NCSD Sony Oum, Sovanna Nhem, Leif Holmberg and Pinreak Sou	July 2020-May then 2021	Implemented

Component	Issues	Action taken	By whom	By when	Status
2) Circular Economy	There was a delay in signing LOAs between NCSD and two departments: 1) Green Economy and 2) Solid Waste Management due to difficulties in creating bank sub-accounts and focal points for implementing the projects.	• Conducted a series of meetings with the NCSD PMU and respective departments to speed up the process. • Support the PMU with inter-department LOAs	Sony Oum and Sreykhuoch Kim and NCSD PMU	Nov-Dec 2020	Implemented
	Delay in piloting municipal waste management in Kep by NCDD-S due to mainstream the plan into 3-rolling plan	• Conducted follow-up meeting with NCDDS team and revised the workplan to reflect the reality.	Sony Oum and Sreykhuoch Kim and NCDDS focal points	Nov 2020	Implemented
3) Solar Energy	Delay in the issuance of purchase order (PO) for selected vendor to implement solar micro-grid	• Decoupled O&M of DC micro-grid so that PO could be issued soon	Vuthy Va, Sarasy Chiphong (MME focal point)	June 2020	Implemented
	Delay in the advertisement of ITB for second village	• Discuss with MME to finalise second village the soonest	Vuthy Va, Sarasy Chiphong (MME focal point)	June 2020	Implemented
	Delay in the field level activities for implementation of solar mini-grid in Ratanakiri because of lockdowns and travel restrictions	• MME/UNDP will issue letter(s) as required to permit travel of the contractor team to field to respond to a rapidly changing context of Covid-19	Vuthy Va, Sarasy Chiphong (MME focal point)	May 2021	Implemented

Annex 4: COMMUNICATIONS, KNOWLEDGE MANAGEMENT AND VISBILITY

The following communications results are listed below:

Knowledge Product Produced this year	Type	Date Published /Produced	Target audience (# people reached)	Link (if available)
The Cash for Work initiative	Awareness	22/05/21	Public **(Reach: 1.5K, likes: 37)**	https://www.facebook.com/UNDPCambodia/photos/4210654609001628/
Why Should we switch to Solar Energy?	Awareness	20/05/21	Public **(Reach: 2.9K, likes: 77)**	https://www.facebook.com/UNDPCambodia/photos/4206525039414585/
Celebrate the National Arbor Day	Awareness	30/04/21	Public (**Reach: 2.4K, likes: 70)**	https://www.facebook.com/UNDPCambodia/photos/4146596015407488/
Zero plastic lover (MDC student-led campaigns)	Awareness	3/01/21	Youth and the public (**Reach: 4K, likes: 51)**	https://www.facebook.com/watch/?v=696206357924403
Model primary school gardening	Awareness	11/01/21	Primary school children (**Reach: 27.5K, likes: 346**)	https://www.facebook.com/141301635936966/posts/3840579326009160/
A two-day consultative workshop on sub-decree for plastic management	Workshop	18/0121	Public (**Reach: 2.8K, likes: 75**)	https://www.facebook.com/141301635936966/posts/3859370840796675/
Featuring MOE Under Secretary of State's quote for shifting toward circular economy	Awareness	18/01/21	Public (**Reach: 3.2K, likes: 109**)	https://www.facebook.com/141301635936966/posts/3859782977422128/
Featuring UNDP Policy Specialist, Climate Change and Environment's quote for shifting toward circular economy	Awareness	20/01/21	Public (**Reach: 5.1K, likes: 165**)	https://www.facebook.com/141301635936966/posts/3862594807140945/
Exchange visit to Battambang with NCDDS team to learn from municipal waste management and plastic recycling	Awareness	21/01/21	Public (**Reach: 13.2K, likes: 233**)	https://www.facebook.com/141301635936966/posts/3864944826905943/
Annual learning forum BESD Project 2020	Workshop	28/01/21	Project partners and public (**Reach: 3.5K, likes: 114**)	https://www.facebook.com/141301635936966/posts/3885023308231428/
Featuring lesson on Circular economy by UNDP DRR	Awareness	28/01/21	Project partners and public (**Reach: 2.5K, likes: 89**)	https://www.facebook.com/141301635936966/posts/3885025424897883/
Guest speaking session by featuring H.E. Dr. Hor Peng, Rector of the National University of Management on commitment for zero-plastic bottle building	Awareness	15/02/21	Project partners and public (**Reach: 17.3K, likes: 152**)	https://www.facebook.com/141301635936966/posts/3933473530053072/
Tried out session at Kampong Chhnang on Greener Thursday Programme with Ministry	Awareness	16/02/21	Youth, teachers and the public	https://www.facebook.com/141301635936966/posts/3935906776476414/

Knowledge Product Produced this year	Type	Date Published /Produced	Target audience (# people reached)	Link (if available)
of Education, Youth and Spots			(**Reach: 4.2K, Likes: 153**)	
Access to clear and productive power at Kampong Chhnang	Awareness	14/02/21	The public (**Reach: 4.2K, Likes: 130**)	https://www.facebook.com/UNDPCambodia/posts/3931125823621176
Featuring access solar energy at Kampong Chhang	Awareness	11/02/21	The public (**Reach: 3.3K, Likes: 94**)	https://www.facebook.com/UNDPCambodia/posts/3923231527743939
Conserving biodiversity reduce risk to future pandemic	Awareness	02/03/21	The public (**Reach: 4.5K, Likes: 130**)	https://www.facebook.com/UNDPCambodia/posts/3978749138858844
Plastic learning session	Awareness	05/03/21	The public (**Reach: 2.6K, Likes: 80**)	https://www.facebook.com/UNDPCambodia/posts/3984355288298229
Featuring plastic waste recycling in Battambang	Awareness	16/03/21	The public (**Reach: 6.9K, Likes: 126**)	https://www.facebook.com/UNDPCambodia/posts/4015053041895120
Plastic recycling	Awareness	18/03/21	The public (**Reach: 2.6K, Likes: 50**)	https://www.facebook.com/UNDPCambodia/posts/4018935024840255
Featuring business model on solar panel	Awareness	24/03/21	The public (**Reach: 2.4K, Likes: 62**)	https://www.facebook.com/UNDPCambodia/posts/4038383859562038
Re-five logo with fabric mask (led by DMC students)	Awareness	27/3/21	Youth and the public (**Reach: 1,054**)	https://www.facebook.com/ReFiveCambodia/posts/20843950773 9239:0
Poster: About Covid19	Awareness	28/3/21	Youth and the public (**Reach: 964**)	https://www.facebook.com/ReFiveCambodia/posts/20915284433 4572
We are back poster	Awareness	29/3/21	Youth and the public (**Reach: 7,541**)	https://www.facebook.com/ReFiveCambodia/posts/20992248759 0941
Featuring productive use and solar	Awareness	30/3/21	Youth and the public (**Reach: 2.5K, Likes: 62**)	https://www.facebook.com/UNDPCambodia/posts/4056594777740946

In 2020, social and communication products produced in 2020, reaching over **352,000 people**.

Knowledge Product Produced this year	Type	Date Published/ Produced	Target audience (# people reached)	Link (if available)
Plastic campaign page in Khmer as a sub-page under the MoE website	Awareness	January 2020	Public audience	https://www.moe.gov.kh/togetherreduceplastic
Site monitoring video	Awareness	January 2020	Donor and board	Soft copy is available
5 ways to reduce plastic	Awareness	2 Jan 2020	Public audience	https://www.facebook.com/UNDPCambodia/photo

Knowledge Product Produced this year	Type	Date Published/ Produced	Target audience (# people reached)	Link (if available)
				s/a.144313525635777/2861740583893044/
Sweden visit Kulen National Park	Awareness	27 Feb 2020	As above **(Reach: 7.5K)**	https://www.facebook.com/UNDPCambodia/photos/pcb.2981880235212411/2981877691879332/
Solar water pump in Kulen as a livelihood option	Awareness	26 Feb 2020	As above **(Reach: 3.1K)**	https://www.facebook.com/UNDPCambodia/photos/a.144313525635777/2979025518831216/
The importance of Kulen ecosystem for fresh water in Siem Reap	Awareness	24 Feb 2020	As above **(Reach: 7.3K)**	https://www.facebook.com/UNDPCambodia/photos/a.144313525635777/2975678055832629/
BESD project pager	Awareness	March 2020	Public audience/ partners	http://ncsd.moe.gov.kh/besd
3rd Project Board Meeting	Other	13 Mar 2020	As above	https://ncsd.moe.gov.kh/dapf/news/3rd-board-meeting-building-enabling-environment-sustainable
Draft Circular Economy Strategy and Action Plan	Other		As above	A soft copy is available
The management of Kulen National Park video	Awareness	04 June 2020	As above (**Reach: 54.5K**)	https://www.facebook.com/UNDPCambodia/videos/2672020926411931/ https://www.facebook.com/UNDPCambodia/videos/2599298003684224
Financing biodiversity conservation options linking to PES	Awareness	21 May 2020	As above **(Reach: 3K)**	https://www.facebook.com/UNDPCambodia/photos/a.144313525635777/3179431568790609/
SHS leaflet	Awareness	August 2020	Public audience/equipment suppliers	Soft and hardcopies are available
Knai Bang Chatt Featuring CE in practice	Awareness	August 2020	Public audience	Soft copy is available
Video documentary on Solar Home System (SHS)	Awareness	September 2020	Public audience / equipment suppliers	Soft and hardcopies are available
Series Video 1: A DMC led video related to reducing the plastic at home and school was produced and published on RE-five Facebook page with sharing on DMC Facebook page on	Plastic campaign	24-Nov- 20	Youth audience **(17.9K visitors and reach: 43.9K)**	https://fb.watch/26Udmzu7Iq/
Guest Speaking Video: We invited Miss Sotheavy At, Founder of "Think Plastic" to share her experience about changing to plastic free lifestyle.	Plastic campaign	29-Nov-20	**Public audience (11.7K viewers and reach: 23.7K**)	Instagram: https://www.instagram.com/ReFiveCambodia/ YouTube: https://www.youtube.com/channel/UC-X_z16vTcfyejqwYwWykqg/ Facebook: https://web.facebook.com/ReFiveCambo

Knowledge Product Produced this year	Type	Date Published/ Produced	Target audience (# people reached)	Link (if available)
				dia
Series videos 2: A video for reducing the plastic at work and public	Plastic campaign	6-Dec-20	Public audience **(11.4K viewers and reach: 23K)**	https://fb.watch/2ohgcicQgj/
Urgent action is required to tackle marine plastic litter	Awareness	09-Dec-20	Public audience (**Reach: 1.3K)**	https://www.facebook.com/141301635936966/posts/3753112431422517/?d=n
Environment ministry sounds alarm over rising air pollution	FB Content	15-Dec-20	**(Reach: 3.1K)**	https://www.facebook.com/141301635936966/posts/3767745756625851/?d=n
25 articles have been received from the candidates	Essay	15-Dec-20		https://www.facebook.com/ReFiveCambodia/posts/125041226079068
How to make cloth face marks by DMC/RUPP students	Plastic campaign	15-Dec-20	**Public audience** (**8.4K viewers** and **21.9K** reach)	https://fb.watch/2HQVX9TCfA/
Opportunity for Cambodia to set example of environmental sustainability	Awareness	17 Dec 2020	**(2.4K)**	https://www.facebook.com/141301635936966/posts/3772971339436626/?d=n
NUM to go plastic free from January	Plastic campaign	13-14 Dec 20	Public audience **(Reach: 54.3K)**	https://bit.ly/2JV3WmS | Khmer Times https://www.facebook.com/141301635936966/posts/3765795766820850/?d=n https://www.facebook.com/141301635936966/posts/3767745756625851/?d=n
Cambodia faces plastic woes	Awareness	17 Dec 20	Public audience **(6.7K)**	https://bit.ly/3gUObrR | The Phnom Penh Post
Providing supplies to informal waste pickers in Phnom Penh	Awareness	17 Dec 2020	Public audience **(Reach: 5.9K)**	https://www.facebook.com/141301635936966/posts/3773435679390192/?d=n
BESD summary result video	Awareness/ knowledge sharing	17 December 2020	BoD and project partners	Soft copy is available
Informal waste pickers play a vital role in the recycling and circular economy in Cambodia	Awareness	21 Dec 2020	Public audience **(Reach: 4.2K)**	https://www.facebook.com/141301635936966/posts/3784027301664363/?d=n
Big water companies have been urged to make voluntary contributions or pay for commercial water use for sustainable ecosystem services (PES)	Awareness	20 Dec 20	Public audience **(Reach: 2.4K)**	https://www.facebook.com/141301635936966/posts/3784027301664363/?d=n

Knowledge Product Produced this year	Type	Date Published/ Produced	Target audience (# people reached)	Link (if available)
Inauguration of DC Micro Grid in Steung Chrow Village, Kampong Chhnang Province	Awareness	21-22 Dec 20	Public audience **(Reach: 12.9K)**	https://www.facebook.com/141301635936966/posts/3784322071634886/?d=n https://www.facebook.com/141301635936966/posts/3784509974949429/?d=n https://www.facebook.com/141301635936966/posts/3788786451188448/?d=n
Kampong Chhnang villages powered by solar published in the Phnom Penh Post	Awareness	22 December 2020	Public audience	https://www.phnompenhpost.com/national/kampong-chhnang-villages-powered-solar
Village first to get 'smart-grid' in Kampong Chhnang province	Awareness	23 December 2020	Public audience	https://www.khmertimeskh.com/50796286/village-first-to-get-smart-grid-in-kampong-chhnang-province/
A series of three videos on RUPP youth-led plastic social media campaigns posted on	Campaign	Dec 2020	Youth ad public audience	Soft copies are available
Series videos 4: A video related Before and After plastic-free lifestyle	Plastic campaign	27-Dec-20	Public audience **(8.4K viewer and reach: 21.9K)**	https://fb.watch/2HR0xWmpFC/
Total views and reach				

Social media posted and communication products produced in 2019:

Knowledge Product Produced this Quarter	Type	Date Published/ Produced	Target audience	Link (if available)
The project page is available in the UNDP website	Other	5/22/2019	Public audience/partners	http://www.kh.undp.org/content/cambodia/en/home/projects/creating-sustainable-cambodia-.html
BESD 2-pager has drafted and being designed for reaching a wider range of audience.	Other	6/28/2019	Potential partners/stakeholders	A soft copy is available.
Plastic pager is drafted and being reviewed for final infographic design.	Other	6/30/2019	Potential stakeholders/partners	A soft copy is available.
The 5 Rs poster on Plastic reduction for MoE/NCSD drafted and being finalized	Other	6/30/2019	MoE and NCSD staff and the public	A soft copy is available.

Webpage content on plastic waste and its impacts for MoE was drafted	Website	6/28/2019	MoE and NCSD staff and the public	A soft copy is available.
Video production guidelines for youth-led plastic campaigns was developed	Training module/manual	6/30/2019	RUPP Students	A soft copy is available.
Facebook content and messaging on plastic campaign drafted	Other	6/14/2019	RUPP Clean and Green Team	A soft copy is available.
Final posters content to stick at cashier counters of Aeon and Lucky. The posters aim to raise public's awareness about negative impacts of plastic and ways to reduce plastic.	Poster	7/5/2019	Customers at supermarkets	A soft copy is available.
Booklet and brochure contents for plastic were drafted	Booklet and brochure	6/14/2019	Booklet for Pedagogy teachers and brochure for general public	A soft copy is available.
BESD board and cost sharing ceremony Press Release				A soft copy is available.
Mascot concept guideline was drafted.	Branding image	6/28/2019	General public	A soft copy is available.
Awareness Raising Material from Baramey Production (Music Video, Animation, Theme Song, Pledge)	Video	Between 11/6/2019 and 12/5/2019	General Public	https://www.facebook.com/barameyofficial/videos/2760874500623931/?__tn__=kCH-R&eid=ARBPHc2y2qZtGolMDw8UXO-adJtyGLBsqg0gb-https://www.facebook.com/barameyofficial/videos/571280400316768/?__so__=permalink&__rv__=related_videos
4R Posters for general events and they are now used by Ministry of Education, Youth and Sport for public awareness raising.	Poster	11/20/2019	General Public	https://www.kh.undp.org/content/cambodia/en/home/projects/our-action-for-plastic-pollution-in-cambodia/what-we-re-doing-to-combat-plastic-0.html
TV Commercial on the impact of plastic and its alternatives,	TV Commercial	11/12/2019	General Public	https://www.youtube.com/watch?v=FAerIdp7v9c&feature=youtu.be
Policy Regulation Reports	Report	12/13/2019	MoE and NCSD Staff	https://www.kh.undp.org/content/cambodia/en/home/projects/our-action-for-plastic-pollution-in-cambodia/what-we-re-doing-to-combat-plastic-0.html

You-led plastic competition	Videos	11/30/2019	RUPP Clean and Green Team	Soft copies are available.
BESD annual result was projected at the learning event in December.	Video	12/26/2019	NCSD/UNDP	A soft copy is available.
Post-event Vox pop video was produced about their participation perspectives to act after the annual learning forum.	Video	12/31/2019	UNDP	A soft copy is available.

Was the project cited/quoted/featured in media reports/articles? If yes, please provide link to article/video.	Some articles published in 2021by news agents: • Plastic recycling in Battambong, published in ThmeyThmey • Battambang city as a role model for municipal waste management, published at Phnom Penh Post and Khmer newspaper, Reaksmey Kampuchea • POWER TO THE PEOPLE: How Cambodia's remote villages are leapfrogging up the energy ladder. Published by UNDP on February 11, 2021. • Battery Power Sharing: The Pod now enables transmission of underutilized battery power to wherever it's most needed at night. Published by Okra on May 17, 2021. • Using Mesh-Grids to energize rural Cambodia. A case study: The Cambodian Government is piloting innovative approaches to sustainably electrify last-mile areas. Published by Okra on 14 May 2021 • DMC project aims to reduce plastic https://www.phnompenhpost.com/national/dmc-project-aims-reduce-plastic. Published on 20 May 2021 Some articles published in 2020: 1. Cambodia: A man's journey to reduce plastic waste by turning it into diesel. Published in Asia News on February 19, 2020. 2. Waste remains a challenge for Phnom Penh City (03/02/2020) https://www.rfi.fr/km/cambodia/chrono-03-02-2020 3. Solving Cambodia's Plastic Problem Seen as Key to Minimizing Waste. Published on VOA on 28 May 2020. https://khmer.voanews.com/a/solving-cambodias-plastic-problem-seen-as-key-to-minimizing-waste/5395699.html 4. Cambodia accelerates fight against single-use plastics. Published in Cambodian news on 05 April 2020. https://cambodianess.com/article/cambodia-accelerates-fight-against-single-use-plastics 5. Cambodia Starbucks Ends Plastic Straw Use. Published in https://cne.wtf/2020/01/31/cambodia-starbucks-ends-plastic-straw-use on 31 Jan 2020. 6. Lessons from 2020: time for a circular economy. Published in Asian Times. https://asiatimes.com/2020/11/lessons-from-2020-time-for-a-circular-economy/ 7. Lessons from 2020: time for a circular economy in Khmer. Published in ThmeyThmey https://www.thmeythmey.com/?page=detail&id=97451 8. The following articles were published various media agencies to raise public awareness on PES at Kulen National Park between 19 and 21 December 2020: **a) Khmer Times** ○ 1st story: Stern action against illegal harvesting of wild orchids. https://www.khmertimeskh.com/50795919/stern-action-against-illegal-harvesting-of-wild-orchids/ ○ 2nd story: Big water companies urged to contribute to ecosystem services.

https://www.khmertimeskh.com/50795454/big-water-companies-urged-to-contribute-to-ecosystem-services/

b) Fresh News (in Khmer)

- MOE led over 20 news agents to better understand PES at Kulen National Park. http://www.freshnewsasia.com/index.php/en/localnews/180711-2020-12-18-04-25-45.html
- MoE to take legal measures to any individual who illegal trade wild orchids or endangered wildlife for export. http://www.freshnewsasia.com/index.php/en/localnews/180926-2020-12-21-02-28-06.html
- MoE calls for commercial water users from Kulen to fund PES to protect ecosystems that Kulen offers. http://www.freshnewsasia.com/index.php/en/localnews/180927-2020-12-21-02-37-38.html
- Phnom Kulen is priceless heritage reservoir. http://www.freshnewsasia.com/index.php/en/localnews/180966-2020-12-21-06-15-57.html
- MoE to create seek back for wild orchid and other plants from extinction. http://www.freshnewsasia.com/index.php/en/localnews/180978-2020-12-21-07-54-41.html

c) Phnom Penh Post (in English)

- 1st story : Endangered status mulled for Wild Orchids. https://m.phnompenhpost.com/national/endangered-status-mulled-kesor-kol
- 2nd story: Pilot ecosystem initiative to draw funds from Kulen water use. https://www.phnompenhpost.com/national/pilot-ecosystem-initiative-draw-funds-kulen-water-use
- https://www.facebook.com/109376125795581/posts/3604358662963959/
- https://www.facebook.com/109376125795581/posts/3602039549862537/

d) VAYO FM Radio

- 1st story: MoE: Should voluntary donation or PES on water usage participate in ecosystem protection. https://vayofm.com/news/detail/106450-597391933.html
- 2nd story: Researcher has been recording wild orchids that exists in nature (in Khmer version). https://vayofm.com/news/detail/106459-251474423.html
- 3rd story: – 20 new reporters conduct a visit to understand about PES (in Khmer). https://vayofm.com/news/detail/106419-343357031.html

e) Khmer Independence

- MoE calls for commercial water users from Kulen to fund PES to protect ecosystems that Kulen offers (in Khmer). https://www.khi-newsdaily.com/detail/409854.html

f) AMS

- https://ams.com.kh/central/?p=214347

g) AKP (in Khmer)

- https://www.information.gov.kh/detail/536369
- https://akp.gov.kh/kh/post/detail/223880

	○ https://akp.gov.kh/kh/post/detail/223958 **h) Bayong TV (BTV)** ○ http://btv.com.kh/?p=106368&fbclid=IwAR0SxdjiEBrVfcIUjEyLWzVnRR32GTdTviBLRnj9yLYuXQIf1Ds3Nhn9nmg **i) Apsara TV** ○ https://www.facebook.com/amstv11/videos/410671417037778 ○ https://ams.com.kh/central/detail/216867 ○ https://l.facebook.com/l.php?u=https%3A%2F%2Fams.com.kh%2Fcentral%2F%3Fp%3D214267&h=AT2S4_vxjdyN1BtzsU8v4LUpGLJFS5wJffMXH6Ttei1eljJfPbGg6MFHlfl-5aGL9WJaiPrJPboDDpIoEQpwoJyfOKEBRRbhrAyOiZaoPIguUz5iqElfBQA0qHP8BVP3gHp87O_6cCiQzFrm1ypGicHhWRFWl4DddQtC0Ra_WyUyts00IwjH4yBKT72l8x0 ○ https://www.facebook.com/amstv11/videos/400697681026693/?vh=e&d=n **j) TVK** ○ https://youtu.be/OJsLoUz_8bU ○ https://www.youtube.com/watch?v=RVVbpVd9XIA&feature=youtu.be ○ https://www.youtube.com/watch?v=OJsLoUz_8bU ○ https://m.facebook.com/story.php?story_fbid=224980725759331&id=518400675179292 ○ https://www.facebook.com/tvkchannel7/videos/236623324730607/ ***k) CTV8*** ○ https://youtu.be/WyCSqOztzo8 9. Village first to get 'smart-grid' in Kampong Chhnang province ▪ https://www.khmertimeskh.com/50796286/village-first-to-get-smart-grid-in-kampong-chhnang-province/ 10. Kampong Chhnang village powered by solar https://www.phnompenhpost.com/national/kampong-chhnang-villages-powered-solar In 2019, Three news articles published our work relating to Cambodia's commitment to the circular economy as the following: 1. Business Time "Cambodia Is Taking Big Steps in Adopting A Circular Economy" 2. Bangkok Post, "Cambodia puts circular economy in motion" 3. Khmer Time, "Youth urged to curb plastic use" Four news articles published our work relating to the National Forum on Actions Against Plastic and waster festival rubbish campaign.

	1. The Khmer Times | Call for more action to reduce plastic waste 2. The Phnom Penh Post | Gov't set to act on plastic waste 3. Xinhua News | Cambodia calls for more action to reduce plastic waste 4. The Ministry of Information | More Action Should Be Taken Against Plastic Waste 5. Khmer time | English |Water Festival rubbish collectors thanked for work 6. Khmer time | English |Water Festival concert to promote clean environment Radio news published on food festival regarding plastic reduction Kon Slab Phrea held on 23-24 Nov 2019 **1. Lotus Radio | Khmer | Love for the food, click here.** **2. Expression Hub | Khmer | Food, click here.**