Completion Report

Encouraging Climate Adaptation and Mitigation Investments through Private Sector Engagement in Decentralised Wastewater Treatment Systems (DEWATS) and Small-scale Water Supply Infrastructure

Lao PDR

NCF6

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Local Partner(s): UN HABITAT

Other Partner(s): Nam Papa State-Owned Enterprise (NPSE) Attapeu and Sekong

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James.leten@siwi.org
+46 812 136 092 **James Leten, Sen. Programme Manager,**

Torgny Holmgren,Executive Director

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1. EXECUTIVE SUMMARY

Baseline

In Laos, floods, droughts and consequent disease epidemics are increasingly harsh as a result of climate change, severely impacting vulnerable communities. The country is one of the most climate vulnerable countries in the world, as shown by its 7th place ranking of countries affected by extreme weather events in The Climate Risk Index for 2013. This is mainly due to its high dependence on climate-sensitive natural resources and its low adaptive capacity. The country has been increasingly affected by natural hazards. Floods, droughts, and storms, which often trigger secondary hazards such as landslides, fires, infestations and outbreaks of disease, cause each year loss of life and severe damage to livelihoods and infrastructure. Proper water supply and sanitation infrastructure is urgently needed to increase resilience to these climate hazards. However, such systems are poorly developed in Laos and similar Least Developed Countries (LDC).

While small-scale floods occur locally every year -often more than once- the most recent example of severe floods took place in 2018 in all the country, with a consequence of 6 provinces being highly impacted (including Attapeu and Sekong). At least 765,000 people were affected and 19 killed by Tropical Storm Podul and Tropical Depression Kajiki. Simultaneously, the area is experiencing longer, dryer seasons, meaning that droughts can also occur. This highlights the on-going need for adaptation measures. In terms of mitigation, while Laos' GHG emissions are relatively low, in the context of its rapidly growing economy emissions are rising, and a project such as this one can represent an innovative first step in terms of 'green growth' in the provision of basic services such as small-scale water supply infrastructures and DEWATS, and at the same time producing biogas and as such providing access to energy. As a result, the Ministry of Planning and Investment (MPI) in its Initial Conceptual Framework and Roadmap for Public Private Partnerships in Lao PDR, has set priorities to enhance delivery of water provision, waste collection and other urban services, as well as to facilitate economic development in remote areas of the country, with the aim to fill gaps in climate resilient infrastructure investments. In that respect, a Decree on Public Private Partnerships has been developed setting up legal and financial facilitations, considering private Parties as domestic or foreign, but giving the priority to local enterprises established and registered in Lao PDR and not affiliated to foreign firms[1].

Project objective

The overall objective of the project was to enhance local climate resilience by encouraging climate adaptation and mitigation investment through Private Sector Engagement in Decentralised Wastewater Treatment Systems (DEWATS) and Small-scale Water Supply Infrastructure in highly vulnerable provinces in Lao PDR. Therefore, the project focused towards enabling 100 households or equivalent to be connected to 2 DEWATS (one in each province) and 1200 households or equivalent to have better access to water supply infrastructure in order for to be better prepared for climate-induced water stresses and reduce GHG emission due to local waste water.

Achievement of results

As a result, the project enabled the development of small-scale infrastructure systems in Attapeu and Sekong provinces: (1) water supply systems (based on rainwater harvesting, including innovative underground rainwater harvesting systems, gravity fed systems, solar pumps and others), and (2)

[1] http://www.investlaos.gov.la/images/sampledata/pdf_sample/PPP_Decree_Draft_Verson%207_Eng_29Jun15.pdf

Decentralised Wastewater Treatment Systems "DEWATS". These appropriate infrastructure resilient to extreme climate events are now increasing water availability and decreasing health hazards incurred by inappropriate sanitation.

To achieve the above results, under Milestone 1 (MS1), an assessment of Climate Change resilience and adaptation capacities was conducted. The implementing team conducted project inception and community-level stakeholders workshops, as well as an assessment of climate change resilience and adaptation capacity of 23 communities, using, when appropriate, the UNHABITAT developed Climate Change Vulnrability Assessment (CCVA) system. This has deepened the understanding of the local context and ensuring that the project was responding to local needs and challenges.

Milestones 2 and 3 focused on feasibility, governance and insititutional arrangements and enabled the construction of small scale resilient water infrastructure. The construction of the two DEWATS were postponed to milestone 5 as per the COVID-19 pandemic situation.

Milestone 4 contributed to the achievement of results on Public-Private Partnerships, especially through the establishment of the Water Supply Public Private Partnership Consortium (WSPPC) mechanism together with the Nam Papa State-Owned Enterprise (NPSE) staff in Sekong and Attapeu. Guidelines for provincial Water Supply Public Private Partnership Consortium (WSPPPC) were produced, setting expectations and standards for the consortium members. These were drafted to clearly define roles and responsibilities and enhance the capacity and mutual understanding among its members, in order to properly manage the multi-stakeholder platform while ensuring the quality of service delivery. Training were facilitated by NPSE to build capacity of all stakeholders of the Water Supply Public Private Partnership Consortium (WSPPPC).

Under Milestone 5, the two DEWATS were built:

- In Sekong, the construction of an improved sewage treatment system and biogas digester is enhancing the hygiene and sanitation standards at the Sekong Hospital, promoting the use of a sustainable and environmental-friendly system.
- In Attapeu, the DEWATS and biogas digester construction are located at the ethnic school, in Saysaart Village. It improves the access to gender-inclusive toilets and WASH facilities for teachers and students. 480 users benefit from the intervention in Sekong province, while 638 students have access to the improved services in Attapeu province.

Along with the above mentioned results, considering direct benefits, biogasdigesters are currently contributing in pollution reduction, and therefore reducing the ecological footprint of the community through reduction of wastewater and pollution discharged in adjacent water bodies and in the atmosphere

In Attapeu, about 50 teachers and students can now easily use the new improved toilets that include gender-separated bathrooms, shower facilities and public hand-washing stations – significantly improving life conditions. Moreover, in line with the Covid-19 pandemic, the project benefited from public promotion to increase handwashing. As a result of teachers and students having access to hand-washing stations 24/7, an important impact on teachers' and sudents' health have been noticed.

Presently, in December 2021, the GHG reduction by the DEWATS and biogesters are lower than expected due to the fact that they have been built in 2021, and it takes several months to have the biodegradable capacity of these installations build up. Full capacity should be reached by June 2022.

Some expected additional directs and indirects impacts have been identified:

- As indicated previously, the DEWATS system is treating wastewater in a low-maintenance and affordable way. It enables water reuse for agriculture and biogas production as energy source, and as such contributes also to climate change mitigation.

- Regarding GHG emissions reduction from the DEWATS system implemented, at full capacities, these processes will enable the following impacts:
    - Value of Direct GHG emissions reduction has been calculated at 2%, considering the following assumptions: (1) Baseline Emissions (kgCO2/y) = the quantity of fuel wood displaced by both biogas systems annually (kg) * the fraction of non-renewable biomass in Laos (i.e., 87% - using the default UNFCCC value) * emission factor of fuel wood (1.75kgCO2 per kg fuel wood (using IPCC default values)). (2) Considering that it is a small project, we assume the project emissions are small and therefore the baseline emissions are equivalent to the emission reductions. (3) The amount of fuel wood displaced: Y1 - 5.4 tons, Y2 - 8.1 tons, Y3 onwards - 10 tons (NB: As a result of biogas production from the DEWATS system increasing over time to a maximum in Y3) .
    - For indirect GHG emissions reduction, the expectation (post NCF) is that 1 new DEWATS and biogas system will be installed every year for the next eight years. The value of indirect emissions reductions will be 3%.

- Additionally, while there is a general reluctance of local communities to use biogas as an alternative source of energy, emphasising on benefits of biogas and on the agricultural gains contribute in delivering positive impacts over the medium term.
- Finally, in the longer term, these systems will potentially contribute to social improvements as well as ecological advancements, especially for water quality improvement and ecosystems protection. At the same time, it will contribute to improving health by potentially decrease mortality and support the eradication of malaria/dengue and waterborne diseases thanks to improved access to basic sanitation.

1.1 Achievement of outcomes and outputs

Expected outcomes and outputs	Indicator(s):	Achievement of outcomes and outputs:
OUTPUT 1. Baseline assessment for climate adaptation and mitigation measures, and the business case established in the target communities		
MS 1.A) Project Inception and community-level stakeholders workshops held (Act 1.1 and 1.2)	Baseline date, Inception report	The project inception workshop was held on June 20th 2018 at the Meeting Room at Attapeu's Provincial Governor Office. 19 participants attended, representing MPWT, Attapeu and Sekong provinces and UN-Habitat. The inception report is available here. Two (2) Community-level stakeholder workshops for district and village level officials took place on 9th & 10th July in Attapeu Province and 11th & 12th July in Sekong Province.
MS 1.B) Climate Change resilience and adaptation assessment with	1 Report setting the baseline on connection to water and	Climate change resilience and adaptation capacity assessed and

baselines and indicators with respect to infrastructure, CC adaption capacities and GHG emission (Act 1.3)	sanitation, on adaptation capacity and GHG emissions produced	documented to act for project baseline in at least 23 communities. The report is available here.
OUTPUT 2. a) Two DEWATS built and operational in two provinces in Laos (one in each province) benefitting at least 100 households and/or business equivalents. ***OUTPUT 2. b) Twenty three small-scale water supply infrastructure systems (rain water harvesting, gravity fed systems, etc.) operational (twelve in one province and eleven in another province), benefitting at least 6,000 people.***		
MS 2.B) Preparatory studies and arrangement for DEWATS and small-scale water infrastructure construction (Act 1.5	1 feasibility study per water infrastructure (DEWATS and water supply), including breakdown of the budget per infrastructure 1 EIA per DEWATS 1 project planning and detailed design per water infrastructure (DEWATS and water supply), including updated budget per infrastructure 1 report reporting on the design participatory process. Details on 'representation by' are expected	1 feasibility study per water infrastructure (DEWATS and water supply), including breakdown of the budget per infrastructure 1 EIA per DEWATS 1 project planning and detailed design per water infrastructure (DEWATS and water supply), including updated budget per infrastructure *1 report reporting on the design participatory process. Details on 'representation by' are expected*
MS 3.A) Community-level stakeholder workshops to discuss and decide construction and governance (Act 2.1)		Workshops were held in 2019 in Attapeu, Sekong and Vientiane. Stakeholder Workshops Summary is available here.
MS 3.B) Identification and decision on best locations for DEWATS and small-scale water infrastructures (as part of the feasibility studies DEWATS and water supply) (Act 2.2)		The completion report of 11 Small-Scale Water Infrastructures in Attapeu and Sekong is available here.
MS 3.C) Construction of 2 DEWATS and 22 small scale water infrastructures (Act 2.3)	In 2 communities, a minimum of 50 households are connected to 2 DEWATS in operation (1 in each province Attapeu and Sekong) 5 persons per community competent and enable to construct, operate and maintain the DEWATS 22 local communities (minimum of 3 000 people) fully supplied with water thanks to the construction of water harvesting and supplying systems and, if needed, flood protection infrastructure 5 persons per community competent and enable to construct, operate and maintain the constructed infrastructure 5 persons per community competent and enable to	Construction of the DEWATS were delayed due to extreme weather events and floods, and were delivered under MS5. Here the completion report for Attapeu and Sekong. The construction of the Water Supply infrastructure was terminated. 23 communities are now served with drinking water. Completion report can be found here.

	construct, operate and maintain the DEWATS.	
OUTPUT 3. A Water Supply Public Private Partnership Consortium established and operational by Nam Papa State-Owned Enterprise (NPSE) staff in Sekong and Attapeu.		
MS 2.A) Establishment of Water Supply Public Private Partnership Consortium (WSPPPC) & assessment of private sector engagement (Act. 1.4)	1 report describing the PPP institutional landscape and Water Supply Public Private Partnership Consortium (an assessment of private actors willing to engage in PPP)	The report on Public Private Partnership Landscape Assessment in Lao PDR is available here.
MS 4.A) Support newly established systems through WSPPPC mechanism (Act 2.4)		2 trainings were provided to the consortium, on PPP and on Water Integrity and anti-corruption in PPP context. 12 local communities fully supplied with water thanks to the construction of water harvesting and supplying systems. Water Supply Public Private Partnership Consortium (WSPPPC) Guidelines were produced in August 2020. The report is available here.
OUTPUT 4. Business case and lessons-learned of the present project are documented and shared with decision- and policy-makers. The latter are informed about and take into consideration the pilot project's lessons learned and success.		
MS 5.C) Development of knowledge products and dissemination in national and provincial levels platforms (Act 4.1)	Top management (Directors and Chief of Divisions) of NPSE Sekong and Attapeu capacitated to engage their institutions in PPP. A minimum of 15 private company/SME understand the responsibilities, obligations, commitments and risk of engaging in a PPP with the NPSE. All trainings include SIWI's "gender and integrity" module. Reported presentations of lessons-learned in government and provincial decision-making meetings.	Guidelines were produced for the use and maintenance of the DEWATS and Water Supply infrastructure. Guidelines were also produced for national and provincial staff for the Public Private Partnership Consortium *PowerPoints of trainings were shared with participants as knowledge products*

1.2 Deviations from the planned outputs and activities

The COVID-19 pandemic affected the project implementation and some activities were delayed. As a result, the construction of 2 DEWATS was postponed and completed under Milestone 5.

Under Milestone 4, it was also decided to have a comprehensive PPP and Water Integrity training of the Water Supply Public Private Partnership Consortium. The capacity development was done through a face-to-face intro training, followed by an online advanced training, presenting and discussing PPP cases and water integrity tools.

1.3 Achievement of NCF indicators

NCF core indicator	Results (quantitative)		Clarifications/Means of verification
Number of beneficiaries reached	women	**8,232**	Beneficiaries of the 11 Small-Scale Water Infrastructures: - In Attapeu: the project reached 11,346 persons (including 5,599 women, all part of ethnic groups) - In Sekong: the project reached 4,181 persons (including 2,074 women, and 4,116 people were part of ethnic groups). *(see MS3. Completion report)* Beneficiaries of the 2 DEWATS: - In Attapeu reached an extra 638 persons; - In Sekong, the project reached 480 persons. *(see MS5. Completion report)*
	men	**7,495**	
	total	**15,727**	
Number of people with increased resilience to climate change	women	**8,232**	
	men	**7,495**	
	total	**15,727**	
Number of people with improved livelihoods	women	**8,232**	
	men	**7,495**	
	total	**15,727**	

2. CLIMATE CHANGE

The project focused on accelerating both mitigation and adaptation, with an emphasis on WASH systems. Overall the project contributed to improving living conditions and access to waste water systems considering gender perspectices, and reducing health issues while enhancing climate resilience through the development of climate resilient infrastructures.

For the 2 DEWATS, both were complemented with a biodigester fed with organic waste from the kitchens, and the biogas, from the DEWATS and biogas digester, is used to substitute fuel wood as cooking fuel in the kitchens. The saved fuelwood is used as the basis of calculating the emission reductions.

Considering direct benefits, the DEWATS and biodigesters are currently contributing in pollution reduction, and therefore reducing the ecological footprint of the community through reducing wastewater and pollution discharged to water bodies and into the atmosphere.

For the DEWATS impact analysis, the GHG emissions were analysed and calculated according to the target population. Thus, the number of emissions equivalent to 50 HH (or 200 people) in each province is 0,02 Gg of CO2. This was considered as part of the project's baseline for each of the sites where DEWATS were built. As a result, considering GHG emissions reduction from the DEWATS system implemented, at full capacities, these processes will enable the following impacts:

- The value of Direct GHG emissions reduction has been estimated at 2%, considering the following assumptions: (1) Baseline Emissions (kgCO2/y) = the quantity of fuel wood displaced by both biogas systems annually (kg) * the fraction of non-renewable biomass in Laos (i.e., 87% - using the default UNFCCC value) * emission factor of fuel wood (1.75kgCO2 per kg fuel wood (using IPCC default values)). (2) Considering that it is a small project, we assume the project emissions are small and therefore the baseline emissions are equivalent to the emission reductions. (3) The amount of fuel wood displaced: Y1 - 5.4 tons, Y2 - 8.1 tons, Y3 onwards - 10 tons (NB: As a result of biogas production from the DEWATS system increasing over time to a maximum in Y3) (See GHG calculations).
- For indirect GHG emissions reduction, the expectation (post NCF) is that 1 new DEWATS and biogas system will be installed every year for the next eight years. The value of indirect emissions reductions was estimated at 3% (see GHG calculations).

Additionnaly, in the longer term, these systems will potentially contribute to social improvements as well as ecological advancements, especially for water quality improvement and ecosystems protection. At the same time, it will contribute to improving health by potentially decrease mortality and support the eradication of malaria/dengue and waterborne diseases thanks to improved access to basic sanitation.

Finally, the project had a strong community participation focus, reinforced by environmental and social safeguard, health and sanitation awareness. This has particularly participated in the following challenges related to climate change:

- Mainstreaming climate action into urban planning to build resilient communities;
- Establishing new optimally sized water supply systems using appropriate innovation technologies;
- Motivating public participation in water and sanitation infrastructure development to improve the environment;
- Strengthening the urban water supply sector planning, managing, and regulating capacity; and,
- Increasing Climate Change resilience, sustainable livelihoods, health conditions, green growth.

2.1 Development impacts and cross-cutting issues

While contributing to accelerate the development of climate-resilient infrastructure, this project has opened up opportunities for future financing initiatives, especially for private sector engagement.

It has also participated in the promotion of local innovation based on people-centred approaches and participation, using efficient systems anchored in local context.

On cross-cutting issues, the project contributed in the achievement of the following:

- **Human rights based approach**
  During the implementation, progress was made towards the achievement of a human rights-based approach, particularly to the human-right to water and sanitation services. The training activities that were completed were organized with the aim of promoting, realising and protecting human rights, as well as social and environmental assets. This has set the basis for demonstrating how investment in infrastructure generates social development and resilience to shocks. Besides, the overall objective of contributing with local communities to improve human health and wellbeing also highlights the importance of the equal opportunities for women and men, by providing a more secured access to water and sanitation for them all.

- **Inclusivity – leaving no one behind**
  The principle of inclusivity was a key factor in the project. First of all, the planning and design of resilient systems was carried out in a participatory manner, with inputs from all sectors of the community. A People's Process approach was also developed, which saw people as active participants and key resource rather than as objects of development. In this respect, in implementing milestone 1 of the project, an inclusive and integrated approach was undertaken using the People's Process and establishing proactive workshops involving stakeholders and beneficiaries.

  Although participatory processes are generally time consuming, the engagement of both women and men in the design, planning and management of the sub-projects was fundamental to achieve the sustainability of the project as it guarantees that it was culturally accepted, that its components were available and affordable, and that a support system was in place.

- **Gender equality**
  Gender was mainstreamed into the entire project, and more than half of the beneficiairies were women. The Lao Women's union was particularly involved to secure women's participation into discussions. Another aspect to advance gender equality was the development of improved sanitation for girls at the ethnic school in Attapeu. Gender and corruption was also addressed during the water integrity trainings.

- **Good governance**
  The activities conducted were aligned with the government's process, particularly district and provincial development plans, in conjunction with NPSE. In addition, Participatory Land Use Planning (PLUP) principles were incorporated to ensure good governance, as well as context specific means to consult with people in the target areas, considering the high numbers of minority groups. In particular, the project aligned with the "Sam Sang" (3-build) policy, established in 2012, aims at strenghtening local capacity and devolving responsibilities to lower levels. By building capacities at the local level, the project participated in the implementation of national targets while ensuring good governance using participatory tools. The project also trained the WSPPPC members with 2 trainings on water integrity in general, and in a PPP context in particular, highlighting the importance and collective benefits of investing in good governance.

3. ASSESSMENT OF THE RESULTS AND IMPACTS OF THE PROJECT

3.1 Relevance

Sanitation improvement

For the record, A total of 44.995 households were identified in Attapeu and Sekong provinces by the 2015 Census, from which a total of 18.700 households still depend on unimproved *water sources*. Therefore, the main objective of the project was to accelerate the development of small scale water infrastructure in the target provinces to improve sanitation conditions and enhance climate resilience. In that sense, the two target provinces were assessed as highly vulnerable to climate change with limited sanitation coverage. By focusing on sanitation and wastewater treatment, the project was aligned to beneficiaries needs.

Additionnaly, while improving beneficiaires' living conditions at the local scale, the project contributed to the achievement of national policies such as the 9th National Socio-Economic Development Plan (9th NSEDP). In this respect, the project is particularly supporting ongoing efforts related to NSEDP's

- NSEDP's Outcome 3: Gradually enhanced people's material and mental well-beings as per the direction of food and income security; *Output 1: Developed rural and remote areas and improved livelihoods*, with the aim to Continue to develop rural communities and irradicate poverty in all areas under the direction of the 3-Build policy and establishing emerging city areas by promoting appropriate social services (education and health, clean and safe water and sanitation).

- NSEDP's Outcome 4: Environmental Protection and Natural Disaster Risk Reduction; *Output 1: Sustainable natural resource use and management*, with the aim to improve and invest in the necessary and low-cost infrastructure for the collection and treatment of wastewater in urban and rural areas. Establish strategies and policies at the national and local levels to encourage effective investment in appropriate sanitation services.

Climate resilience

As stated earlier, Attapeu and Sekong provinces are highly vulnerable to the effects of climate change. Several ongoing efforts are therefore focusing on building resilience in these areas, and the NCF project has been complementing current initiatives.

In line with its National Determined Contribution, the project has consequently contributed in building synergies between adaptation and mitigation in human settlements. Particularly, the project supported the implementation of the National Climate Change Strategy by focusing on developing resilient infrastructure projects, improving wastewater management and engaging the private sector to build resilience.

Additionnaly, the project is contributing to the achievement of the 9th NSEDP Outcome 4: Environmental Protection and Natural Disaster Risk Reduction; *Output 2: green growth and climate change actions* by promoting businesses with low greenhouse gas emission to contribute to a climate change mitigation effort; incentivizing the use of techniques and modern technologies that generate fewer wastes, save energy, and use clean and environmentally friendly energies.

Private sector engagement
The project has particularly supported the development of public-private initiatives, a key development target at the national country, especially for basic infrastructure development.

As a reminder, in 2013 the 'Strategic Framework for the Development of the Urban Water Supply and Sanitation Sector' 2013-2030 was issued. This Strategic Framework consolidated and extended a number of ongoing initiatives in the sector to build the capacity of provincial utilities and create a policy and institutional environment more conducive to private sector participation and sustainable service delivery. The state of public infrastructure and services are a major impediment for the nation's economic growth and development objectives. Consequently, the involvement of private partners to manage infrastructure will not only reduce climate-related risk but it will promote green growth through job creation while building capacity and skill, as the private sector has been identified as the main engine of growth and the Government of Lao PDR is committed to fostering a transition to a private-sector-led market economy.

In this respect, the project supported ongoing policies aim at strengthening private sector engagement for sustainable development such as the 9th NSEDP Outcome 1: Continuous quality, stable and sustainable economic growth; *Output 1: Robust and sustainable macro-economic*, promoting private investment to reach the national and subnational targets.

In line with national and sub-national policies, the project has therefore enabled the facilitation of private sector participation through local Public Private Partnership (PPP) by setting up Water Supply Public Private Partnership Consortium (WSPPPC). Such a consortium is the first of its kind in Laos, and will serve as an example of successful Public Private Partnership at the local scale.

Decentralisation
Finally, in line with the decentralisation process enhanced by the "Sam Sang" policy, the project participated in the reinforcement of local capacities. This is particularly aligned with the 9th NSEDP Outcome 6: Efficient public administration, and equal, just, and protected society following the direction of the effective and strict rule of laws; *Output 1: Enhanced the efficiency of public administration to make it more streamlined* and *Output 2: Harmonized and revised coordination mechanism and regulations within the public sector* to improve efficiency.

3.2 Effectiveness

First of all, the holistic and people-centered approach towards capacity development was a critical factor of effectiveness. Nam Papa State-Owned Enterprise (NPSE) staff and local communities were engaged in the project design and implementation through capacity building activites and the provision of use and infrastructure and DEWATS maintenance guidelines. These activities aimed at ensuring the constructions' sustainability and appropriate use, extending their lifespan. In addition, it is expected that the training module delivered bolsters the capacity of key local stakeholders, setting the grounds for further interventions.

As a result, the piloting process developed has also successfully influenced the achievement of the project due to high level of communities and local authorities' participation. Communities and local authorities were particularly engaged and committed to the project, ensuring its success. The operational and maintenance aspect of the projects were developed at the community level for maximum impacts, and designs were shared for future work. Although the COVID-19 pandemic affected the project implementation, the two DEWATS initiatives developed in close collaboration

with the ethnic school and the hospital in Sekong, benefited from strong cooperation with the hosting institutions. Consequently, this approach may be replicated in a similar context. Furthermore, the development of small scale infrastructure and DEWATS using appropriate, low-cost and simple design has amplified communities' engagement and has opened some ways to scale-up systems developed.

Finally, while the COVID-19 pandemic has impacted the implementation of the project, adaptability was a key factor of success to effectively deliver the project. In this respect, the implementing team and stakeholders were able to make timely decision to ensure the achievement of outcomes and outputs.

3.3 Efficiency

Efficiency was at the centre of this initiative. The project design enabled the implementing team to deliver activities on time and in a logical manner. The adaptability of the team has also enhanced efficiency, especially in terms of coping with the pandemic situation in the target provinces.

Cost-efficiency has further played a key role in ensuring success and sustainability. By developing small scale water infrastructure and DEWATS using simple construction methods and minimum of ressources, the project offers several opportunities for scaling-up in similar contexts with the capacity to engage local communities at all steps of the project.

3.4 Impact

Safer places
Aside from improved sanitation and water systems, the project has delivered significant but unexpected impacts, participating in accelerating the development of safer places. This was particularly illustrated during the local pandemic outbreak where the small-scale infrastructures projects enabled communities to benefit from accessible hand-washing stations, enhancing local resilience to shocks and health issues reduction.

Strenghtened partnerships
Additionally, while the project targeted private investment for resilient infrastructure, Public Private Partnershps developed, especially under the WSPPPC strengthened local cooperation between private sector and public sector as well as appreciation for each other's challenges. In our view, this is a significant positive step to support the development of sustainable partnerships. This was particularly demonstrated during stakeholdrs discussions where each party highlighted the importance of shared vision of the public and the private sectors in achieving the goal of local development. It has also contributed to identifying critical factors for success, and developing mutual trust amongst the stakeholders while working to achieve their common goal. Consequently, the project is a successful example of multisectorial cooperation.

3.5 Sustainability

The project has considered sustainability since its conception.

First of all, the selected approach focusing on capacity building, community participation, and partnership development ensure that all stakeholders -mainly government officials and NPSE staff- gain an understanding of the short term and long-term needs associated with climate change threats and that they are able to plan for climate resilient water small-scale infrastructure. Communities were also engaged at all phases of the project, ensuring local sustainability. As a result, on an organisational perspective, as much as possible, project activities have been executed by local organizations enabling them to make use of the lessons learned from this project. Therefore, the effects of the project on this matter are likely to be continued.

The assessment of Climate Change resilience and adaptation played also a key role in ensuring the project was directly responding to local needs and vulnerabilities. On another hand, these produced have the potential to be reused for further projects.

The WSPPPC has also appeared as an important tool to reinfore local coordination and networks, hence potentially leveraging the effects of the project. This plateform has therefore strengthened existing structures and instilled ownership. Furthermore, bearing in mind that the pool of funds is limited and the needs in Laos are numerous, the project benefits constitute an investment opportunity for future initiaves and private investments.

Finally, the knowledge management strategy implemented, enabled stakeholders to have access to produced materials and knowledge. This is particularly critical for maintenance, experience and best practices sharing, replication and scaling-up. By its innovative nature, the impact of the DEWATS on climate change mitigation and adaptation have been highlighted, particularly in terms of resilience and reduced exposure to diseases during extreme climate events, but also in terms of GHG emission equivalents. This will therefore contribute to fill several knowledge gaps in Laos as well as internationally

3.6 Coherence

Overall the project has been complimented several past and ongoing efforts. Its technical nature and the direct provision of small-scale infrastructure and DEWATS have enabled to translate policies and strategies into practices. By its innovative nature, the project was therefore a successful pilot experience for low-emissions systems development.

Considering policy, the project has directly contributed in the achievement of national and sub-national strategies, such as the National Determined Contributiion (updated in 2021), as well as of the targets of the National Climate Change Strategy (2010). On this note, adaptation and mitigation have been the main focus of this initiative. Additionnally, the project has also contributed to the achievement of several outcome of the 9th National Socio-Economic Development Plan (9th NSEDP), especially:

- **Outcome 1: Continuous quality, stable and sustainable economic growth**
    - Output 1: Robust and sustainable macro-economic
      Invest in rural development and poverty reduction linked to commercial production and improvement and building of rural and economic infrastructure

- **Outcome 2: Improved qualities of human resources with enhanced research capacities, and abilities to meet development needs and utilized science and technologies to improve efficiency and add values to productions and services**
    - *Output 1: More inclusive and better quality healthcare services and nutrition*
      WASH: Improve sanitation and access to safe water in rural and urban areas. This must also be accompanied by responsible water resources management and improved wastewater collection and treatment.

- **Outcome 3: Gradually enhanced people's material and mental well-beings as per the direction of food and income security**
    - *Output 1: Developed rural and remote areas and improved livelihoods*
      Continue to develop rural communities and irradicate poverty in all areas under the direction of the 3-Build policy and establishing emerging city areas by promoting a commercialization of goods, access to finance, production systems, markets, personnel, natural resources (land, forests and non-timber forest products), agricultural information, social services (education and health, clean and safe water and sanitation), and rural finance.

- **Outcome 4: Environmental Protection and Natural Disaster Risk Reduction**
    - Output 1: Sustainable natural resource use and management
      Improve and invest in the necessary and low-cost infrastructure for the collection and treatment of wastewater in urban and rural areas. Establish strategies and policies at the national and local levels to encourage effective investment in appropriate sanitation services.

This project also contributed to the efforts made by the National Government towards access to renewable energy. In this respect, the project has directly supported the "Green growth" ambition of the new 9th National Socio-Economic Development Plan (9th NSEDP), encouraging green infrastructure development to improve energy efficiency, accelerating the development of the renewable energy industry by focusing on selectively promoting public, private, and foreign direct investments, and promoting low-emissions initiatives to improve health and reduce air pollution. Furthermore, the project supported the creation of mechanisms to mobilize domestic financial resources as source of fund for necessary public infrastructure construction. Mobilize domestic and international private sectors through a BOT, PPP model to invest in infrastructure for economic connectivity (Green growth strategy, 9th NSEPD).

Regarding interlinkages with other initiatives, the project was complementing several initiatives in the provision of basic services as well as advancing climate resilience:

- UN-HABITAT: *Building climate and disaster resilience capacities of vulnerable small towns in Lao PDR (Adaptation Fund)* project aimed at building climate resilience in small towns along the east-west economic corridor in the central region of Lao PDR through the provision of climate resilient water infrastructure and the mainstreaming of climate change into urban planning.

- UN-Habitat (2009-2017): *Mekong Region Water and Sanitation Initiative (MEK-WATSAN)* supporting the participating countries in the Greater Mekong Sub-region (GMS) attain their water and sanitation related Millennium Development Goals (MDGs).

- ICLEI (2017-2021) : *Urban LEDS II* project aims at accelerating the development of urban low-emissions projects in Savannakhet and Pakse cities.

- UNEP (2018-2022): *Building climate resilience of urban systems through Ecosystem-based Adaptation (EbA) in the Asia-Pacific region* (developed in Oudomxay and Phongsaly Provinces, in the north of Laos).

- World Bank (2011-2016): *Mainstreaming disaster and climate risk management in investment decisions.*

Finally, the project participated to achieving the following outcomes of the SIWI Overall programme:

- **Strategic Objective 1. "SIWI leverages its convening power to facilitate and influence water governance dialogues"**
  This project attempts to bridge a gap between public and private sector. It attempts to create a platform where PPP can be discussed, and partnerships established.
- **Strategic Objective 2. "SIWI influences priority-setting for improved water governance"**
  Based on the above PPP dialogue, the experience of this project feeds into and influences policy dialogues. The lessons-learned have been captured and hopefully transposed in possible policy measures. In this project, SIWI is insisting on "quality of governance" characteristics. A training in PPP has been provided and was completed with modules on "gender" and "integrity".
- **Strategic Objective 4. "SIWI contributes to the implementation of improved water policy and practices"**
  This project implements solutions towards climate change adaptation and mitigation. It also implements new delivering modalities for Laos, i.e., the collaboration with the private sector in service delivery and in delivering adapting and mitigating on solutions.
- **Strategic Objective 5. "SIWI advances water knowledge"**
  The lessons-learned have been captured (reference made to paragraph **Error! R eference source not found.**) and being transposed in possible policy measures.

4. INNOVATION

The project has a strong innovative specificity. In line with NCF's definition of innovation, the project has directly contributed to improve the quality of life for the most vulnerable, including women, girls and ethnic groups, while advancing local resilience to climate change and shocks.

In that sense, the methodology used engaging communities and local public and private stakeholders greatly contributed in innovation. This process has enabled the development of resilient infrastructure based on community-designs to ensure proposition were anchored in local context, while delivering many co-benefits (sanitation improvement, wastewater management, climate mitigation, diseases prevention). The two DEWATS were also the first of their kind in Lao PDR, serving now as pilots for similar projects and paving the way for more sustainable and low-emissions initiatives.

5. POTENTIAL FOR SCALING UP AND FOLLOW-UP INVESTMENTS

As a successful provision of basic services project, this initiative has a lot of potential for long term effects and replication. First of all, the approach engaging local stakeholders and communities is a working methodology that can be re-used for similar projects.

Secondly, the establishment of the Water Supply Public Private Partnership Consortium (WSPPPC) has set out the grounds for public-private collaboration. This aspect is aligned with national and subnational strategies, enabling the process developed to be replicated. In this respect, partners have now a direct platform to share ideas and expertise, and accelerate the development of local initiatives.

Finally, all materials produced, training and technical document have been shared with stakeholders, contributing in the development of a database for similar projects.

6. RISKS

Throughout the project duration, the following risks occurred:

- One of the risks identified at the start phase of the project, described as "a risk of a further extreme weather event delaying the project by preventing access to target towns or by causing a diversion of efforts to emergency response", was faced in this initial stage. On 24 July 2018, as a consequence of heavy rainfall caused by Tropical Storm Son Tinh on the previous days, a huge amount of water devasted the construction site of the Xepien-Xenamnoy hydropower dam, in Attapeu province. This caused a flash flood through eight villages downstream, destroying houses, fields, roads and bridges. After that and due to the heavy rainfall registered along the country, 15 provinces and 86,760 people were affected.

  Although these episodes have not impacted the completion of Milestone 1 as both the workshops and assessment were conducted prior to the event, the process faced drawbacks due to the recovery time needed after the events.

- Risk mitigation measure: NCF and stakeholders have been informed continuously on the project implementation status.

- Under MS 3, the COVID-19 outbreak resulted in the enactment of strategies such as 'Stay at Home' and 'Work from Home', which, in addition to travel restrictions, impacted the implementation of activities across the country. Due to weak connectivity conditions – especially in remote areas-, online meetings and trainings were discouraged. Also, little IT knowledge and equipment at the local level has augmented the challenge.

    - Risk mitigation measure: A no-cost extension until May 2021 was requested and approved by NCF, re-arranging the delivery of Milestones 3, 4 & 5.

7. MONITORING AND EVALUATION

A close follow-up was developed at an early stage to ensure effective monitoring and provide early information on progress or lack of progress towards achieving the intended objectives outcomes and outputs.

At the same time, the implementing team has been closely working with partners, local stakeholders and communities throughout the project duration to gather feedbacks and adjust activities accordingly. Document produced were also shared with relevant authorities and line ministries for their review and feedbacks. For example, during the inception workshops, comments and feedbacks from the respected party representatives were collected to improve the project development and activities (see report of the inception workshop). Communities were also encouraged to provide input during all the stages of the project.

8. LESSONS LEARNT

1. **The overall organisation of the project had significant impacts on the completion of activities.** The main lesson learnt has to do with organization. After the trainings conducted, the team recognised the importance of carefully planning ahead the necessary activities required by all the stakeholders involved before determining a fixed schedule. Moreover, due to the strong technical component of the trainings it is imperative to provide the information to small groups of trainees, in order to avoid confusions, miscommunication or delays in the implementation of the tasks programmed.

2. **Developing strong relationships and networks among stakeholders was a key resource to cope with the unexpected COVID-19 pandemic.**
   One of the main lessons learned has to do with the importance of developing strong networks with local partners, as visits to the field were temporally suspended due to COVID-19 contention measures, but that was not an impairment for making progress in the sites. Once again, the fluent communication between the UN-Habitat team and Nam Papa State-Owned Enterprise (NPSE) staff has shown that teamwork is essential yet the most efficient way for achieving objectives in a timely manner.

3. **The piloting process was a success due to high level of communities and local authorities' participation**
   Communities and local authorities were particularly engaged and committed to the project, ensuring its success. The operational and maintenance aspect of the projects were developed at the community level for maximum impacts, and designs were shared for future work. Although the COVID-19 pandemic affected the project implementation, the two DEWATS initiatives developed in close collaboration with the ethnic school and the hospital in Sekong, benefited from strong cooperation with the hosting institutions. As a result, this approach may be replicated in a similar context.

4. **The project participated in reflecting on opportunities for developing viable PPP models in Lao PDR.**
   While the establishment of the Water Supply Public Private Partnership Consortium (WSPPPC) did not draw an official conclusion on the project impacts to develop viable PPP models in Lao PDR, many discussions took place showing appetite and interest of the private sector. Overall, the limited fiscal space at the sub-national level was the main obstacle. Therefore, the project revealed the need for capacity building activities targeting local institutions and banks to advance such investment, including risks support.

5. **PPP is an exciting opportunity but there has to be enhanced financial securities and opportunities to enable private sector investments in the provinces of Lao PDR.**
   The private sector is an important player in the economy due to the input it makes to the national income. Particularly, it delivers vital goods and services, contributes to tax revenues, and ensures the efficient flow of capital.

   PPP can provide a new financial opportunity for public investments. However, in order to enhance the finance security and open new opportunities for the private sector to invest in the climate resilience infrastructure at the local level, governments need to provide incentives that promote climate change adaptation investments, including tax breaks, reduction of the Rate of Interest, Stability of Wage Level, Price Policy, Abolition of Monopoly Privilege. They need to offer risk guarantees and use procurement contracts that help secure the demand for climate-resilient products and services. In the meantime, the private sectors should have further improvement such as context-specific multi-faceted strategies that are needed, including the local adaptation and dissemination to providers of relevant evidence, the education/training of communities to adopt effective contribution and involvement, and feasible mechanisms for ensuring and monitoring service quality. However, in Lao PDR, in the context of stifled capital available, PPP remains a challenge.

6. **Private sector involvement in capacity building activities undertaken by development partners and Government will ensure CC resilient infrastructure at the local level**
   In case of Lao PDR, lack of climate change knowledge is a major constraint on private sector involvement in climate resilience infrastructure projects. This lack of understanding of specific types of climate change investments and their risk profiles, means that private sectors often find it difficult to develop and invest in the appropriate financial infrastructure. Most of the private sectors in Lao PDR, for example, rely on short term deposits, and an asset-liability mismatch also limits their ability and willingness to structure financial infrastructure with the longer tenure that is typically needed for climate investments. Although some of the development agencies have funded some limited capacity building initiatives, the constraints remain substantial. Only few appear to have sufficient technically competency in the area of climate change to be willing to offer the scale of financing new industries and projects need.

Therefore, engaging private sectors in capacity building activities is crucial. The capacity building activities, such as conducted in the NCF project, can help enhance the climate resilience investment opportunities at the local level in Lao PDR, especially those where the operator takes on some or all commercial risk, need to be carefully designed to ensure that investment/implementation commitments can be financed and that commercial partners can recover costs. The capacity-building as well as awareness raising activities are not limited to the climate change knowledge but it needs to be included, for instance, the modules on the regulatory frameworks of the specific local contexts, technical aspects, project finance and risk management.

7. **PPP related project activities strengthened cooperation between private sector and public sector and appreciation for each other's challenges**
   Collaboration between public and private entities creates better and more effective public and private services and products. The collaboration enables the participants to exchange and share knowledge, experiences, know-how, and expertise. Each party highlights the importance of shared vision of the public and the private sectors in achieving the goal of local development. It also identifies critical factors for success, especially the respective roles and responsibilities of the public and private sectors that contributed to developing mutual trust amongst the stakeholders while working to achieve their common goal. In the meantime, the PPPs also allow public and private sectors to exchange challenges faced by both parties including the case study examples of successful partnership in practice, the main lessons learned in the effective establishment and management of the partnership with the private sector, etc.

8. **Involvement of communities and local policy makers are key to successful implementation of the sub-projects**
   Active community participation in project planning and implementation improves project design through the use of local knowledge, increase project acceptability. This also produces a more equitable distribution of benefits, promote local resource mobilization, and help ensure project sustainability.

9. OUTREACH

From its conception, the project has included outreach and knowledge management. As a result, a Knowledge Management, Advocacy & Communications Strategy as well as a dedicated Work Plan has been developed at an early stage.

Furthermore, outcome 4 focused on "Business case and lessons-learned of the present project are documented and shared with decision- and policy-makers. The latter are informed about and take into consideration the pilot project's lessons learned and success". Activity 4.1 was implemented to enable Knowledge Management materials preparation and publication for wider dissemination, including ocumentation of the pilot cases and presentation of lessons-learned in national and regional policy platforms.

The following tab gives an overview of products developed:

ENCOURAGING CLIMATE ADAPTATION AND MITIGATION INVESTMENTS THROUGH PRIVATE SECTOR ENGAGEMENT IN DECENTRALISED WASTEWATER TREATMENT SYSTEMS (DEWATS) AND SMALL-SCALE WATER SUPPLY INFRASTRUCTURE IN LAO PDR

Project Output 4:

Business case and lessons-learned of the present project are documented and shared with decision- and policy-makers. The latter are informed about and take into consideration the pilot project's lessons learned and success

KM, Advocacy & Communication Strategy (KMAS) objective:

Knowledge and awareness enhanced from national to local levels, ensuring sustainability, favouring replicability and leading to policy changes at the national level

Cluster	Activity	Output	Output completion date	Target Audience
Knowledge Products	Conduct Vulnerability Assessments for Sekong and Attapeu based in secondary and primary data	2 Vulnerability Assessments (for Sekong and Attapeu) produced	31-08-2018	Communities, Government Officials
	Produce infographics for each settlement using baseline data (25 in total)	25 Infographics created	31-08-2018	Communities, Government Officials, Project Team
	Develop feasibility studies for 23 small-scale water infrastructures and 2 DEWATS systems	Feasibility studies for 23 small-scale water infrastructures and 2 DEWATS systems produced	31-12-2019	Private Stakeholders, Government Officials
	Develop a portfolio that summarizes the main standard water supply and DEWATS systems' designs used in this project	Water Supply and DEWATS design portfolio produced	31-12-2020	Government Officials, Private Stakeholders, Donors

	Formulate guidelines for the constitution of Water Supply Public Private Partnership Consortiums in Lao PDR	Guidelines for WSPPPC produced	31-07-2020	Communities, Private Stakeholders, Government Officials
Data Management	Generate a GIS database using geo-tagged data collected during VA phase	GIS database generated	31-08-2018	Communities, Government Officials, Project Team
Media & Communications	Get and compile Impact Stories for sharing online	Impact Stories developed and shared online	31-10-2021	Communities, Private Stakeholders, Donors

10. FINANCIAL SUMMARY

	Financing, EUR			
Expenditures, EUR	NCF	SIWI	UNHABITAT	**Total**
Grantee-SIWI	44 491	25 091		**69 582**
Local partner-UNHABITAT	339 831		589 345	**929 176**
Total	**384 323**	**25 091**	**589 345**	**998 758**
	38%	3%	59%	

7%

93%

11. CONCLUSIONS AND RECOMMENDATIONS

The project is now fully delivered, and its current effects are already positive on the ground, improving sanitation and water services, while advancing the local quality of life. All the 23 small-scale water supply infrastructures and the 2 DEWATS systems are operational and can be maintained by the local communities. Although the pandemic has not yet enable these systems to work at full capacity, the preliminary results are highly positive. Several unexpected co-benefits have also been identified, illustrating the innovative and sustainability of the initative. All knowledge products have also been developed and handed over, building knowledge for future similar projects.

On accelerating the financing of resilient infrastructures, the reality for PPP in rural Laos has been explored and recommendations have been drawn to adjust the enabling environment to make PPPs reality in rural Laos. According to the deliverables, the WSPPPC is established, PPP guidelines have been developed, and the capacity development of the WSPPPC members and partners has been completed under MS5. However, while this mechanism is promising, several limitations have been identified and the implementing team has agreed on the following recommendations:

- On PPP, the weaknesses of local financing for water supply schemes remains challenging. The availability of spare parts and the lack of technical and financial knowledge among the community-based committees that manage the systems were identified as the main causes of conflict in rural areas.

- Apart from government and donor support, water utilities should in principle be able to access private sources of finance. However, few have done so: the utilities are not yet operating on a commercial basis (the development of business plans has only recently begun) and as such would be regarded as a significant risk to potential lenders. The aforementioned weaknesses can be addressed through external support, which could provide subsidies for the investments and technical assistance (including facilitation). The improvement of regulatory environment, financial autonomy and investment conditions in climate change resiliency for water utilities would be the next steps. Private sector involvement, expansion and sustainability of service delivery ought to happen as a result.

- Furthermore, clear criteria for selection and appointment in terms of choosing private contractors should be created in order to improve efficiency

- The creation of a WSPPPC represents a strategic opportunity to encourage private sector participation, coordinate demand driven infrastructure development and undertake bidding processes to identify potential private investors. Building a knowledge base, where benchmarks and standards have been clearly defined and understood, will be key to encourage quality and attention to detail rather than profits. Any relevant information such as designs and processes will be documented and shared for future projects. This will enhance future projects and will build competency.

- Additionally, remuneration based on the level of quality of the work completed should be implemented to encourage higher quality. New contracts should be distributed in relation to the quality of work done previously and those not performing well should have a reduced chance to be awarded another job. In regards to scepticism, provincial and district authorities will need to explain the benefits of contracting from the private sector, to offer advice to villagers and remain transparent in regards to the projects benefits and its effect on the community.

- Other success factors include the willingness for public and private actors to cooperate, which requires improved communication and efforts to implement a co-creation process from early design stages onwards. Finance capacity building efforts, combined with stakeholder engagement are further critical to ensuring local buy-in and the participation of local financial intermediaries to find locally-adequate solutions that meet the needs of end-beneficiaries.

Annex 1 Project completion fact sheet

Project Name:	**Encouraging Climate Adaptation and Mitigation Investments through Private Sector Engagement in Decentralised Wastewater Treatment Systems (DEWATS) and Small-scale Water Supply Infrastructure**		
Project no.			
Country:	Lao PDR	**Financing:**	
		EUR	**%**
Nordic Partner:	SIWI – Stockholm International Water Institute	EUR 25 091	3%
Local Partner:	UNHABITAT	EUR 589 345	59%
Other Partner:	Nam Papa State-Owned Enterprise (NPSE) Attapeu and Sekong	In-kind	
	NCF grant disbursed	EUR 384 323	38%
	Total	**EUR 998 758**	**100%**
Classification:	Combination (Mitigation + Adaptation)		
Project cycle:	Project start date: 12/06/2018 Original closing date: 30/06/2020 Actual closing date: 30/05/2021		
Short project description:	In Laos, floods, droughts and consequent disease epidemics are increasingly harsh as a result of climate change, severely impacting vulnerable communities. The country is one of the most climate vulnerable countries in the world, as shown by its 7th place ranking of countries affected by extreme weather events in The Climate Risk Index for 2013. The overall objective of the project was to enhance local climate resilience by encouraging climate adaptation and mitigation investment through Private Sector Engagement in Decentralised Wastewater Treatment Systems (DEWATS) and Small-scale Water Supply Infrastructure in highly vulnerable provinces in Lao PDR, in Sekong and Attapeu. The project focused towards enabling 100 households or equivalent to be connected to 2 DEWATS (one in each province) and 1200 households or equivalent to have better access to water supply infrastructure in order for to be better prepared for climate-induced water stresses and reduce GHG emission due to local waste water.		

Project performance:

Expected Outcomes and Outputs	**Achieved**	**End-of-project status**
OUTPUT 1. Baseline assessment for climate adaptation and mitigation measures, and the business c in the target communities		
MS 1.A) Project Inception and community-level stakeholders workshops held (Act 1.1 and 1.2)	100%	The project inception workshop on June 20th 2018 19 participants attended, representing MPWT, Attapeu and Sekong provinces and UN-Habitat. Two (2) Community-level stakeholder workshops for district and village level officials took place on 9th & 10th July 2018 in Attapeu Province and 11th & 12th July 2018 in Sekong Province.
MS 1.B) Climate Change resilience and adaptation assessment with baselines and indicators with respect to infrastructure, CC adaption capacities and GHG emission (Act 1.3)	100%	Climate change resilience and adaptation capacity assessed and documented to act for project baseline in at least 23 communities.
OUTPUT 2. a) Two DEWATS built and operational in two provinces in Laos (one in each province) benefitting at least 100 households and/or business equivalents. ***OUTPUT 2. b) Twenty three small-scale water supply infrastructure systems (rain water harvesting, gravity fed systems, etc.) operational (twelve in one province and eleven in another province), benefitting at least 6,000 people.***		
MS 2.B) Preparatory studies and arrangement for DEWATS and small-scale water infrastructure construction (Act 1.5	*100%*	1 feasibility study per water infrastructure produced including breakdown of the budget per infrastructure

			1 EIA produced per DEWATS 1 project planning and detailed design per water infrastructure (for DEWATS and Water Supply) Feasabilty and planning was based on participatory process. Evidence of participation exist.
	MS 3.A) Community-level stakeholder workshops to discuss and decide construction and governance (Act 2.1)	*100%*	Workshops were held in 2019 in Attapeu, Sekong and Vientiane.
	MS 3.B) Identification and decision on best locations for DEWATS and small-scale water infrastructures (as part of the feasibility studies DEWATS and water supply) (Act 2.2)	*100%*	The construction of the Water Supply infrastructure have also been terminated for 11 communities.
	MS 3.C) Construction of 2 DEWATS and 22 small scale water infrastructures (Act 2.3)	100%	Construction of the DEWATS were delayed due to extreme weather events and floods, and were delivered under MS5. All have been completed and are operational. The construction of the Water Supply infrastructure have also been terminated. 23 communities are now served with drinking water.
	OUTPUT 3. A Water Supply Public Private Partnership Consortium established and operational by Nam Papa State-Owned Enterprise (NPSE) staff in Sekong and Attapeu.		
	MS 2.A) Establishment of Water Supply Public Private Partnership Consortium (WSPPPC) & assessment of private sector engagement (Act. 1.4)	*100%*	The Public Private Partnership Landscape has been assessed, and the WSPPPC establisehd.
	MS 4.A) Support newly established systems through WSPPPC mechanism (Act 2.4)	*100%*	2 trainings were provided to the consortium, on PPP and on Water Integrity and anti-corruption in PPP context. 12 local communities fully supplied with water thanks to the construction of water harvesting and supplying systems. Water Supply Public Private Partnership Consortium (WSPPPC) Guidelines were produced in August 2020.
	OUTPUT 4. Business case and lessons-learned of the present project are documented and shared with decision- and policy-makers. The latter are informed about and take into consideration the pilot project's lessons learned and success.		
	MS 5.C) Development of knowledge products and dissemination in national and provincial levels platforms (Act 4.1)	*100%*	Guidelines were produced for the use and maintenance of the DEWATS and Water Supply infrastructure. Local communities are trained in operating and maintaining the infrastructure

			Guidelines were also produced for national and provincial staff for the Public Private Partnership Consortium. WSPPPC member and public officials have the recommendations to adapt the enabling environment to attract private actors in the sector. They have also been trained on good governance and particularly on corruption risks in the life of a PPP.	

Climate change outcomes and impacts:	Climate change mitigation: the DEWATS and the complementing biodigersters, together will reduce GHG emission by 1 830 ton CO2 over 20 years. Climate change adaptation: 15 727 persons have now access to water supply system and wastewater sanitation. They now have a secured access to water supply and santiation services, making them resilient to future climate induced droughts and flood.
Development outcomes and impacts:	The project enabled the development of small-scale infrastructure systems in Attapeu and Sekong provinces: (1) water supply systems (based on rainwater harvesting, including innovative underground rainwater harvesting systems, gravity fed systems, solar pumps and others) for 15 727 persons, and (2) Decentralised Wastewater Treatment Systems "DEWATS" for 2 communities, or a total of 1 118 persons. These appropriate infrastructure resilient to extreme climate events are now increasing water availability and decreasing health hazards incurred by inappropriate sanitation.

NCF core indicators

NCF core indicator	Results (quantitative)		Clarifications/Means of verification
Number of beneficiaries reached	women	**8,232**	Beneficiaries of the 23 Small-Scale Water Infrastructures: - In Attapeu: the project reached 11,346 persons (including 5,599 women, all part of ethnic groups) - In Sekong: the project reached 4,181 persons (including 2,074 women, and 4,116 people were part of ethnic groups). *(see MS3. Completion report)* Beneficiaries of the 2 DEWATS: - In Attapeu reached an extra 638 persons; - In Sekong, the project reached 480 persons. *(see MS5. Completion report)*
	men	**7,495**	
	total	**15,727**	
Number of people with increased resilience to climate change	women	**8,232**	
	men	**7,495**	
	total	**15,727**	
Number of people with improved livelihoods	women	**8,232**	
	men	**7,495**	
	total	**15,727**	

Annex 2 Results Framework

Milestone deliverable	Completed yes/no	Comments/clarifications
1.A) Project Inception and community-level stakeholders workshops held (Act 1.1 and 1.2)	Yes	Reported under MS1
1.B) Climate Change resilience and adaptation assessment with baselines and indicators with respect to infrastructure, CC adaption capacities and GHG emission (Act 1.3)	Yes	Reported under MS1
2.A) Establishment of Water Supply Public Private Partnership Consortium (WSPPPC) & assessment of private sector engagement (Act. 1.4)	Yes	1 report describing the PPP institutional landscape and Water Supply Public Private Partnership Consortium (an assessment of private actors willing to engage in PPP)
2.B) Preparatory studies and arrangement for DEWATS and small-scale water infrastructure construction (Act 1.5)	Yes	1 feasibility study per water infrastructure (DEWATS and water supply), including breakdown of the budget per infrastructure 1 EIA per DEWATS 1 project planning and detailed design per water infrastructure (DEWATS and water supply), including updated budget per infrastructure 1 report reporting on the design participatory process. Details on 'representation by' are expected
3.A) Community-level stakeholder workshops to discuss and decide construction and governance (Act 2.1)	Yes	The Stakeholder workshop report
3.B) Identification and decision on best locations for DEWATS and small-scale water infrastructures (as part of the feasibility studies DEWATS and water supply) (Act 2.2)	Yes	Identification and decisions of best location are developed in the feasibility reports, … both for DEWATS and water supply
3.C) Construction of 2 DEWATS and 9 small scale water infrastructures (Act 2.3)	Yes	Construction of the DEWATS were delayed due to extreme weather events and floods, and were delivered under MS5. They are now delivered. Here the completion report for Attapeu and Sekong. The construction of the Water Supply infrastructure was terminated. 23 communities are now served with drinking water. Completion report can be found here.
4.A) Support newly established systems through WSPPPC mechanism (Act 2.4)	Yes	12 local communities fully supplied with water thanks to the construction of water harvesting and supplying systems. Completion report can be found here.
5.A) Guidelines for WSPPPC produced (Act 3.1)	Yes	Guideline were drafted and can be found here.
5.B) Capacity building training for all stakeholder of WSPPPC (Act 3.2)	Yes	A one-day training on PPP and water integrity was provided to each NPSE, one in Attapeu, one in Sekong

		A 2-day online training was provided by SIWI to the NPSE staff on PPP and on Water Integrity in a PPP context. PowerPoints can be found here for Day 1 and Day 2
5.C) Development of knowledge products and dissemination in national and provincial levels platforms (Act 4.1)	Yes	Guidelines were produced for the use and maintenance of the DEWATS and Water Supply infrastructure. Guidelines were also produced for national and provincial staff for the Public Private Partnership Consortium PowerPoints of trainings were shard with participants as knowledge products

Annex 3 Pictures

Annex 4 Impact story

Impact story 1: DEWATS Attapeu

Mme Padthana Thepsombath, Attapeu's provincial deputy department of sports and education said:

"The successful and meaningful DEWATS's project granted by NCF and UN-HABITAT enabled the construction of the gender-separated four bathrooms, four hand-washing and two showers. Therefore, the project supported providing bathing-shower facilities, public hand-washing stations and hygiene supplies, women bathrooms, and bathing-shower areas with sufficient privacy and security for female students. The project was shown a good practice of improved sanitation for school with a pro-poor condition which is essential to prevent the spread of COVID-19".

Impact story 2: WASH infrastructure in Sekong

Nang Noi from Talui village (Kaleum of Sekong)

Nang Noi, 24, is a farmer living in Talui village, Kaleum district, Sekong province. Her family is one of the poorest in the village. Before the project intervention, she had to walk more than a kilometre each day to bring water from the river to her house for cooking, feeding animals and irrigation. She said that the river water was not always healthy and often turbid and that she had to keep the water from the river in barrels to let the particles settle before she could boil it and make it safe to drink.

Thanks to the project, Nang Noi's life changed in several ways. She also had her first baby and, at about the same time, her family received a domestic water connection through the NCF project. The arrival of a baby naturally meant new tasks for her. However, with the new 24/7 water system installed, daily household chores became much easier, as it was no longer necessary to carry the water they needed from the river. "Before, I had to carry water in buckets up to twice a day," Nang Noi said.