

# Enhancing climate resilience in Thailand through effective water management and sustainable agriculture

## Environmental and Social Management Framework

20 May 2021

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## EXECUTIVE SUMMARY

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This Environmental and Social Management Framework (ESMF) is prepared in support of a project proposal entitled “*Enhancing climate resilience in Thailand through effective water management and sustainable agriculture*”. The project is submitted by the Office of Natural Resources and Environmental Policy and Planning (ONEP) in the Ministry of Natural Resources and Environment (MONRE) and Royal Irrigation Department (RID) under the Ministry of Agriculture and Cooperatives (MOAC) to the Green Climate Fund (GCF). This project is supported by the United Nations Development Programme (UNDP) in its role as a GCF Accredited Entity. The project has been screened against the UNDP’s Social and Environmental Standards Procedure and deemed a Moderate Risk (World Bank/International Finance Corporation Category B) project. As such, an ESMF has been prepared for the project. Chapter Eight (8) of the ESMF provides the Environmental and Social Management Plan (ESMP) for the project.

The MONRE is the National Designated Authority, with the MOAC being the Executing Agency. A Project Management Unit (PMU) will be established for the implementation of the project and to manage compliance with the ESMF and ESMP.

The project will target farmers directly (62,000 people, of which 32,104 are women) affected by the impacts of climate change; and 25 million indirect beneficiaries of the lower Chao Phraya River Basin area. The project involves three outputs; these being improved climate and risk informed planning in the water and agricultural sectors; strengthening water infrastructure and management for greater resilience to projected climate change through both hard and soft activities; and increased resilience of agriculture livelihoods in drought and flood prone areas. The project is fully aligned with Thailand’s priorities as outlined in its Nationally Determined Contribution to the Paris Agreement and Thailand’s Country Work Programme as submitted to the GCF.

The project has the potential to cause moderate environmental and social impacts. These include impacts to water quality through sediment movement during the replacement of existing infrastructure, channel and retention basin works; and ecosystem based adaptation activities for monkey cheek and wetland restoration. Noise and air quality may also be impacted during these works. Minor impacts also include increased waste from the removal of existing structures.

The project does not require any land acquisition and/or resettlement. None of the interventions will require the displacement of people, involve economic displacement or will be conducted in protected areas or sensitive locations. It may be necessary to utilise areas of land adjacent to where the structural interventions will be undertaken so as to access water courses. The land is currently under agricultural production. Where access is required, the land will be returned in the same condition if not better that it was prior to any access. Access to this land will only be undertaken through voluntary agreements with landholders. Where a voluntary agreement cannot be established, the land will not be used.

Appropriate and relevant avoidance and mitigation options have been proposed in the ESMF, which if put in place, will significantly reduce the potential impacts of the project to an acceptable level. The mitigation measures include the development of site-specific erosion, drainage and sediment control plans that will be developed and implemented as a mitigation measure. The plans will include disposal plans for soil and silt removed during earthworks to restore monkey cheeks and wetlands, ensuring that the surrounding communities and environment are not adversely impacted. Where possible, the project will undertake beneficial reuse of any excess sediment. Measures to avoid this impact include the prefabrication of materials, including for example, the water control infrastructure to reduce this risk of waste being generated. The project also includes a Livelihood Restoration Plan where access is needed that might impact on current economic activities.

Thailand currently has an established regime for grievances. Notwithstanding, an independent two tier Grievance Redress Mechanism structure was developed to address all complaints and/or grievances in the





## **Annex 6(b) – Environmental and Social Management Framework**

Green Climate Fund Funding Proposal



project. This Grievance Redress Mechanism complies with Thailand, UNDP and GCF Safeguard procedures.

Budgeting for environmental interventions and the application of mitigation measures to enhance positive impacts within the main river basins of Thailand is an investment in the future as it will reduce the environmental and social liability at local, regional and national levels.

## 1 INTRODUCTION

- 1 This Environmental and Social Management Framework (ESMF) is prepared in support of a project proposal entitled “*Enhancing climate resilience in Thailand through effective water management and sustainable agriculture*”. The project is submitted by the Office of Natural Resources and Environmental Policy and Planning (ONEP) under the Ministry of Natural Resources and Environment (MONRE) and the Royal Irrigation Department (RDI) under the Ministry of Agriculture and Cooperatives (MOAC) to the Green Climate Fund (GCF). This project is supported by the United Nations Development Programme (UNDP) in its role as a GCF Accredited Entity. The project has been screened against the UNDP’s Social and Environmental Standards Procedure and deemed a Moderate Risk (World Bank/International Finance Corporation Category B) project. As such, an ESMF has been prepared for the project. Chapter Eight (8) of the ESMF provides the Environmental and Social Management Plan (ESMP) for the project.

### 1.1 BACKGROUND

- 2 Thailand is one of 16 countries identified globally as being in the ‘extreme risk’ category of those most vulnerable to future climate change impacts over the next 30 years. Extreme, severe drought and intense rainfall events resulting in significant flooding have already been experienced and will increase in the near and longer-term future, as a result of the combined effects of a more vigorous hydrological cycle and enhanced surface drying.
- 3 The IPCC Fifth Assessment Report indicates that in Southeast Asia temperatures overall have been increasing at a rate of 0.14°C to 0.2°C/decade since the 1960s. This is predicted to increase from 0.8°C to 3.2°C by the end of the century, with differences between regions and microclimates within and across Southeast Asia. A positive trend in the occurrence of heavy (top 10 percent by rain amount) and light (bottom 5 percent) rain events is also predicted with key determinants such as the amount and intensity of rainfall, and the rate of evaporation set to affect surface water flow and water availability. This will see a significantly greater frequency and intensity of flooding during wet season, and extended drought periods during the dry season, presenting a significant challenge to effective water management in Thailand.
- 4 The frequency of flood and drought events in Northern Thailand has already increased considerably over the past 50 years. Increased incidence of extreme events, and rainfall variability, are adversely impacting economic activity and livelihoods. As an example, Thailand was the largest exporter and leading rice supplier in the world. Thailand’s consecutive years of below-normal rainfall has devastated the agricultural sector and slowed Thailand’s economy. Future climate change influence on these extremes, according to climate projections, is set to increase both in the magnitude and frequency of these extreme events.
- 5 A significant number of Thailand’s population are dependent on the agricultural sector for their livelihoods. The total number of households engaged in agriculture in Thailand is estimated at 5,910,791 households comprising 23,686,102 of Thailand’s 67 million people.
- 6 Climate impacts on agriculture will particularly affect the most poor. Poverty in Thailand predominately has a rural-profile, which fluctuates according to vulnerabilities in the agricultural sector – such as faltering economic growth, falling agricultural prices, and ongoing droughts. In 2013, 80% of Thailand’s poor 7.3 million lived in rural areas, and a further 6.7 million were living within 20% above the national poverty line. About 48% of Thailand’s provinces have a poverty head count of <10%, and a further 25% of provinces have a poverty headcount rate of between 11 and 20 percent. Proportionally, the Central and Northern Regions of Thailand have the highest levels of poverty with certain areas within the region >40%, and some >62-72%. Sukothai, Phitsanulok and Uttaradit Provinces, included as part of the Northern Central region, have higher poverty levels when compared with other parts of the country.

- 7 Flood and drought events have become more severe, causing losses and damages to crop production and farmers' income. These impacts are felt more by those with higher levels of poverty, predominately due to the high level of dependence on natural resources, and in general, a limited capacity in terms of access to resources for responding to climate vulnerability and extremes. Higher levels of poverty for the Northern-Central region in turn, means that this area also has an increased level of vulnerability to climate change impacts, with lower levels of access to resources for adaptation strategies and in which to build climate resilience. In the Chao Phraya River basin region, climate projections show trends of increasing temperature with fluctuating precipitation. Calculations for the region, found that on average (with variations between the provinces) during 2040 -2049, farmland values per rai, are projected to decrease from \$2,703 to \$2,068 and \$2,538 per rai in climate scenarios.
- 8 The 2011 floods devastated sixty-five of Thailand's 77 provinces, and over 20,000km<sup>2</sup> of farmland was damaged. Catastrophic droughts occurred in 2015 and 2016, with 2016 being the first time Thai farmers drew water from the Mekong River for irrigation. In economic terms, the recent drought in 2015-2016 is estimated to have resulted in losses of US\$3.4 billion, while the 2011 floods are estimated to have cost US\$45.7 billion in loss and damage costs. Projected negative impacts are estimated to affect Thailand's agriculture nationally during 2040 – 2049 to range from loss and damage impacts of US\$24 to US\$94 billion.
- 9 Climate change research, recorded evidence of impacts and risks to development gains, strongly indicate a need for improved water management in order to better respond to climate change conditions in coming years – to mitigate flooding, to prepare for drought periods, and to ensure more efficient use of water resources in response. Improved climate change data information, dissemination, management and accessibility are much needed. Combined with improved water management and agricultural livelihoods, improvements climate change information could assist in building resilience by supporting climate-informed water management; resulting in better planning and preparedness to flood and drought events.

## 1.2 DESCRIPTION OF THE PROJECT

- 10 Thailand has 25 river basin systems (including 254 sub-basins). Of these river basins; there are two principal systems, the Mekong and Chao Phraya River systems. The Mekong River forms much of the border between Thailand and Laos, eventually flowing through southern Laos into Cambodia and on to Vietnam. The Greater Chao Phraya River Basin Area consists of eight sub-river basins including Ping, Wang, Yom, Nan, Chao Phraya, Sakaekrung, Pa Sak and Tha Chin, covering an area of 158,586 km<sup>2</sup> with a population of approximately 25 million people. The average annual rainfall is 1,100 mm while the average annual runoff is 34,600 million m<sup>3</sup>. In the northern part of the basin, the entire storage capacity is approximately 27,446 million m<sup>3</sup>, while the central area can store only 1,808 million m<sup>3</sup>. The Chao Phraya River will not overflow its banks, if the discharge does not exceed 2,800 m<sup>3</sup> per second.
- 11 With its tributary headlands gathering in the northern mountains of Thailand, the Chao Phraya River starts with the confluence of its tributaries; the Yom and Nan Rivers and the Wang and Ping Rivers at Nakhon Sawan. The principal tributaries are the Pa Sak River, the Sakae Krang River, the Nan River (along with its principal confluent the Yom River), the Ping River (with its principal confluent the Wang River), and the Tha Chin River. Figure 1 shows a map of Thailand with the project areas in yellow while shows Figure 2 the Chao Phraya River Basin area.
- 12 The Yom and Nan River Basins in Phitsanulok, Sukothai and Uttaradit, provinces, are part of the middle-upper catchments of the Chao Phraya River Basin area. After Nakhon Sawan, the Chao Phraya flows from north to south for 372km from the central plains through Bangkok to the Gulf of Thailand. In Chai Nat province, the river splits into the main river course and the Tha Chin River, which then flows parallel to the main river section and exits to the Gulf of Thailand in Samut Sakhon Province.
- 13 The topography of the Yom-Nan River Basin in particular, and the related challenges it presents in managing changes in precipitation and related water flow, make the area an adaptation priority for

Thailand. The Yom River (watershed area 23,600 km<sup>2</sup>), and Nan River (watershed area 34,300 km<sup>2</sup>) flow down from the northern mountain system and join together at Nakhon Sawan. Upstream along the Nan River, the Sirikit Dam reservoir (capacity 9.5 billion m<sup>3</sup>, catchment area 13,000 km<sup>2</sup>, built in 1974) was constructed for multiple purposes, including flood and drought management. There is no major dam or reservoir that can regulate water throughout the year in the Yom River basin. Plans to build the Kaeng Sua Ten River Dam (1.15 billion m<sup>3</sup>) for flood and drought protection were not approved by CSOs or communities. In the lower part of Yom and Nan Rivers, the river gradients are around 1/10,000 to 1/15,000 which is relatively flat. The width of the Yom River at the downstream section is narrow with low capacity for water retention.

- 14 Undertaking comprehensive climate change adaptation actions in the Yom and Nan River basin is of critical importance to a very large area of Thailand, and about 25 million people. The Yom and Nan River basins need to have effective water management to mitigating flooding and buffering against drought agricultural livelihoods. Such actions will in turn have co-benefits further downstream reducing flood impacts in the greater Chao Phraya River and the downstream urban areas that include metropolitan Bangkok which suffered significantly in the 2011 floods. The provision of improved climate change data information, dissemination, management and accessibility are much needed for informing these responses to mitigate loss and damage related to flooding and drought, as well as to strengthen the long-term resilience of vulnerable agricultural-livelihood dependent households to climate impacts are vitally important.

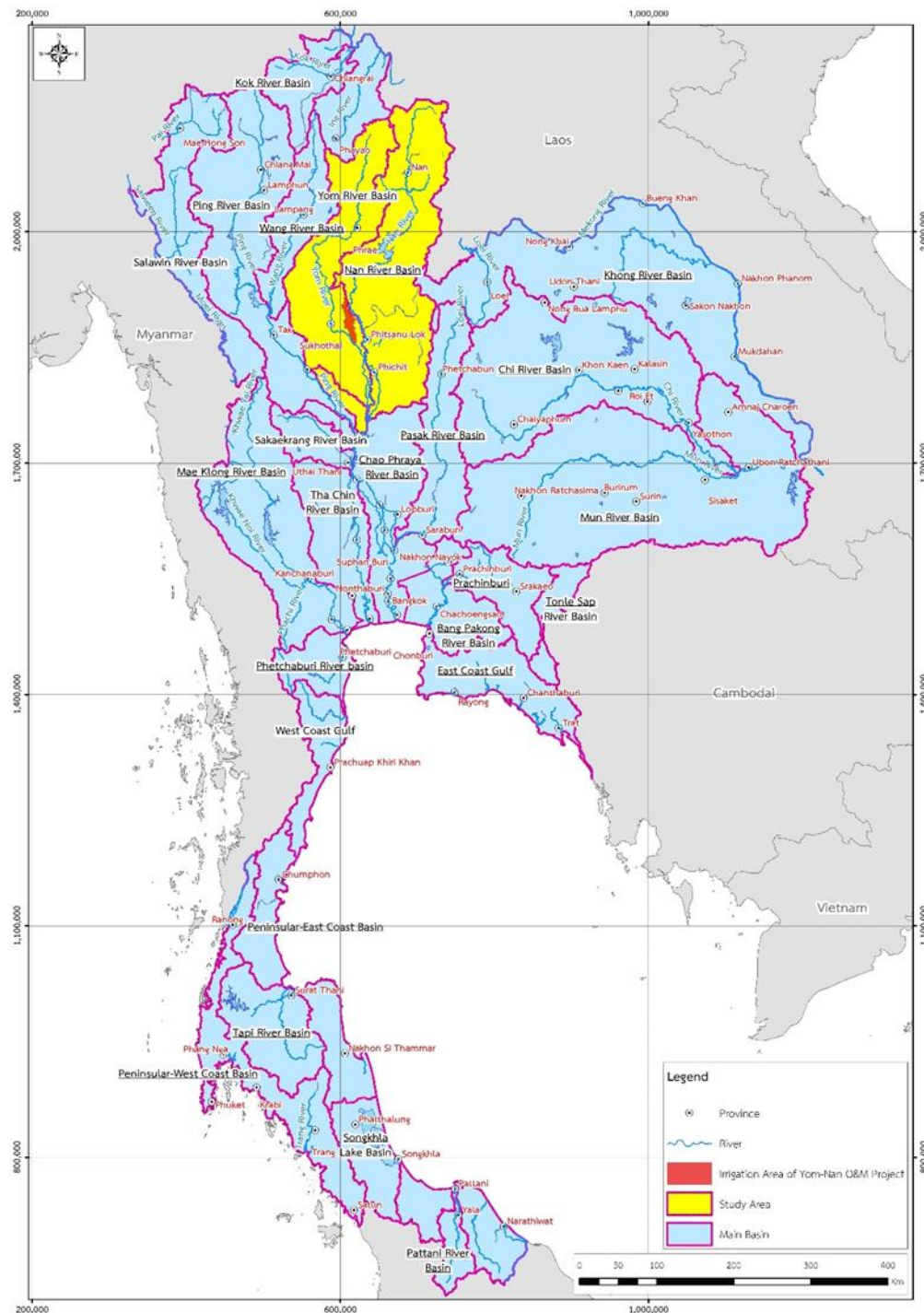


Figure 1 Map of Thailand with project area in yellow





Figure 2 Map of the Chao Phraya River Basin

#### 1.2.1 Summary of Activities

15 The proposed project is structured across three outputs:

16 Under Output 1 Enhance climate and risk informed planning in the water and agricultural sectors through improved climate information and cross sectoral coordination, there are three activities:

- a. Activity 1.1 Strengthening capacity to generate tailored climate information to inform water management and agriculture planning. This activity will facilitate inter-ministerial coordination, to ensure that climate change projections and predictions are analysed, tailored and disseminated in a way which supports integration into policies and planning across sectors (especially the water and agriculture sectors);
- b. Activity 1.2 Facilitating inter-ministerial coordination for climate-informed and integrated planning. This activity will involve training to government staff on climate scenarios to project rainfall, runoff, temperature, and evaporation, and to predict with greater accuracy incidence of flooding and drought for informing water resource management and agricultural and crop planning;
- c. Activity 1.3 Expanding access to climate information for application at the household level. GCF resources will support the development of climate information hub centres and key climate information dissemination tools for farmers; as well as

- 17 Under Output 2: Improve water management through strengthened infrastructure complemented by Ecosystem Based Adaptation (EbA) measures, for greater resilience to climate change impacts, there are two activities:
  - a. Activity 2.1 Climate-informed engineering designs for the thirteen (13) schemes of the Yom-Nan river basin, and upgrade of two (2) flood gates. This activity will include reviewing the current designs for the thirteen (13) schemes and the upgrading of two (2) sites containing existing critical infrastructure, namely the canal and regulator network in the Yom and Nan River basins. As part of the two (2) upgrades, two gates will be replaced and based on current estimates, between 1,602,000m<sup>3</sup> and 2,670,000m<sup>3</sup> of sediment will be removed to increase depth and water storage (26.7km \* between 25m and 30m wide \* between 2m and 4m deep). All of these environs are significantly disturbed from past activities. The Government of Thailand will undertake works at the other eleven (11) sites as part of co-financing. All these activities will increase the capacity to store water volume within the areas during the rainy season and the beginning of the dry season to ensure enough storage of water to irrigate the area during the dry period. The proposed interventions will be undertaken at the locations identified in Figure 3. A topographic map showing the general area is shown in Figure 4 while details of each intervention;
  - b. Activity 2.2 Complementing of grey infrastructure with EbA measures and integration of EbA approaches into water management policy and planning. The project will undertake EbA activities in the two basins (specific sites will be determined in the first year of implementation following site specific assessments and data collection), through the re-introduction and/or strengthening of integrated farming practices (such as rice-fish management), as well as the re-introduction and strengthening of vegetation and water flow systems, within the reinforcement of the existing canal channels and large irrigation system structures already in place. Water areas (e.g. monkey cheek) will follow wetlands management techniques, which is likely to allow for the re-introduction of some of the original fauna and flora can take place;
- 18 Under Output 3: Reduce volatility of agriculture livelihoods in drought and flood prone areas through strengthened extension support and local planning, investment in on-farm adaptation measures and greater access to finance and markets, there are three activities:
  - a. Activity 3.1 Application of climate information in household agriculture planning and strengthening of related support through extension services. Households will be provided data to allow for long-term climate risk responsive agricultural planning. Where CVAs indicate flood or water scarcity issues for the village regions of the project target area, farmers will be supported in constructing on-farm ponds;
  - b. Activity 3.2 Implementation of on-farm climate resilient measures to improve drought and flood resilience and improve access to finance for sustainable agriculture. This activity will include the implementation of EbA measures to improve drought and flood resilience on farm; and
  - c. Activity 3.3 Capacity building for farmers to support market access for climate resilient agriculture products. This activity will include the development of supportive measures for climate change resilient agriculture, such as market access, training and access support for farmers.

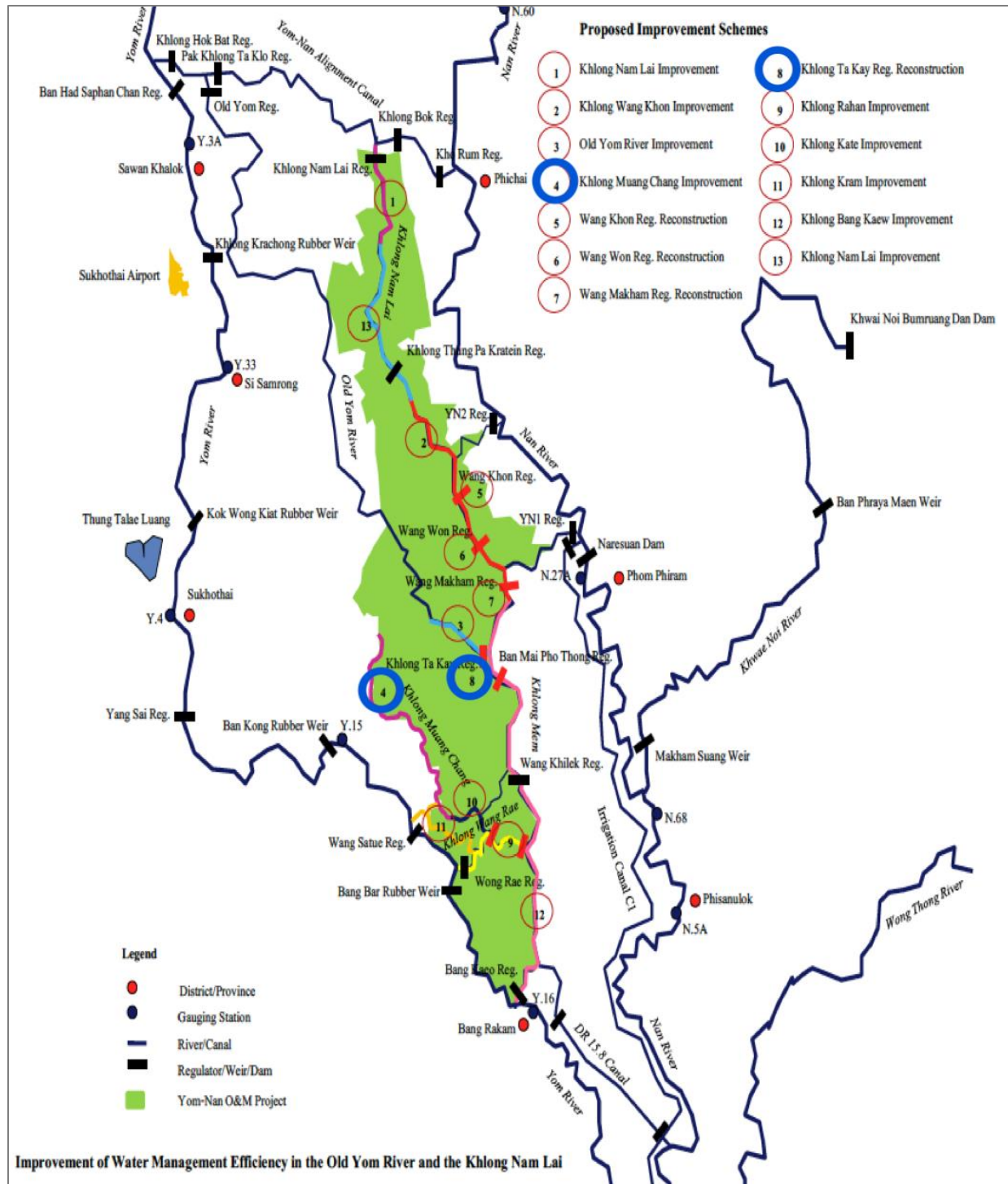


Figure 3 Overall planned upgrades, including 2 proposed GCF sites





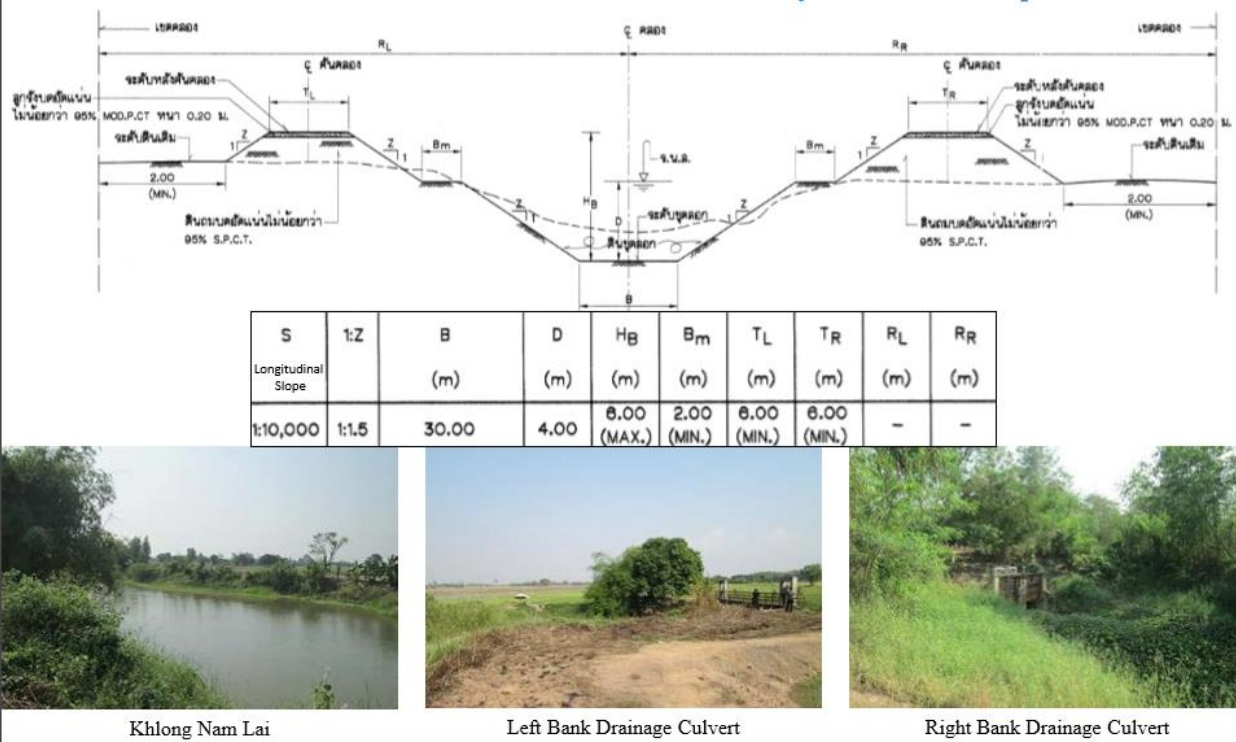
# H



Figure 5 Thirteen Intervention Sites<sup>1</sup>

### 1. Khlong Nam Lai Improvement:

- To increase its discharge capacity from 100 to 150 cms and channel storage.
- Dredging distance 12 km.
- Improving the left and right banks drainage culverts on its tributaries.
- The estimated construction cost is 60 million baht with one year construction period.

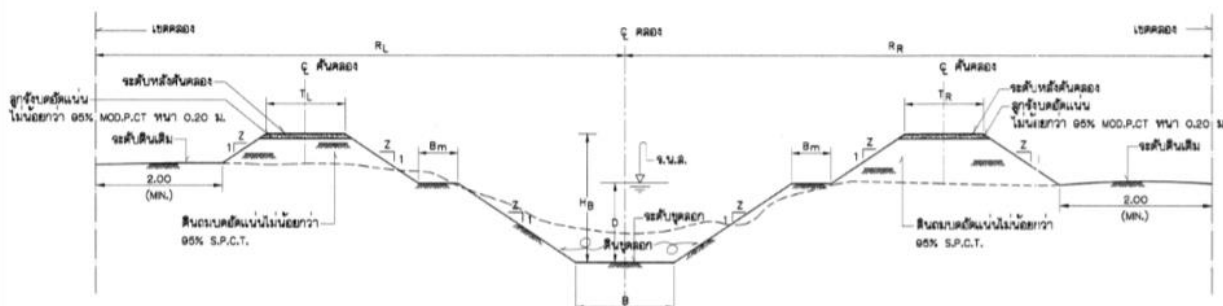


<sup>1</sup> While the proposed GCF project covers only 2 sites, the 13 planned sites have been presented.



## 2. Khlong Wang Khon Improvement:

- To increase its discharge capacity from 100 to 150 cms and channel storage.
- Dredging distance 27 km.
- The estimated construction cost is 135 million baht with one year construction period.



S	1:Z	B	D	H <sub>b</sub>	B <sub>m</sub>	T <sub>L</sub>	T <sub>R</sub>	R <sub>L</sub>	R <sub>R</sub>
Longitudinal Slope		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
1:10,000	1:1.5	30.00	4.00	6.00 (MAX.)	2.00 (MIN.)	6.00 (MIN.)	6.00 (MIN.)	-	-



Khlong Wang Khon near Ban Khom



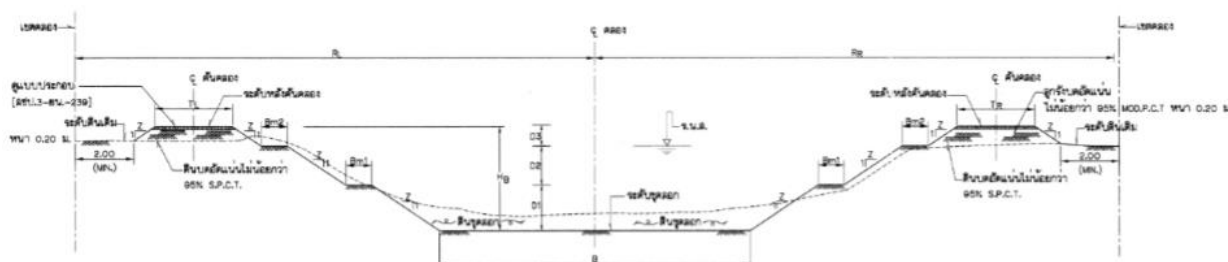
Khlong Wang Khon near Wang Khon Culvert



Khlong Wang Khon near Wang Won Culvert

### 3. The Old Yom River Improvement:

- To increase its discharge capacity from 120 to 200 cms and channel storage.
- Dredging distance 11 km.
- Improving the left bank dyke to prevent floods in the agricultural and residential areas near the river as well as using the dyke as a road for people's transportation.
- The estimated construction cost is 85 million baht with one year construction period.



S Longitudinal Slope	1:Z	B (m)	D1 (m)	D2 (m)	D3 (m)	HB (m)	Bm1 (m)	Bm2 (m)	TL (m)	TR (m)	RL (m)	RR (m)
1:10,000	1:1.5	40.00	4.00	3.50	3.00	10.50 (MAX.)	2.00 (MIN.)	2.00 (MIN.)	6.00 (MIN.)	6.00 (MIN.)	-	-



The Old Yom River near Khlong Ta Kay Cul.



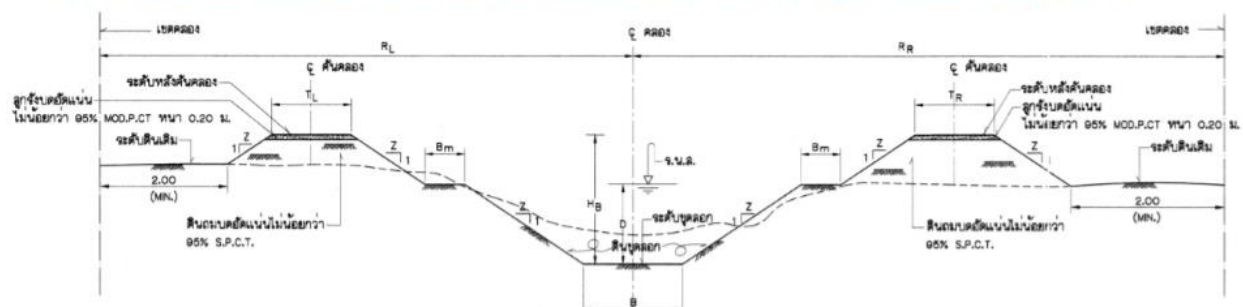
The Old Yom River



Beneficiary Areas

#### 4. Khlong Muang Change Improvement:

- To increase its discharge capacity from 100 to 120 cms and channel storage.
- Dredging distance 26.7 km.
- Construction of regulating gate size 2 @ 6.00 x 5.00 m. at two locations.
- The estimated construction cost is 200 million baht with one year construction period.



S	1:Z	B	D	H <sub>b</sub>	B <sub>m</sub>	T <sub>L</sub>	T <sub>R</sub>	R <sub>L</sub>	R <sub>R</sub>
Longitudinal Slope		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
1:10,000	1:1.5	30.00	4.00	6.00 (MAX.)	2.00 (MIN.)	6.00 (MIN.)	6.00 (MIN.)	-	-



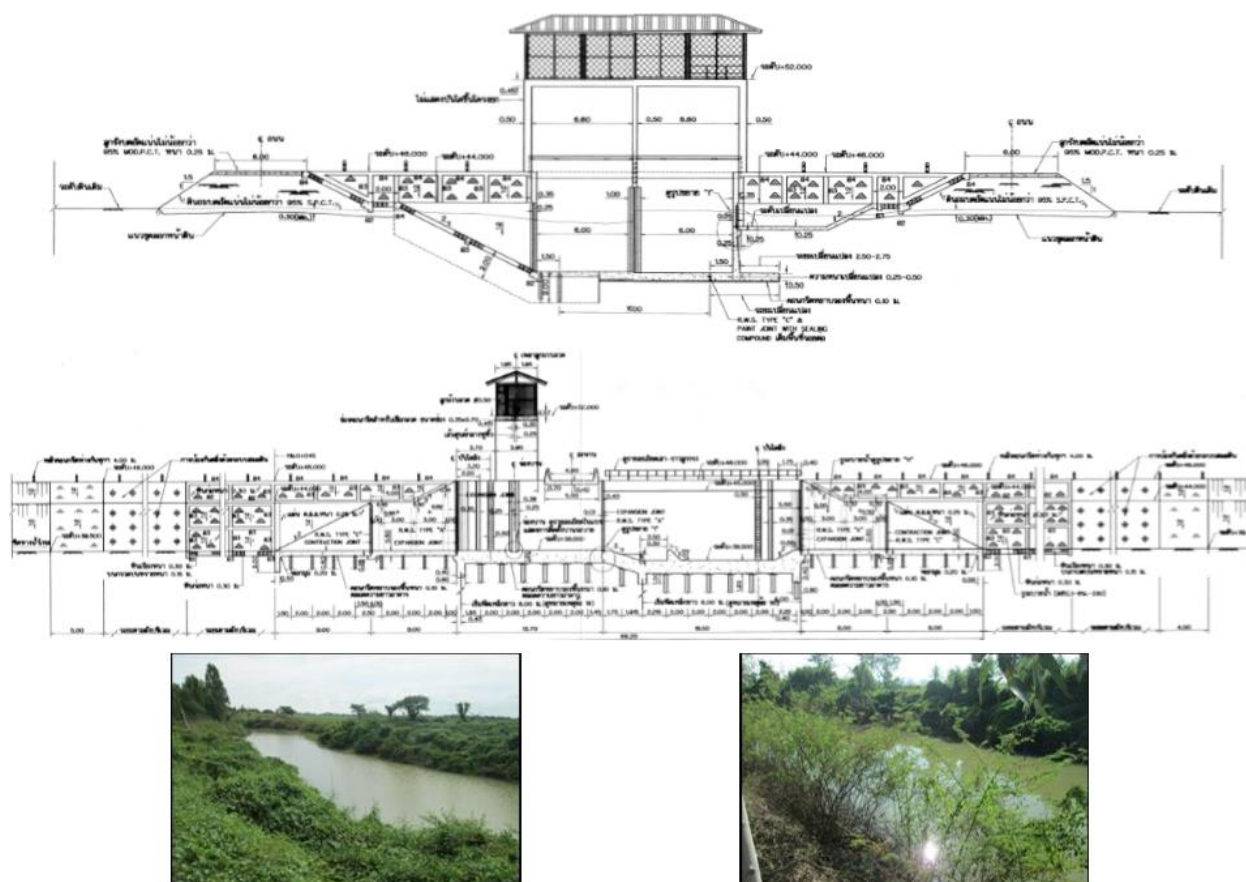
Khlong Muang Change



Khlong Muang Change



Beneficiary Areas



Regulating Gate Site No.1 Upstream

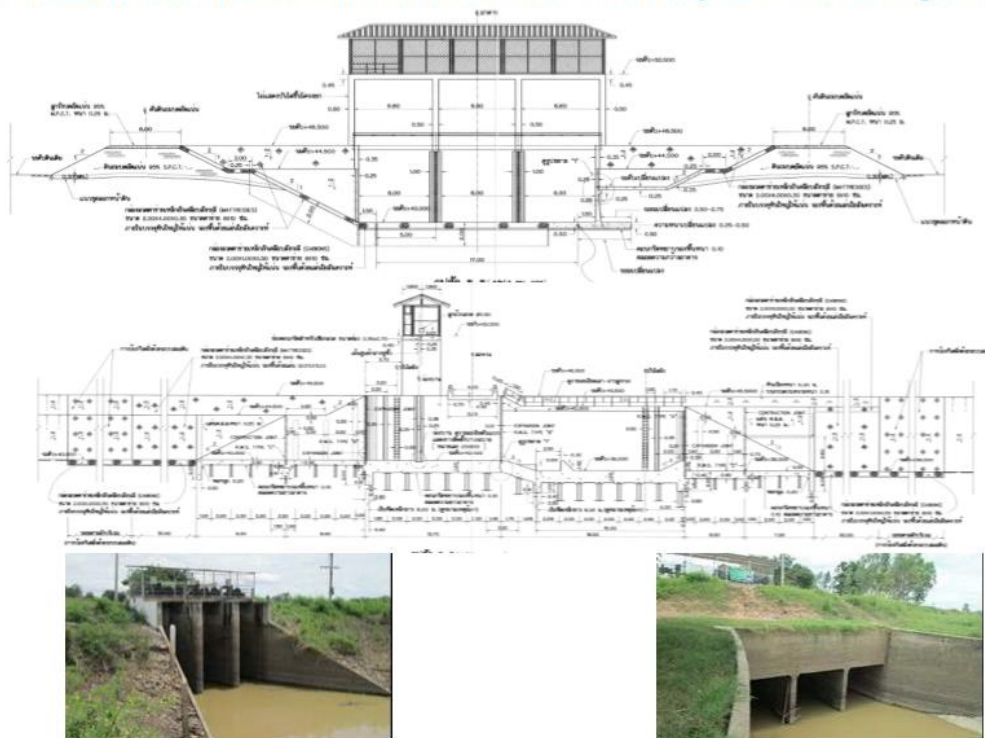


Regulating Gate Site No.2 Downstream



### 5. Wang Khon Culvert Reconstruction:

- To increase its discharge capacity from 100 to 150 cms and channel storage.
- Reconstruction of regulating gate size 3 @ 6.00 x 5.00 m (Existing 3 @ 2.90 x 3.00 m)
- The estimated construction cost is 60 million baht with one year construction period.

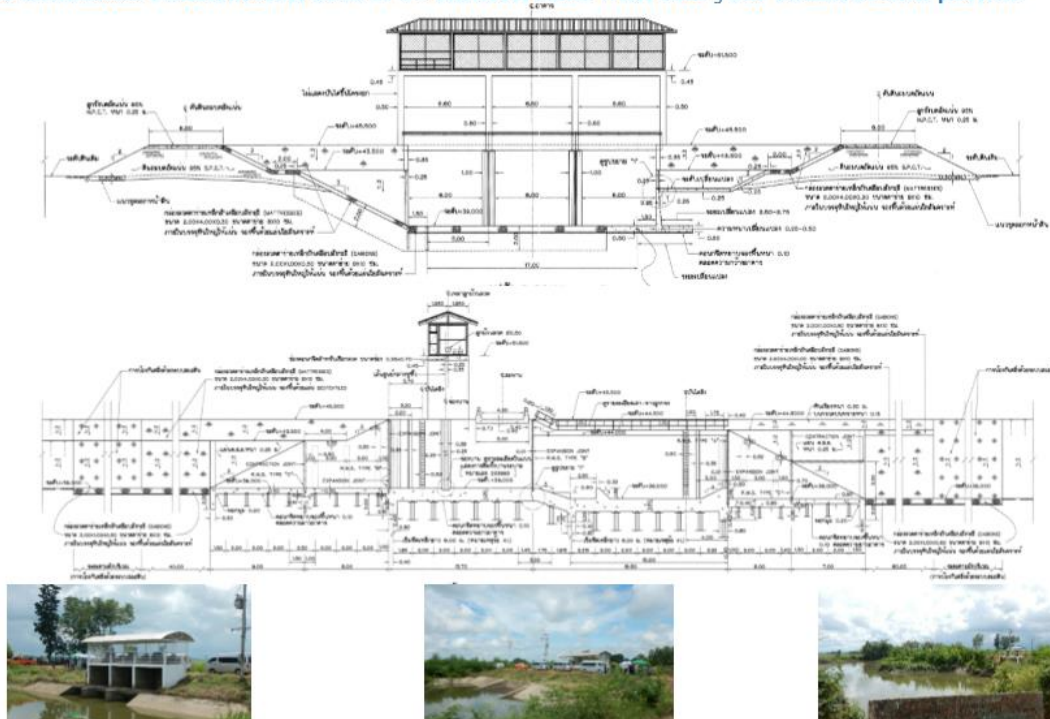


Existing Wang Khon Culvert 3 @ 2.90 x 3.00 m (looking upstream)

Existing Wang Khon Culvert 3 @ 2.90 x 3.00 m (looking downstream)

## 6. Wang Won Culvert Reconstruction:

- To increase its discharge capacity from 100 to 150 cms and channel storage.
- Reconstruction of regulating gate size 3 @ 6.00 x 5.00 m (Existing 3 @ 2.90 x 3.00 m)
- The estimated construction cost is 60 million baht with one year construction period.



Existing Wang Won Culvert 3 @ 2.90 x 3.00 m  
(looking upstream)



Existing Wang Won Culvert 3 @ 2.90 x 3.00 m  
(looking downstream)

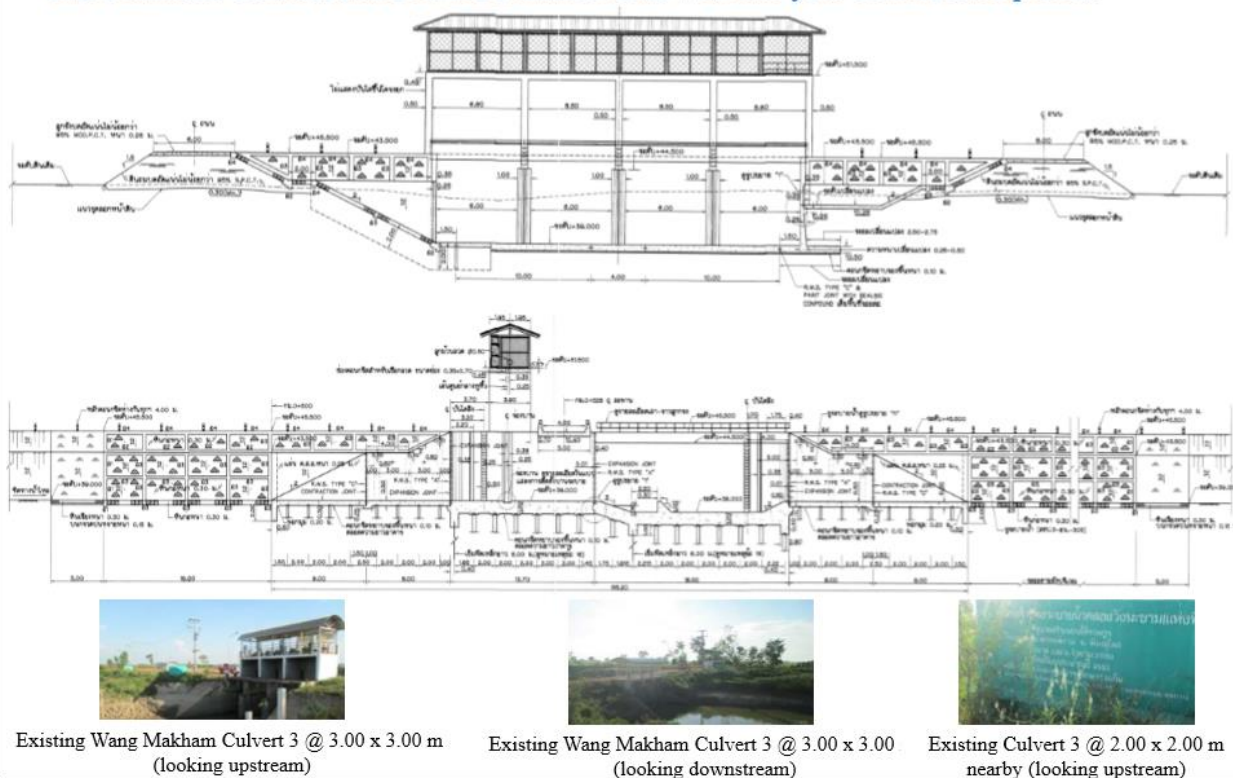


Existing Culvert 2 @ 2.00 x 2.00 m  
nearby (looking downstream)



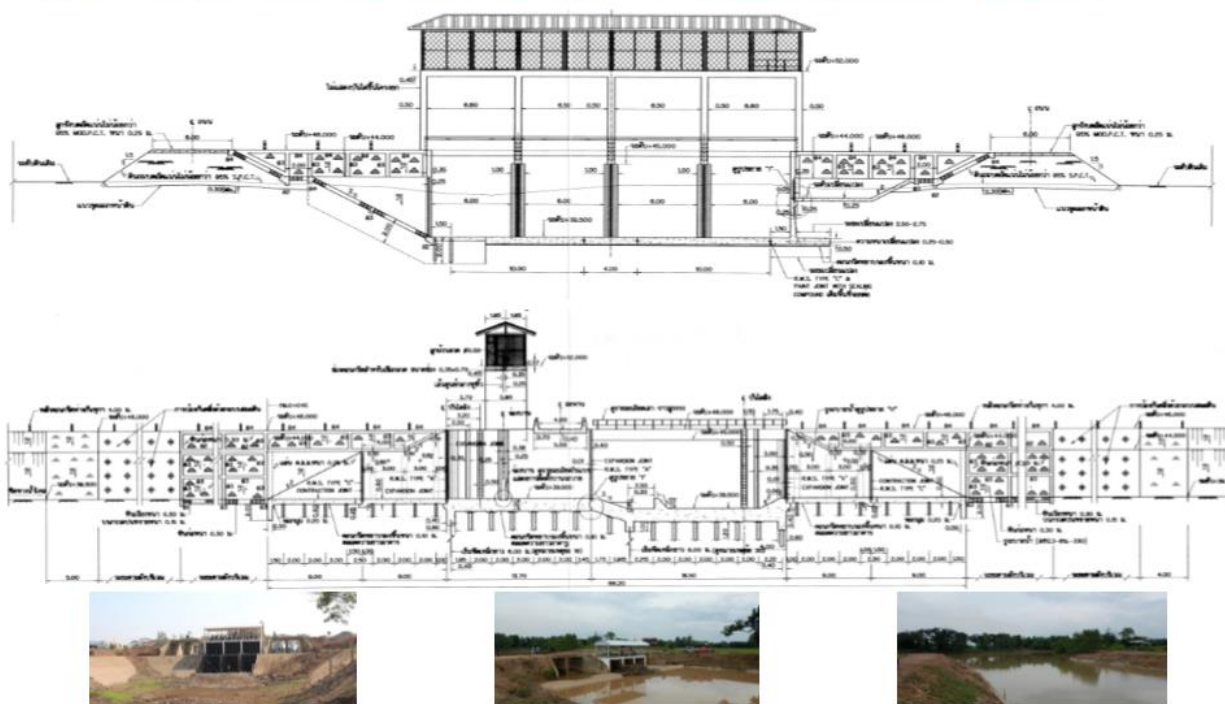
### 7. Wang Makham Culvert Reconstruction:

- To increase its discharge capacity from 100 to 200 cms and channel storage.
- Reconstruction of regulating gate size 4 @ 6.00 x 5.00 m (Existing 3 @ 3.00 x 3.00 m)
- The estimated construction cost is 90 million baht with one year construction period.



### 8. Khlong Ta Kay Culvert Reconstruction:

- To increase its discharge capacity from 100 to 200 cms and channel storage.
- Reconstruction of regulating gate size 4 @ 6.00 x 5.00 m (Existing 3 @ 2.90 x 3.00 m)
- The estimated construction cost is 90 million baht with one year construction period.



Existing Khlong Ta Kay Culvert 3 @ 2.90 x 3.00 m  
with Culvert 2 @ 2.00 x 2.00 m at both sides

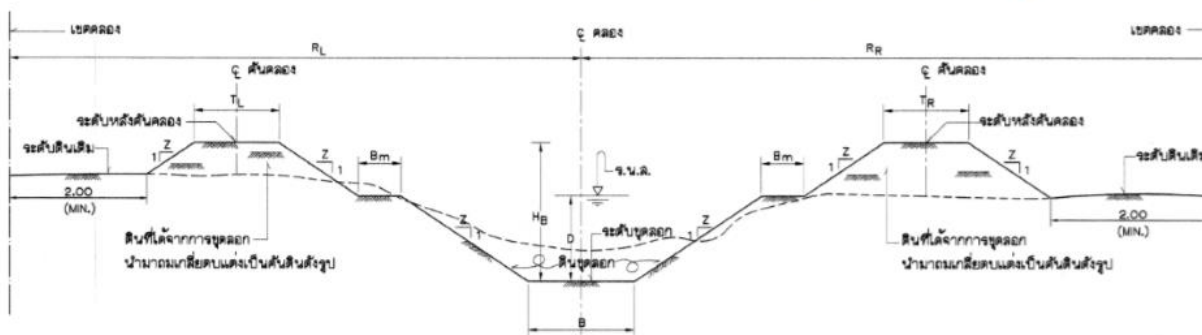
Existing Khlong Ta Kay Culvert  
(looking upstream)

Existing Khlong Ta Kay Culvert  
(looking downstream)

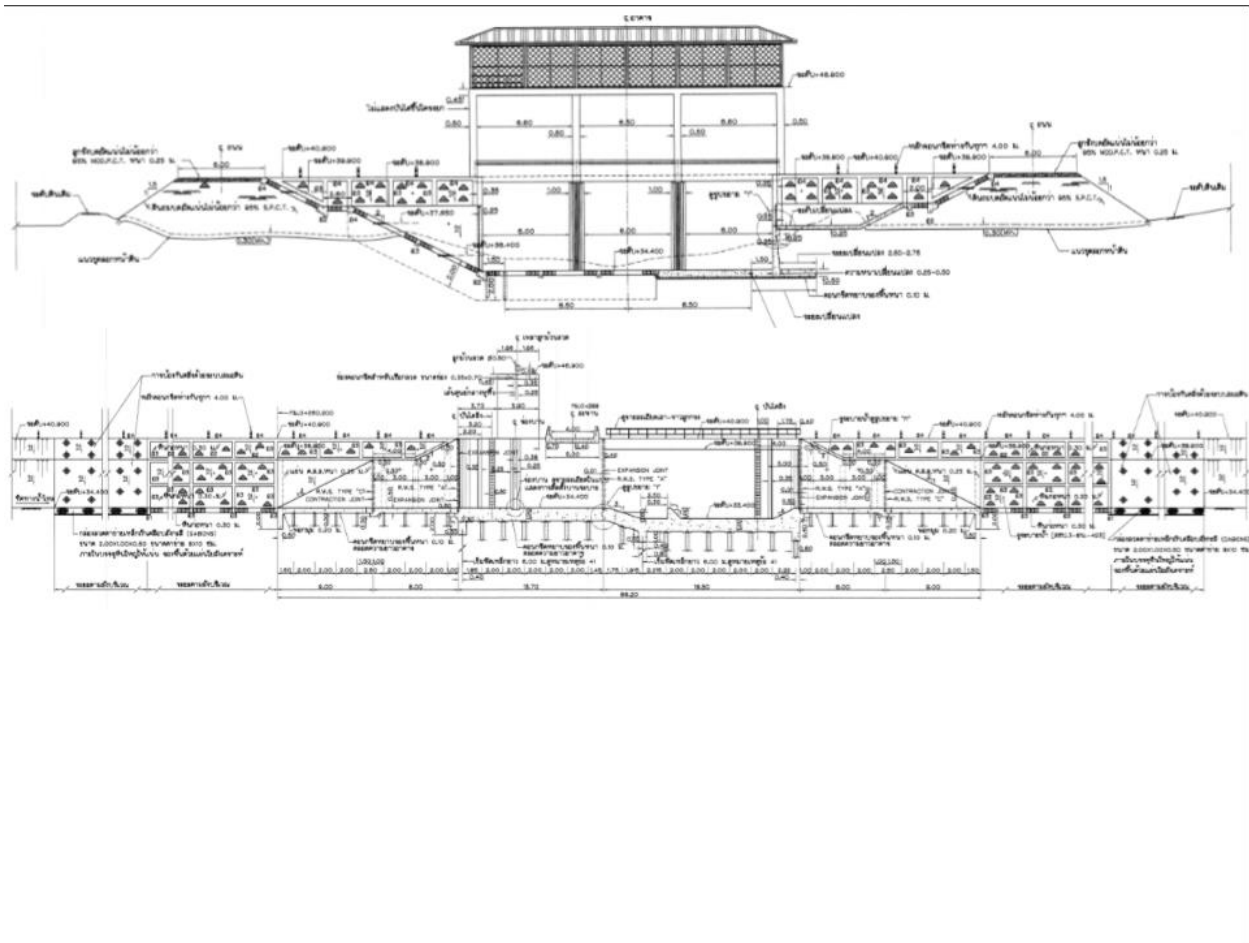


### 9. Khlong Rahan Improvement:

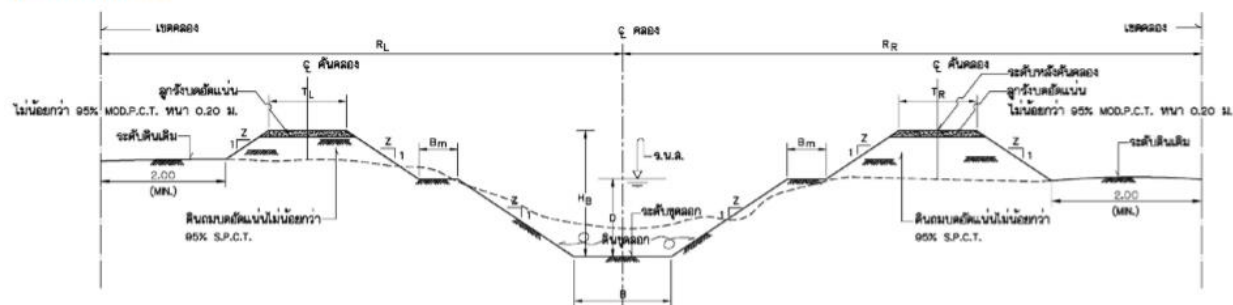
- To increase its discharge capacity from 100 to 150 cms and channel storage.
- Dredging distance 11.6 km.
- Construction of regulating gate size 3 @ 6.00 x 5.00 m.
- The estimated construction cost is 100 million baht with one year construction period.



S Longitudinal Slope	1:Z	B (m)	D (m)	H <sub>B</sub> (m)	B <sub>m</sub> (m)	T <sub>L</sub> (m)	T <sub>R</sub> (m)	R <sub>L</sub> (m)	R <sub>R</sub> (m)
1:8,000	1:2	20.00	4.50	6.50 (MAX.)	2.00 (MIN.)	6.00 (MAX.)	6.00 (MAX.)	-	-



**10. Khlong Kate Improvement:** Improvement of Khlong Kate, including a regulator, to strengthen water distribution and diversion capacity. The distance is 7.5 km and the cost is 60 million baht.



S	1:Z	B	D	H <sub>B</sub>	B <sub>m</sub>	T <sub>L</sub>	T <sub>R</sub>	R <sub>L</sub>	R <sub>R</sub>
Longitudinal Slope		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
1:10,000	1:1.5	25.00	4.00	5.50 (MAX.)	2.00 (MIN.)	6.00 (MIN.)	6.00 (MIN.)	—	—



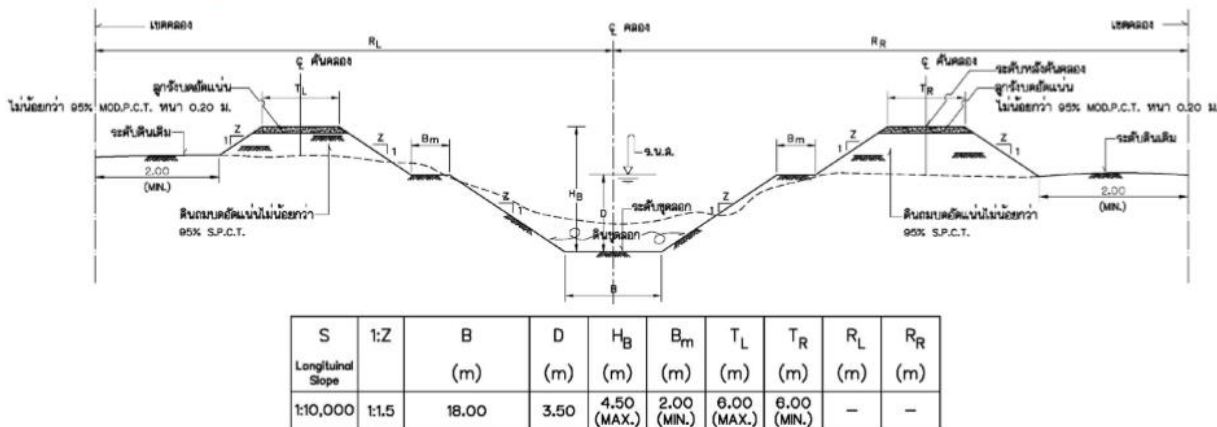
Khlong Kate



Khlong Kate



**11. Khlong Kram Improvement:** Improvement of Khlong Kram to strengthen water distribution and diversion capacity. The distance is 12 km and the cost is 30 million baht.

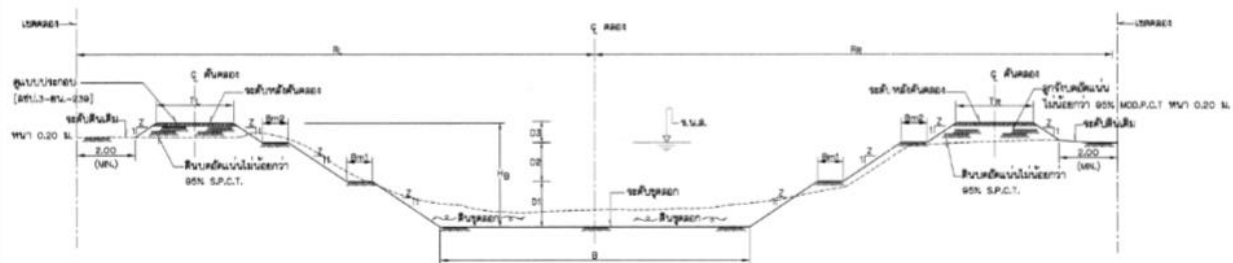


Khlong Kram



Khlong Kram

**12. Khlong Bang Kaew Improvement:** Improvement of Khlong Bang Kaew to strengthen water distribution and diversion capacity. The distance is 60 km and the cost is 400 million baht.



S	1:Z	B	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	H <sub>B</sub>	B <sub>m1</sub>	B <sub>m2</sub>	T <sub>L</sub>	T <sub>R</sub>	R <sub>L</sub>	R <sub>R</sub>
Longitudinal Slope		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
1:10,000	1:1.5	50.00	4.00	3.50	3.00	10.50 (MAX.)	2.00 (MIN.)	2.00 (MIN.)	6.00 (MIN.)	6.00 (MIN.)	—	—

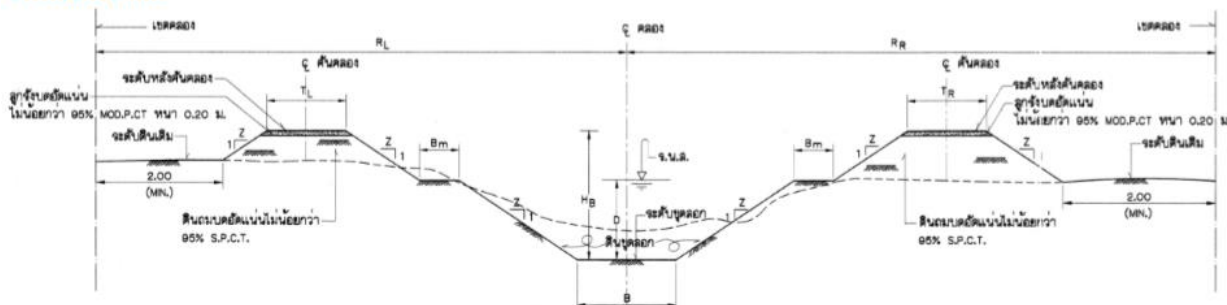


Khlong Bang Kaew



Beneficiary Areas

**13. Khlong Nam Lai Drainage Improvement:** Improvement of Khlong Nam Lai drainage to strengthen water distribution and diversion capacity. The distance is 17.5 km and the cost is 85 million baht.



S	1:Z	B	D	H <sub>b</sub>	B <sub>m</sub>	T <sub>L</sub>	T <sub>R</sub>	R <sub>L</sub>	R <sub>R</sub>
Longitudinal Slope		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
1:10,000	1:1.5	30.00	4.00	6.00 (MAX.)	2.00 (MIN.)	6.00 (MIN.)	6.00 (MIN.)	-	-



Khlong Nam Lai



Khlong Nam Lai



Beneficiary Areas



### 1.3 PROJECT ALTERNATIVES

19 As part of the project development, a range of alternatives were considered.

#### 1.3.1 Do Nothing Alternative

- 20 The thirteen (13) water infrastructure interventions, two (2) of which will be funded under the project have been designed for each site. Without undertaking the activities, it would not be possible to maintain productive agriculture while increasing environmental stability. Without undertaking these interventions, the environment would continue to be degraded as a result of the impacts of climate change and flooding like was seen in Thailand in 2011 would continue.
- 21 Without undertaking the river works activities, significant flooding and loss of life and assets would continue to occur.
- 22 Without undertaking the deepening of the existing canals, the project will not achieve the climate change benefits needed.
- 23 The GCF project will support the commitment of the Thai government to avoid losses of lives and to reduce economic and infrastructure losses caused by climate-induced hydro meteorological disasters. Without undertaking these interventions, the country would not be able to reduce the potential for loss of life and loss of assets.

#### 1.3.2 Alternative Locations, Technologies etc

- 24 The proposed infrastructure activities could be undertaken in a number of different locations. However the proposed locations, particularly the river works interventions have been identified by the Government of Thailand as those sites that provide the greatest economic, environmental, and social benefit and more importantly, will provide the best climate change adaptation outcomes.
- 25 The specific site interventions will be determined within the first year of project implementation. During this period, specific sites, intervention technologies, design and operation will be considered in conjunction with base line data collection and subsequent impact assessment as discussed in para 78 of the ESMF.

## 2 LEGAL AND INSTITUTIONAL FRAMEWORK FOR ENVIRONMENTAL AND SOCIAL MATTERS

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### 2.1 LEGISLATION, POLICIES AND REGULATIONS

#### 2.1.1 Constitution 2007

- 27 The Government of Thailand enacted a new constitution on 6 April 2560 (2017). There are numerous provisions of the new constitution that are relevant for the project.
- 28 Under Section 43(2) of the Constitution, a person and community shall have the right to manage, maintain and utilise natural resources, environment and biodiversity in a balanced and sustainable manner, in accordance with the procedures as provided by law.
- 29 Section 50 of the Constitution sets out the duties of the Thai people. Section 50(8) states that Thai people have a duty to cooperate and support the conservation and protection of the environment, natural resources, biodiversity, and cultural heritage. This is very relevant to the current project.
- 30 Under Section 57, the Government of Thailand shall
  - a. conserve, revive and promote local wisdom, arts, culture, traditions and good customs at both local and national levels, and provide a public area for the relevant activities including promoting and supporting the people, community and a local administrative organisation to exercise the rights and to participate in the undertaking;
  - b. conserve, protect, maintain, restore, manage and use or arrange for utilisation of natural resources, environment and biodiversity in a balanced and sustainable manner, provided that the relevant local people and local community shall be allowed to participate in and obtain the benefit from such undertaking as provided by law.
- 31 Section 58 is critical for broader environmental and social matters, and more specifically, environmental impact assessment matters. Section 58 states that
  - a. In regard to any undertaking by the State or that the State will permit any person to carry out, if such undertaking may severely affect the natural resources, environmental quality, health, sanitation, quality of life or any other essential interests of the people or community or environment, the State shall undertake to study and assess the impact on environmental quality and health of the people or community and shall arrange a public hearing of relevant stakeholders, people and communities in advance in order to take them into consideration for the implementation or granting of permission as provided by the law.
  - b. A person and community shall have the rights to receive information, explanation and reasons from a State agency prior to the implementation or granting of permission under paragraph one.
  - c. In the implementation or granting of permission under paragraph one, the State shall take precautions to minimise the impact on people, community, environment, and biodiversity and shall undertake to remedy the grievance or damage for the affected people or community in a fair manner without delay.
- 32 Section 59 of the Constitution says that the State shall disclose any public data or information in the possession of a State agency, which is not related to the security of the State or government confidentiality as provided by law, and shall ensure that the public can conveniently access such data or information.
- 33 While there are no indigenous and/or ethnic groups likely to be in any way impacted by the project, section 70 is relevant as it states that the Government *should promote and provide protection for different ethnic groups to have the right to live in the society according to the traditional culture, custom,*

*and ways of life on a voluntary basis, peacefully and without interference, insofar as it is not contrary to public order or good morals or does not endanger the security of the security, health or sanitation.*

- 34 Section 72 is highly relevant to the project. Section 72 states that the Government *should take actions relating to land, water resources and energy as follows:*
- a. to plan the country's land use to be appropriate to the area conditions and potentials of the land in accordance with the principles of sustainable development;
  - b. to undertake town planning at every level and to enforce such town planning efficiently, as well as to develop towns to prosper and meet the needs of the people in the area;
  - c. to provide measures for distribution of landholding in order to thoroughly and fairly allow people to have land for making a living;
  - d. to provide quality water resources which are sufficient for consumption by the people, including for agriculture, industry and other activities; and
  - e. to promote energy conservation and cost-effective use of energy, as well as to develop and support the production and use of alternative energy to enhance sustainable energy security.
- 35 As with section 72, section 73 is very relevant. Section 73 says that the State should provide measures or mechanisms to enable farmers to efficiently carry out agriculture which yields produce of high quantity and quality that is safe, low cost and competitive in the market, and should assist indigent farmers to have land for making a living through land reform or any other means.
- 36 With respect to the project specifically, section 258 is very relevant. Section 258 sets out the State's national reform agenda, with section 258(G)(1) stipulation that the Government will enact reforms that provide a *water resource management system which is efficient, fair and sustainable, with due regard given to every dimension of water demand in combination with environmental and climate change.*

## 2.2 WATER RESOURCES ACT 2018

- 37 In December 2018, the Government of Thailand passed the *Water Resources Act 2018*. The Act provides for the allocation, use, development, management, maintenance, rehabilitation and conservation of water resources and rights in water except where other laws allow for water to be used inconsistent with the Act.
- 38 Section 4 provides a number of important definitions including but not limited to:
- a. "water" means atmosphere water, surface water, underground water and seawater;
  - b. "water resources" water, public water resources, river sources, water detention basins, water-supply canals, flood-water areas, whether naturally formed or man-made, and other things used for water management and shall include water from international water sources and foreign water sources capable of exploitation by Thailand;
  - c. "public water resources" means water in a water source which is publicly used or reserved for common use by the public or, by nature, capable of common use by the public and shall include rivers, canals, waterways, swamps, underground water sources, lakes, internal waters, territorial seas, wetlands, other natural water sources, water sources built or developed by the State for common use by the public, international water sources located in the territory of Thailand and capable of use by the public, irrigation waterways under the law on irrigation and groundwater under the law on groundwater;
  - d. "water use" means a pursuit of activities in relation to public water resources for the purpose of consumption, ecosystem conservation, customs, public disaster mitigation, agriculture, industry, commerce, tourism, communication, waterworks or energy generation or for any other purpose, whether it may result in a change in the quantity of water or not;

- e. “drainage basin” means an area which covers natural streams and through which waters centrally flow into streams as prescribed in the Royal Decree;
  - f. “water drought” the state of such consistent decrease of the water quantity, water-flow quantity or water level as to be likely to cause effects on the living of human-beings, animals and plants in any particular area; and
  - g. “flood” means the state of such consistent, sharp or immediate increase of the water quantity, water-flow quantity or water level as to be likely to cause effects on the living of human-beings, animals and plants in any particular area but shall not include a naturally rising and falling tide;
- 39 Section 7 of the *Water Resources Act* establishes that public water resources are publicly owned. The section states that a person has the right to use or keep water to the extent necessary for the benefit of his activities or his land without causing grievance or damage to other persons who may use such water, unless otherwise provided by this Act or Ministerial Regulations, Rules or Notifications issued by virtue of the provisions of this Act or other laws.
- 40 Section 8 of the *Water Resources Act* establishes that the owner or possessor of land from which a water springs or through which water flows naturally, whether on or beneath the land, has the right to use or keep such water to the extent necessary for the benefit of his land without causing grievance or damage to other persons.
- 41 Section 41 of the *Water Resources Act* states that the use of public water resources is classified into three types, viz:
- a. water use of Type One, which signifies the use of public water resources for the living, household consumption, agriculture or livestock farming for subsistence, household industry, ecosystem conservation, customs, public disaster mitigation, communications and the use of water in a small quantity;
  - b. water use of Type Two, which signifies the use of public water resources for the industry, tourism industry, electricity generation, waterworks and other undertakings; and
  - c. water use of Type Three, which signifies the use of public water resources for a large-sized undertaking which requires the use of a large quantity of water or possibly has effects across drainage basins or covering large areas.
- 42 The *Water Resources Act* also establishes the “National Water Resources Commission which has the duties and powers in connection with water resources administration in order to achieve the purpose of integrating the use, development, management, maintenance, rehabilitation and conservation of water resources with a view to uniformity and also has the duties and powers as follows:
- d. to prepare policies and the master plan on water resources administration in line with national strategies for submission to the Council of Ministers for approval;
  - e. to consider and approve action plans of State agencies and local government organisations in connection with water resources and plans on water resources administration budgets, as prepared in an integrated manner, in line with the policies and master plan under
  - f. and submit them to the Council of Ministers for consideration in the preparation of annual appropriations;
  - g. to consider and approve the master plan on the use, development, management, maintenance, rehabilitation and conservation of water resources in areas of drainage basins as proposed by drainage basin committees under section 35 (1);
  - h. to superintend, supervise, accelerate, inspect, monitor and advise State agencies and local government organisations in connection with the pursuit of activities in the implementation of the policies and master plan under (1) as well as the action plans and budget plans under (2) and report the same to the Council of Ministers for information at the end of every budget year;

- i. to consider and approve the water chart as proposed by the Office and publish the same in the Government Gazette;
  - j. to make suggestions or provide directions to State agencies and local government organisations in connection with the enforcement of laws concerning the effective administration of water resources and the management of water pollution falling within the duties and powers of such State agencies or local government organisations;
  - k. to propose matters to the Council of Ministers for resolving problems from the performance of work of State agencies and local government organisations which take action in accordance with the laws, Regulations or Rules binding them insofar as they are concerned with the use, development, management, maintenance, rehabilitation and conservation of water resources, with a view to generating integration as well as public participation;
  - l. to designate State agencies and local government organisations to assume the duty of co-operating with the Office in the gathering, linking and integrating information on water resources;
  - m. to set a framework, rules and directions for work performance of drainage basin committees and priorities of water use for undertakings of respective types, to be taken into consideration by drainage basin committees in their allocation of water and control of water use in each drainage basin;
  - n. to consider and approve plans on the prevention and resolution of water drought and plans on the prevention and resolution of flood as prepared by drainage basin committees, with a view to integrating the prevention and resolution of flood amongst drainage basins;
  - o. to consider and approve permission for water use of Type Three under section 44 and revocation of a permit for water use of Type Three under section 54;
  - p. to consider and approve the diversion of water amongst drainage basins and diversion of water from international water sources or foreign water sources;
  - q. to mediate and decide disputes between drainage basin committees;
  - r. to make recommendations on the enactment, issuance or amendment of Royal Decrees or Ministerial Regulations under this Act;
  - s. to make recommendations to the Council of Ministers, State agencies and local government organisations concerned in connection with the enactment of laws or amendment to laws, bye-laws, Rules, Regulations or ordinances in connection with water resources administration;
  - t. to issue Rules prescribing measures for promoting and encouraging participation, by the private sector, people and communities concerned, in the use, development, management, maintenance, rehabilitation and conservation of, and any other activities in connection with, water resources;
  - u. to perform any other activities as prescribed in this Act or as prescribed by any other law to be the duties and powers of the N.W.R.C. or as entrusted by the Council of Ministers or the Prime Minister; and
  - v. The preparation of the policies and master plan on water resources administration under (1) shall also embrace the preservation of, and the resolution of problems in connection with, water quality.
- 43 The Government of Thailand has also passed a 20-year Master Plan on Water Resource Management (2018-2037), following the proposal by the Office of the National Water Resources. The Master Plan provides a framework that all Government Ministries need to include in their work plans and action plans. The Office of the National Water Resources will monitor and assess the effectiveness of the 20-year master plan.
- 44 The Master Plan is an improvement from the previous Water Resource Management Strategy (2015-2026) to manage water resources throughout the whole system for Thailand's water security.

- 45 The Master Plan's objectives are that all villages will have clean water for consumption and production, flood damage will be reduced, water quality will be at acceptable standards, and water resource management will be sustainable, under the concepts of balanced development and the participation of all sectors. The Master Plan includes constructing over 541,000 small dams, restoring 5,600 square kilometres of watershed areas, supplying safe water to 75,032 villages by 2030, and finding solutions to the country's chronic alluvions and droughts in 66 different areas.
- 46 The Master Plan comprises 28 strategies and 54 work plans, in six (6) major areas, involving the management of water for consumption, water security in the production sector, water management to tackle floods, water quality and water resource conservation, watershed rehabilitation and soil erosion prevention, and efficient management, such as law improvements and international cooperation.
- 47 The Office of the National Water Resources, the Ministry of Interior, the MOAC, and the MONRE will serve as core agencies in mobilising the implementation of the Master Plan.

## 2.3 ENVIRONMENTAL IMPACT ASSESSMENT IN THAILAND

- 48 The Office of National Resources and Environmental Policy and Planning (ONEP) under the Ministry of Natural Resources and Environment (MONRE) is the main agency responsible for the administration of the Thai environmental impact assessment process; including the development of environmental impact assessment system and review process. ONEP is responsible for reviewing and making proposals on the types and sizes of projects and/or activities that require the preparation of an environmental impact assessment and the rules and regulations for the preparation of environmental impact assessment reports to the National Environment Board (NEB) for approval. ONEP is also responsible for guideline development for the preparation of environmental impact assessment for various types of projects or activities, and the registration of environmental impact assessment consulting firms.

### 2.3.1 National Environmental Quality Act 2535 (1992)

- 49 Part 4 of *Enhancement and Conservation of Nation of National Environmental Quality Act 2535 (1992)* establishes the environmental impact assessment system for Thailand. The assessment procedure established under Part 4 depends on whether or not a project requires Cabinet approval.
- 50 Under Section 46 of the *Enhancement and Conservation of Nation of National Environmental Quality Act 2535 (1992)*, the Minister shall, with the approval of the National Environment Board, have the power to specify, by notification published in the Government Gazette types and sizes of projects or activities, likely to have environmental impact, of any government agency, state enterprise or private person, which are required to prepare reports on environmental assessment for submission to seek approval in accordance with section 47, section 48 and section 49. There are currently 35 types of projects that require an environmental impact assessment and eleven types of projects that require an environmental and health impact assessment.
- 51 Under Section 47, in the case of a project or activity that is required to prepare an environmental impact assessment and which requires the approval of the Cabinet, the environmental impact assessment report is lodged with MONRE and then submitted to the NEB for its review and comments. The environmental impact assessment report is then submitted to the Cabinet for consideration.
- 52 A project that does not require approval from the Cabinet is covered under section 48. Under section 48 of the *Enhancement and Conservation of Nation of National Environmental Quality Act 2535 (1992)*, the official who is legally authorised to grant permission shall withhold the granting of permission for the project or activity referred to in the first paragraph until having been notified by the Office of Environmental Policy and Planning of the result of consideration pertaining to the review of the environmental impact assessment report in accordance with section 49.



- 53 Further, under Section 48 of the *Enhancement and Conservation of Nation of National Environmental Quality Act 2535 (1992)*, the ONEP shall examine the environmental impact assessment report and related documents filed. If it is found that the report as filed is not correctly made in accordance with the rules and procedures specified by virtue of section 46, second paragraph, or the accompanied documents and data are incomplete, the ONEP shall notify the person applying for permission who files the report within fifteen days from the date of receiving such report.
- 54 With respect to section 48 of the Enhancement and Conservation of Nation of National Environmental Quality Act 2535, the Government of Thailand has passed the Notification of the Ministry of Natural Resources and Environment on measures and procedures of EHIA B.E. 2555 re Types and Sizes of Projects or Activities Requiring Environmental Impact Assessment Report and Rules, Procedures, Practices and Guidelines for Preparing Environmental Impact Assessment Report. The Notification considers the projects that need an initial environmental examination and/or an environmental impact assessment under the Act. Annex One includes a list of the 25 main river basins in Thailand. The Yom and Nan River Basins are listed as No 8 and 9 respectively. Further, Annex Two includes a list of the 23 principal rivers in Thailand. The Yom and Nan Rivers are listed as No 8 and 9 respectively.
- 55 Under Clause 7 of the Notification, a project or activity listed in Annex Three of the Notification belonging to government agencies, state enterprises or the private sector that is subject to preparation of an environmental impact assessment report as a project or activity that may cause a severe impact on the quality of environment, natural resources and health of a community under the Notification of Ministry of Natural Resources and Environment prescribing types, sizes and practices of projects or activities that may cause a severe impact on the quality of environment, natural resources and health of a community, shall be subject to preparation of an environmental impact assessment report under such notification only. Consistent with Annex Three, irrigation activities of 80,000 rai or more (No 32); all types of projects located in the Class 1 Watershed Area designated by the Cabinet resolution (No 33 – refers to those included in Annex One and Two of the Notification); trans basin diversion of main river basins, except for temporary diversion in the case of a disaster or where there is an impact on national security (No 34.1); and sluice gate in the principal river (No 35) require an environmental impact assessment.
- 56 The environmental impact assessment needs to be prepared consistent with that contained in section 49 of the Enhancement and Conservation of Nation of National Environmental Quality Act 2535 and Notification of the Ministry of Natural Resources and Environment Re: Rule, Procedure, Method and Guideline for Preparation of the Environmental Impact Assessment Report for Project or Activity which may Seriously Affect Community with respect to Quality of Environment, Natural Resources and Health 2010.
- 57 Environmental impact assessment reports are submitted to ONEP for a preliminary review. ONEP has 15 days to undertake their review. In cases where the ONEP finds that the environmental impact assessment report together with related documents is considered adequate, the ONEP review and make preliminary comments on the report within thirty days from the date of receiving such report in order that the report together with the preliminary comments shall be referred to the committee of experts for further consideration. Projects that require Cabinet approval are referred by ONEP, together with all comments, to the NEB, before referral to Cabinet.
- 58 Any incomplete environmental impact assessment reports are referred back to the proponent and/or consultant to make amendments. Once the environmental impact assessment is resubmitted, ONEP then has 15 days for a preliminary assessment of the documentation. Following this step, the EIA must be referred to an Expert Review Committee (ERC) for assessment. The ERC has 45 days to review the environmental impact assessment report. If approved, the environmental impact assessment report is then sent to other permitting agencies, which will grant the appropriate permits subject to the recommendations of the ERC.
- 59 Permitting agencies can stipulate the conditions of permission, including all mitigation measures and comments of the ERC included in the approved environmental impact assessment. ONEP also acts as

the Secretariat for the ERCs that are responsible for the review and assessment of EIAs and EIA. There are 15 ERCs currently established. Other lines agencies can also grant the permission for construction or operation of the projects or activities after they have been notified by ONEP of the result of environmental impact assessment approval.

- 60 Monitoring, reports must be submitted to ONEP and the permitting body twice per year. These are placed on the ONEP website and are publicly available.
- 61 Of particular relevance to the current project, in 2016, the National Council for Peace and Order passed Order No. 9/2016, which amended section 47 of the *Enhancement and Conservation of Nation of National Environmental Quality Act 2535 (1992)*. With the passing of the amendment, it is now possible for projects related to transportation, irrigation, public rescue and protection, hospital and residential development to enter into construction contracts prior to the approval of an environmental impact assessment.
- 62 The RID has prepared an overarching Environmental Impact Assessment for the water infrastructure component of the project which has been approved by Government. The two (2) infrastructure projects were included in this Environmental Impact Assessment. Updated site assessments will be undertaken in the first year of the project of the two proposed sites, and the Environmental Impact Assessments will be updated accordingly, as needed and the updated documents will be disclosed on the RID website with a link sent to the GCF website.

### 2.3.2 Disclosure in the Environmental Impact Assessment Process

- 63 The disclosure of information is governed by the *Official Information Act 1997*. Persons requesting information are entitled to be provided with the environmental impact assessment report, the environmental and health impact assessment report and the assessments of the report/s, any comments, the environmental management plan and monitoring report/s.
- 64 The 2007 Guidelines prepared by MONRE provide that a project is required to hold public participation at least twice. The first public participation occurs at the start of the preparation of the environmental impact assessment report. At this time, the public have the opportunity to review the terms of reference for the project and the scope of the studies required. The second stage is during the preparation of the draft environmental impact assessment report, including the proposed prevention and mitigation measures. In the case of a project requiring an environmental and health impact assessment, the Guidelines require four public meetings.
- 65 A project has to disclose information at the office of local authorities, project site and communities, in accordance with the Prime Minister's Office Rule on Public Hearing (2005) and consist of at least the following information:
  - a. Rationale and objectives of the project;
  - b. Main points of the project;
  - c. Project proponent;
  - d. Project site;
  - e. Products and outcomes of the project, including positive benefits that each stakeholder group will receive from the project;
  - f. Negative impacts that might happen to the people living or working in area and neighbouring areas of the project site and general public including prevention, mitigation and remediation measures; and
  - g. The estimated project cost.
- 66 There are five steps and corresponding tasks in the environmental impact assessment process where public participation is included, although the inclusion is not clearly defined. The steps include:



- a. screening which includes the initiation of the project, site evaluation and local authorities involvement;
- b. scoping which includes of site selection, scope of environmental impact assessment and public and stakeholders' involvement;
- c. report preparation which includes consultant selection, draft report preparation and data acquisition/public input/opinion;
- d. the environmental impact assessment review which includes of final report preparation, environmental impact assessment expert panel review for private project submitted to permitting authority, for government project submitted to NEB and to the Cabinet; and
- e. monitoring which includes project owner submitted reports, follow-up by the permitting authority and monitoring by a third-party.

### 2.4 UNDP SOCIAL AND ENVIRONMENTAL STANDARDS

- 67 The UNDP has established the Social and Environmental Standards and Environmental and Social Screening Procedure. Under the Social and Environmental Standards, there are three (3) Overarching Policy and Principles; these being
  - a. Principle 1: Human Rights;
  - b. Principle 2: Gender Equality and Women's Empowerment; and
  - c. Principle 3: Environmental Sustainability.
- 68 Under the three (3) Overarching Policy and Principles, there are seven (7) Project Level Standards; these being
  - a. Biodiversity Conservation and Sustainable NRM;
  - b. Climate Change Mitigation and Adaptation;
  - c. Community Health, Safety and Working Conditions;
  - d. Cultural Heritage;
  - e. Displacement and Resettlement;
  - f. Indigenous Peoples; and
  - g. Pollution Prevention and Resource Efficiency.
- 69 UNDP has also developed Guidance Notes to assist in the understanding of each of the three (3) Overarching Policy and Principles and seven (7) Project Level Standards. Also key to these, if the Grievance Redress process established under the Social and Environmental Compliance Unit within the Office of Anti-Corruption and Integrity.

### 2.5 GCF ENVIRONMENTAL AND SOCIAL POLICY

- 70 The GCF Environment and Social Policy is the GCF commitment to integrate environmental and social issues into its decision-making and outcomes, and establishes the principles, requirements, and responsibilities to deliver on these commitments. Through this policy, GCF requires all projects it supports to:
  - a. Enhance equitable access to development benefits; and
  - b. Give due consideration to vulnerable populations, groups, and individuals (including women, children, and people with disabilities, and people marginalised by virtue of their sexual orientation

or gender identity), local communities, indigenous peoples, and other marginalised groups of people and individuals that are affected or potentially affected by GCF-financed activities.

- 71 The project complies with the requirements of the GCF Environment and Social Policy.
- 72 The GCF Environment and Social Policy has requirements as to information disclosure, stakeholder engagement and grievance redress which are included in the GCF Information Disclosure Policy. The project has and will continue to comply with these requirements.

## 2.6 GCF INDIGENOUS PEOPLES POLICY

- 73 The GCF Indigenous Peoples Policy recognises that indigenous peoples often have identities and aspirations that are distinct from mainstream groups in national societies and are disadvantaged by traditional models of mitigation, adaptation and development. In many instances, they are among the most economically marginalised and vulnerable segments of the population. The economic, social and legal status of indigenous peoples frequently limit their capacity to defend their rights to, and interests in, land, territories and natural and cultural resources, and may restrict their ability to participate in and benefit from development initiatives and climate change actions. In many cases, they do not receive equitable access to project benefits, or benefits are not devised or delivered in a form that is culturally appropriate, and they are not always adequately consulted about the design or implementation of activities that would profoundly affect their lives or communities.
- 74 The GCF Indigenous Peoples Policy is supported by operational guidelines which have been assessed and used in determining the engagement of any indigenous peoples under this project.

## 2.7 MULTILATERAL AGREEMENTS AND BIODIVERSITY PROTOCOLS

- 75 Thailand is signatory to a number of United Nations and International Agreements, including on Biodiversity, Climate Change, Climate Change - Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Marine Life Conservation, Ozone Layer Protection, Tropical Timber 83, Tropical Timber 94, Wetlands, as well as being signed but not ratified party to the Law of the Sea. These international agreements frame both governance and some of the principles informing the project and its design, namely in terms of ensuring how project activities relate to environmental impacts – flora, fauna, terrestrial and marine (e.g. through water runoff), pollutants (e.g. agricultural), land use and livelihoods, agriculture and food security, as well as climate change mitigation and adaptation. For example:
  - a. The 1995 Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin (the Mekong Agreement)
  - b. The Convention on Biological Diversity relates to ensuring ‘the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from commercial and other utilisation of genetic resources. The agreement covers all ecosystems, species, and genetic resources;
  - c. The Stockholm Convention on Persistent Organic Pollutants aims to eliminate or restrict the production and use of persistent organic pollutants (POPs);
  - d. The International Tropical Timber Agreement (ITTA, 1983) is an agreement to provide an effective framework for cooperation between tropical timber producers and consumers and to encourage the development of national policies aimed at sustainable utilization and conservation of tropical forests and their genetic resources;
  - e. International Tropical Timber Agreement, 1994 (ITTA, 1994 or ITTA 2) was drafted to ensure that by the year 2000 exports of tropical timber originated from sustainably managed sources and to

establish a fund to assist tropical timber producers in obtaining the resources necessary to reach this objective;

- f. The United Nations Convention on the Law of the Sea (UNCLOS): UNCLOS defines the rights and responsibilities of nations with respect to their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources;
- g. The Convention on Wetlands of International Importance (the Ramsar Convention) provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The convention covers all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities;
- h. The Vienna Convention for the Protection of the Ozone Layer;
- i. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a multilateral treaty to protect endangered plants and animals. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species in the wild, and it accords varying degrees of protection to more than 35,000 species of animals and plants;
- j. The United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD) is a Convention to combat desertification and mitigate the effects of drought through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements;
- k. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes to ensure that hazardous wastes are managed in an environmentally sound manner in the country of import; and;
- l. The United Nations Framework Convention on Climate Change (UNFCCC) to reduce atmospheric concentrations of greenhouse gases with the goal of "preventing dangerous anthropogenic interference with Earth's climate system.

76 Thailand has signed but not ratified:

- a. the Convention on the Conservation of Migratory Species of Wild Animals, or the Bonn Convention, and
- b. International Treaty on Plant Genetic Resources for Food and Agriculture.

### 3 DESCRIPTION OF EXISTING ENVIRONMENT

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- 77 This section identifies the key environmental and social baseline identified for the project areas. The current information is considered both general and more importantly, adequate for the purposes of the overall project assessment.
- 78 Prior to the implementation of the outputs and activities, the UNDP, MRDI and MoENRP will assess the need for any additional information and baseline data that may be required for project specific sites based on project activities. This data may include but not be limited to sediment and soil samples, and the collection of biological data, and the collection and modelling as necessary of hydrology and water quality. This information will be used to assess any potential site-specific impacts and then develop site specific ESMPs based on the current ESMP contained in Chapter Eight (8) of this ESMF..

#### 3.1 TOPOGRAPHY, GEOLOGY AND SOILS

- 79 The suspended sediments in the Nan River downstream of the confluence of the Yom and Nan Rivers in Nakhon Sawan province is approximately 2.60 million tonnes/year. The average annual suspended sediments are 45.32 tonnes/km<sup>2</sup>; and the erosion rate is 0.045mm/year.

##### 3.1.1 Sediment Characteristics

- 80 Soil pH in the project area is slightly acidic to very strongly acidic (4.6–6.9). Soil organic matter is very low in monkey cheeks near Uttaradit and Ratchaburi; while soil organic matter in other areas range from medium to high. Soil samples previously collected contain low available phosphorus, medium to very high soluble potassium, and high soluble calcium. The electrical conductivity (EC) is lower than 1 dS/m whereas the cation exchange capacity (CEC) ranges between 14.80 and 37.80 ml/100 g which are high. Soil in the project area is fertile as it has high ability to absorb and exchange nutrients.
- 81 While no sampling and analysis has been undertaken in the preparation of this ESMF, it is likely that the sediments within the canals has been somewhat contaminated through the use of agricultural fertilisers, pesticides and herbicides that are used by landholders in the region and the overland flow of these attached to soils during high rainfall events.

#### 3.2 SEISMIC ACTIVITY

- 82 The project area in Thailand is not known for its seismic activity. Seismic activity within Thailand is usually located in the western areas closer to Myanmar. Seismic activity within Thailand is shown in red in Figure 6.

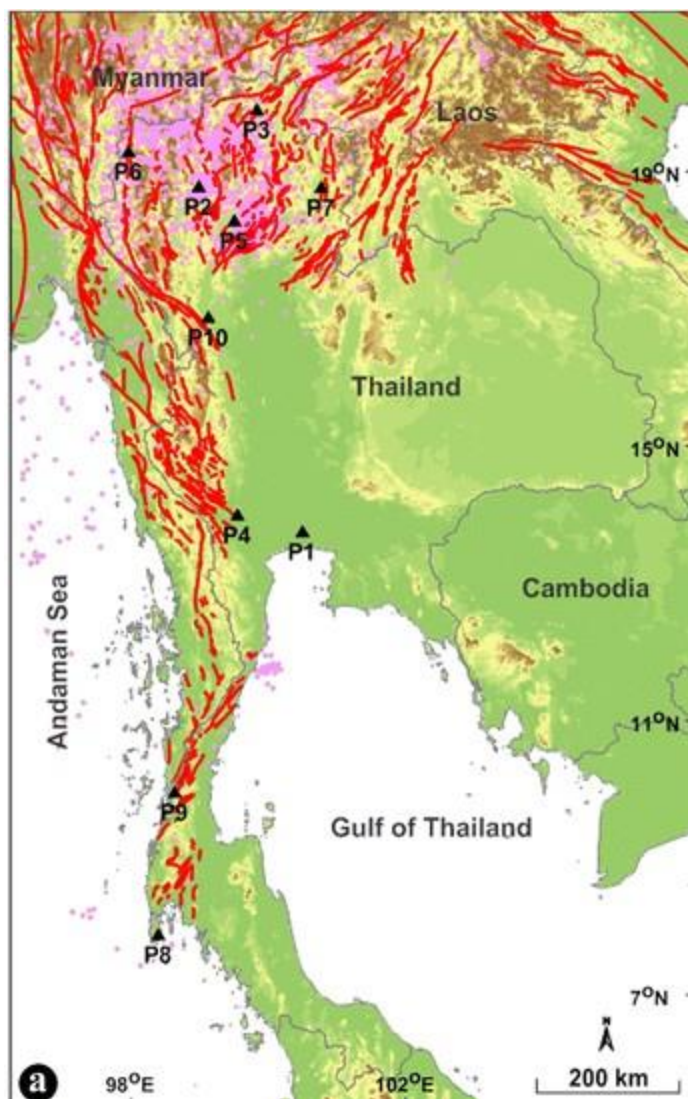


Figure 6 Seismic Activity in Thailand

### 3.3 CLIMATE

83 Thailand may be divided into three seasons as follows:

- a. Rainy or southwest monsoon season (mid-May to mid-October). The southwest monsoon prevails over Thailand and abundant rain occurs over the country. The wettest period of the year is August to September. The exception is found in the Southern Thailand East Coast where abundant rain remains until the end of the year that is the beginning period of the northeast monsoon and November is the wettest month;
- b. Winter or northeast monsoon season (mid-October to mid-February). This is the mild period of the year with quite cold in December and January in upper Thailand but there is a great amount of rainfall in Southern Thailand East Coast, especially during October to November; and

- c. Summer or pre-monsoon season, mid-February to mid-May. This is the transitional period from the northeast to southwest monsoons. The weather becomes warmer, especially in upper Thailand. April is the hottest month.
- 84 The project area usually experiences a long period of warm weather due to its inland locations and latitude. March to May are the hottest period of the year, when maximum temperatures can be up to 40°C. The onset of the rainy season reduces the temperatures from mid-May. In winter the outbreaks of cold air from China reduce temperatures. The mean monthly temperature varies in a range of 24.6 - 30.7°C. Figure 7 shows mean temperature across two of the provinces in the project area, Phisanulok and Sukhothai.
- 85 Cloud cover is normally less from November to March. Most clouds in this period are high clouds but cumulus and cumulonimbus also occur. During the southwest monsoon, most clouds are convective clouds. During this period, the project area receives lower sunshine hours/day. The mean monthly cloudiness varies in a range of 2.5–8.3 oktas in the 10-class scale. The average sunshine hours/day is shown in Figure 8 while Figure 9 shows the mean sunlight hours/month across the year.
- 86 The project area usually experiences dry weather in winter because of the northeast monsoon which is a main factor that controls the climate of this region. Summer is characterised by increasing rainfall with thunderstorms. The onset of the southwest monsoon leads to heavier rainfall from mid-May through to early October; with rainfall peaking in August and September. Mean and annual rainfall are shown in Figure 10 and Figure 11 respectively.
- 87 Based on the high rainfall above and seasonal temperatures, the project area is covered by warm and moist air in most periods of the year. The mean monthly relative humidity varies in a range of 66.8–83.3%. The mean monthly evaporation varies in a range between 115.9 and 181.8 mm and this is shown in Figure 12.
- 88 Surface wind directions is characterised by the monsoon systems. The prevailing winds during the northeast monsoon season are mostly north and northeast in the project area. In summer, prevailing wind are mostly south. The mean monthly wind speed varies in a range of 1.1–2.5 knots. And are shown in Figure 13



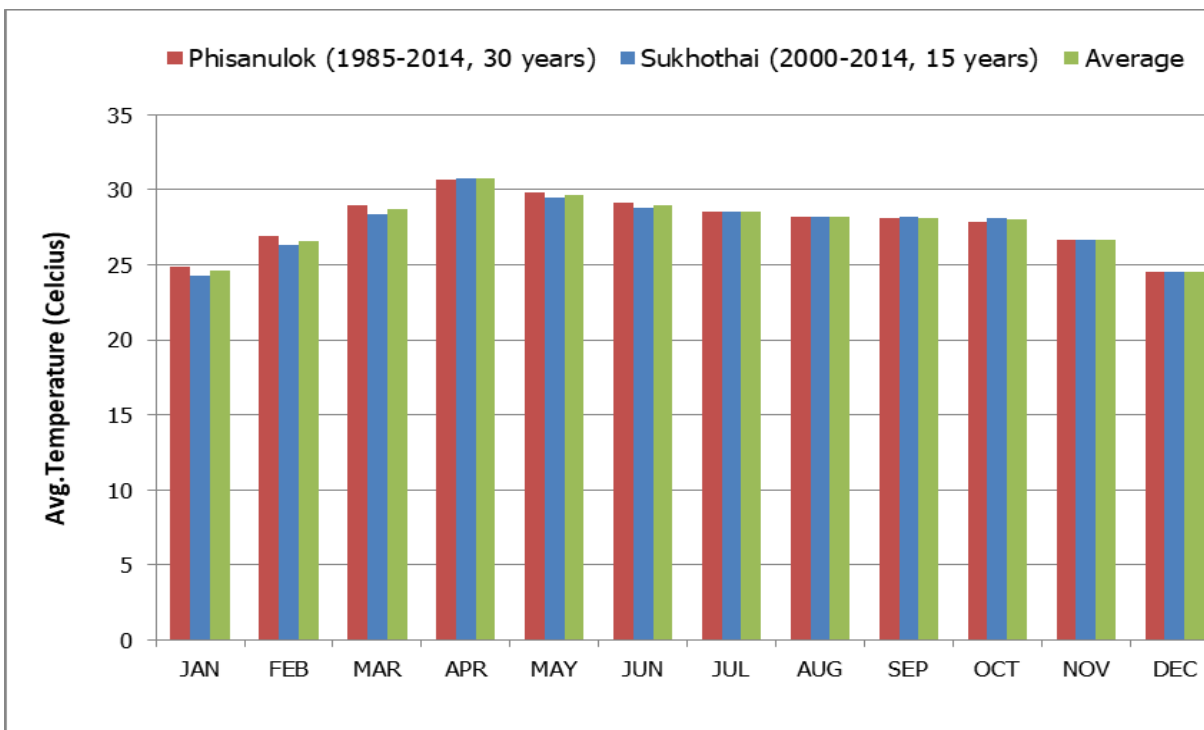


Figure 7 Mean Temperature across Phisanulok and Sukhothai

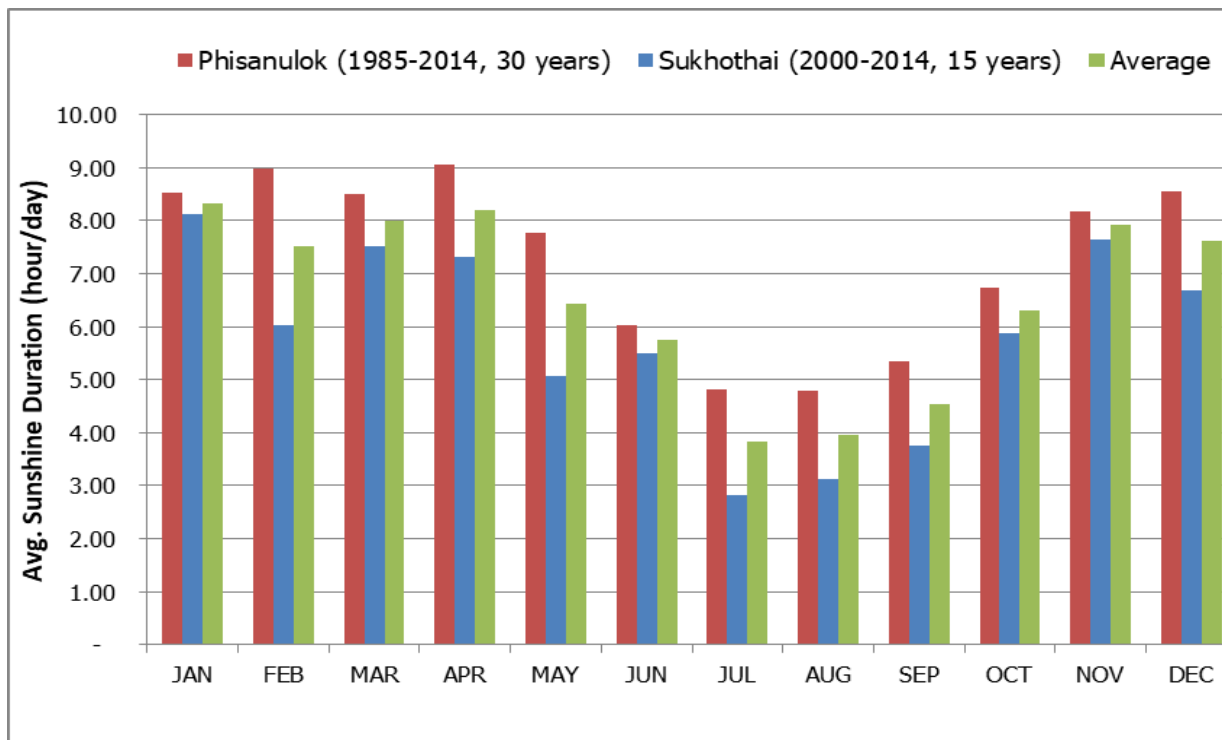


Figure 8 Mean Daily Sunshine Duration across Phisanulok and Sukhothai

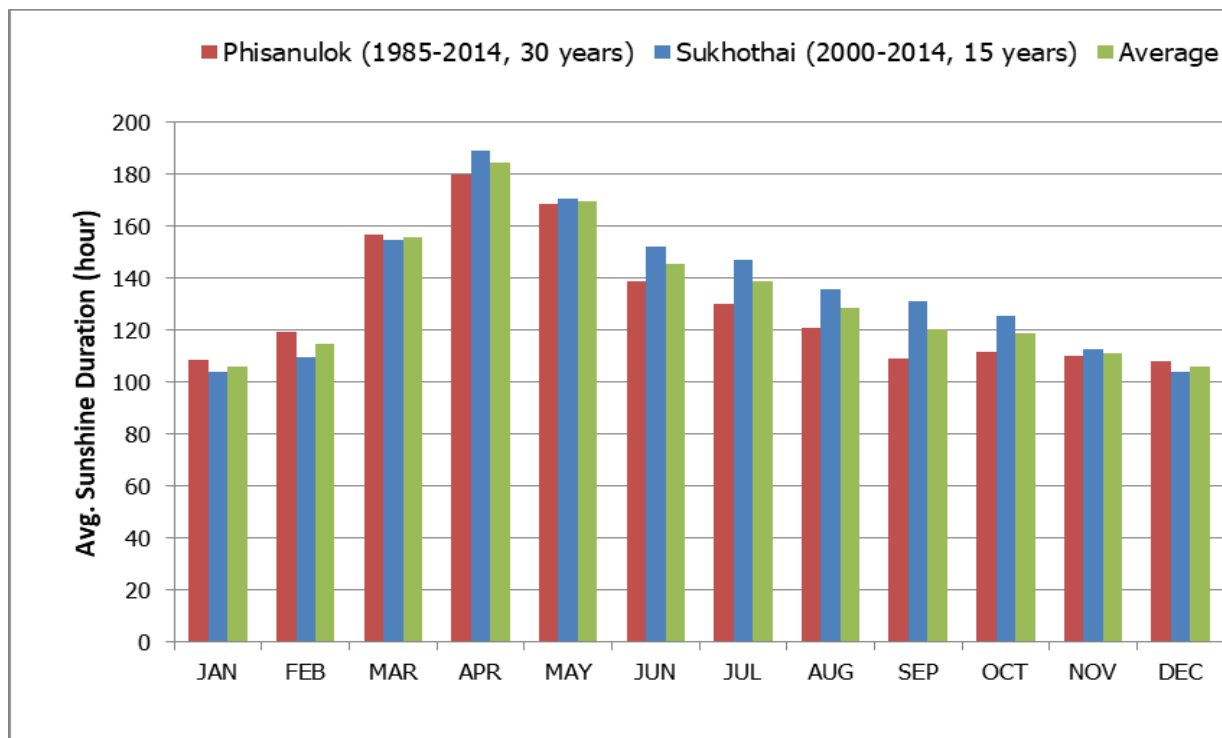


Figure 9 Mean Monthly Sunshine across Phisanulok and Sukhothai

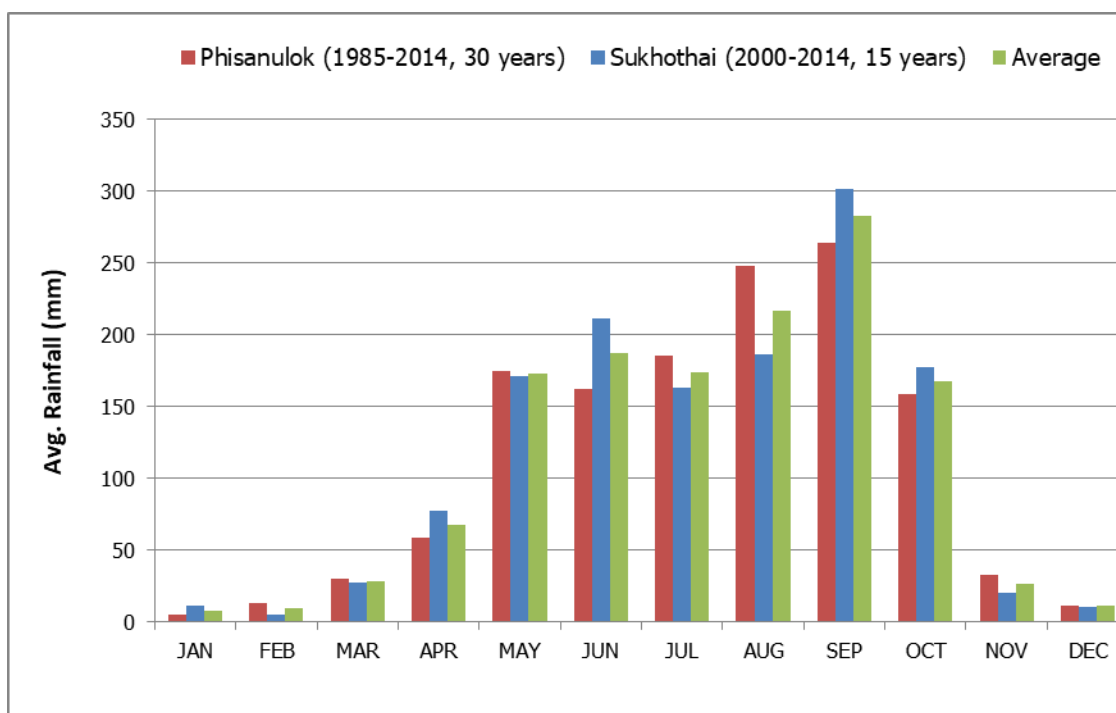


Figure 10 Mean Monthly Rainfall across Phisanulok and Sukhothai

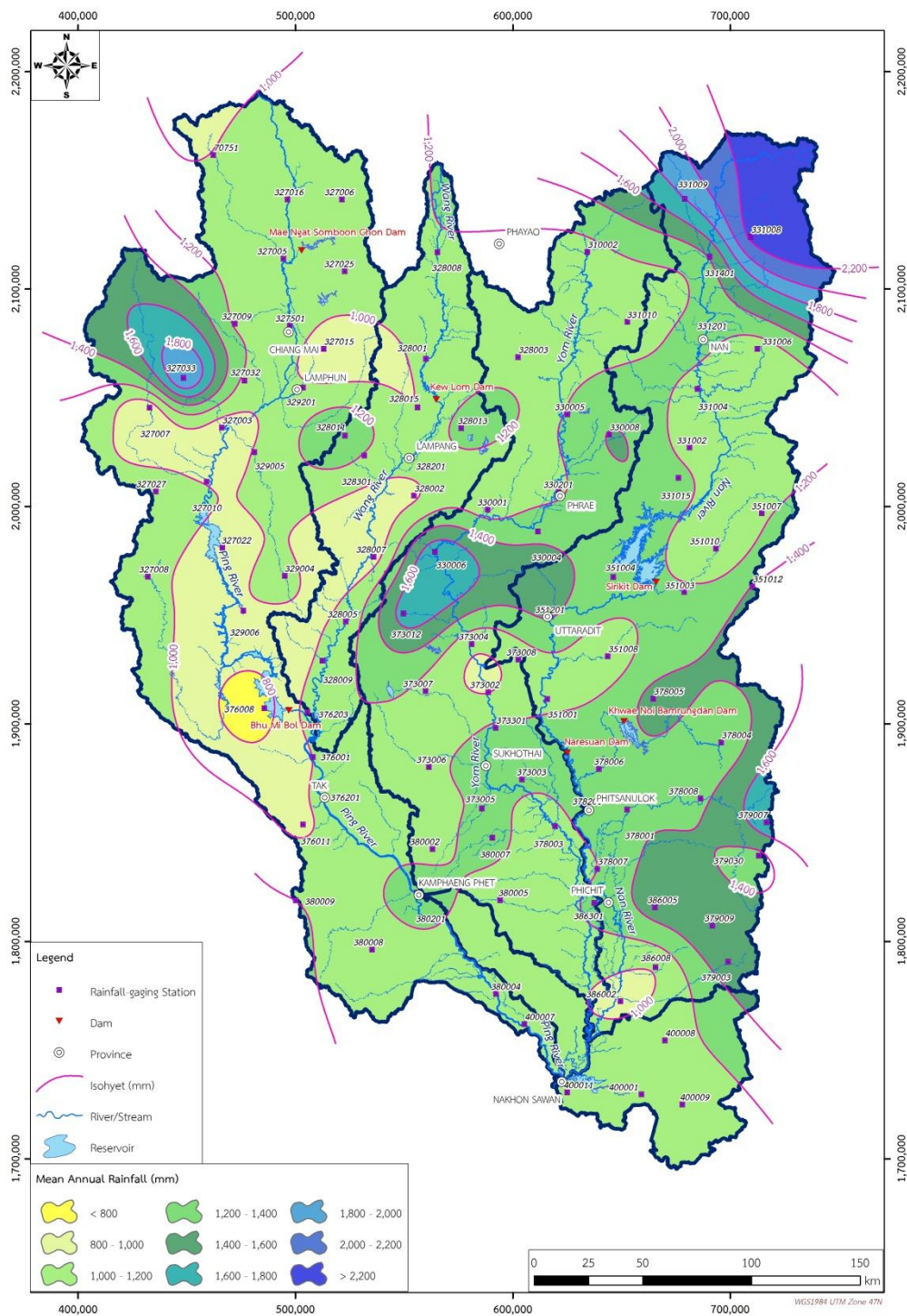


Figure 11 Annual Rainfall across the Project Area

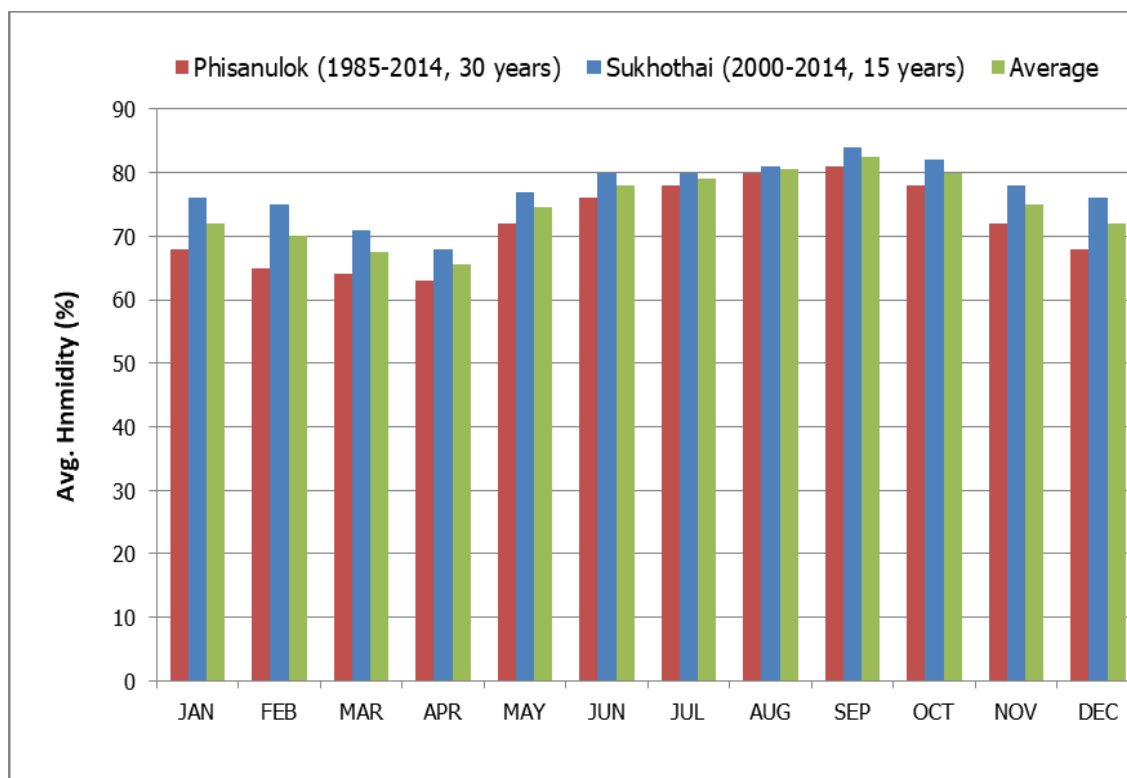


Figure 12 Mean Monthly Humidity across Phisanulok and Sukhothai

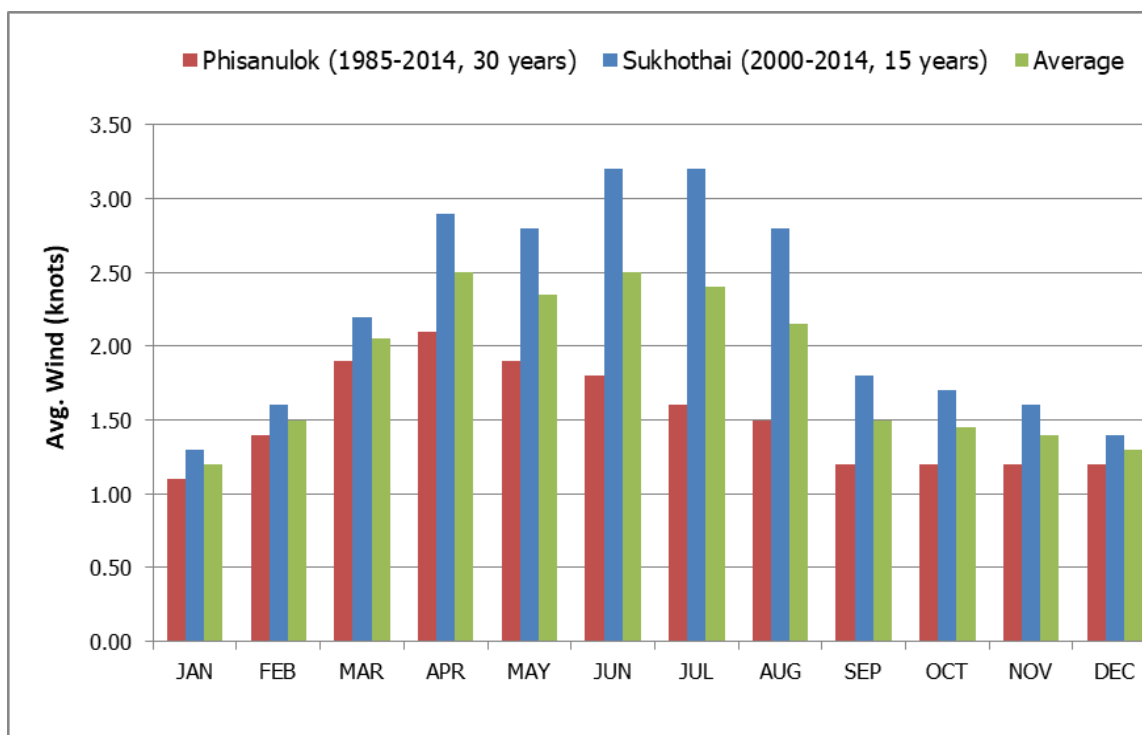


Figure 13 Mean Monthly Wind Speed across Phisanulok and Sukhothai

### 3.3.1 2016 Climate Data

89 In 2016, the majority of Thailand was warm and much wetter by contrast to historical averages. The annual mean temperature of 28°C, which was about 1°C above historical averages, and the warmest year in Thailand based on 66 years' of records. The mean temperature was above normal for all months especially April and May which was 2.2 and 1.8°C above means respectively. The maximum temperature reached the new highest record in several areas. Figure 14 shows the mean temperatures across Thailand in 2016 while Figure 15 and Figure 16 show monthly mean and mean temperature anomalies in 2016 respectively. Within the project area, there was an increase of at least 0.5°C across the year.

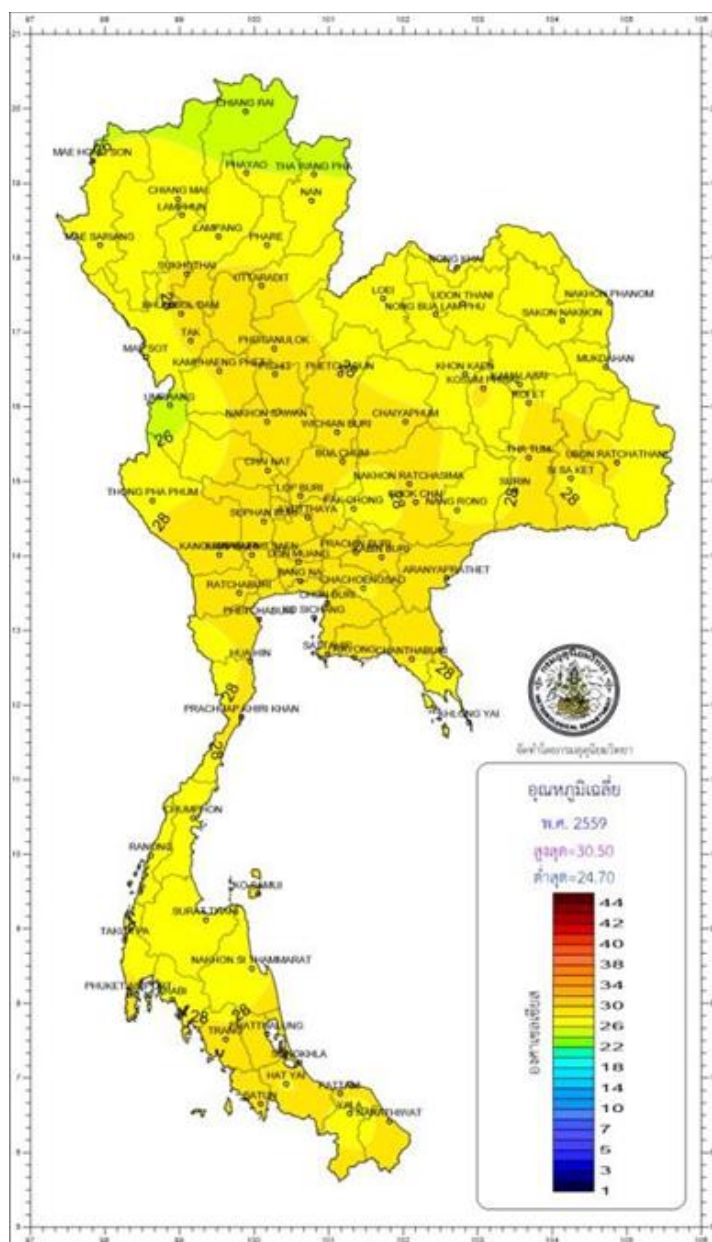


Figure 14 Annual Mean Temperature (°C) in 2016



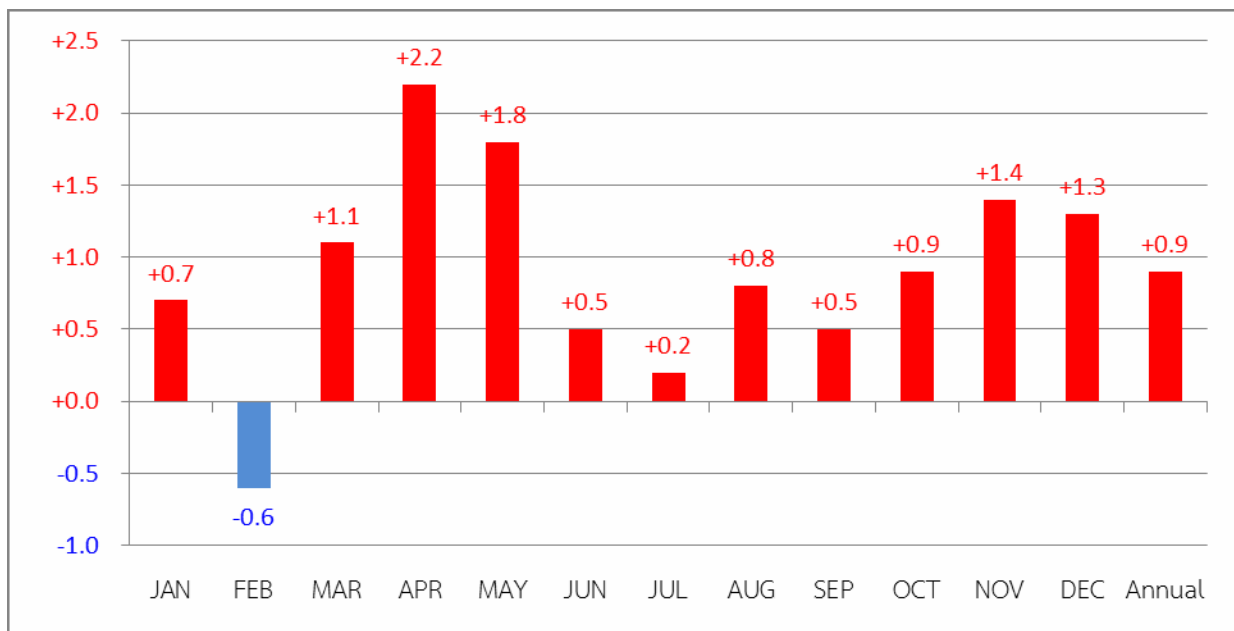


Figure 15 Thailand's Monthly Mean temperature Anomalies (°C) in 2016

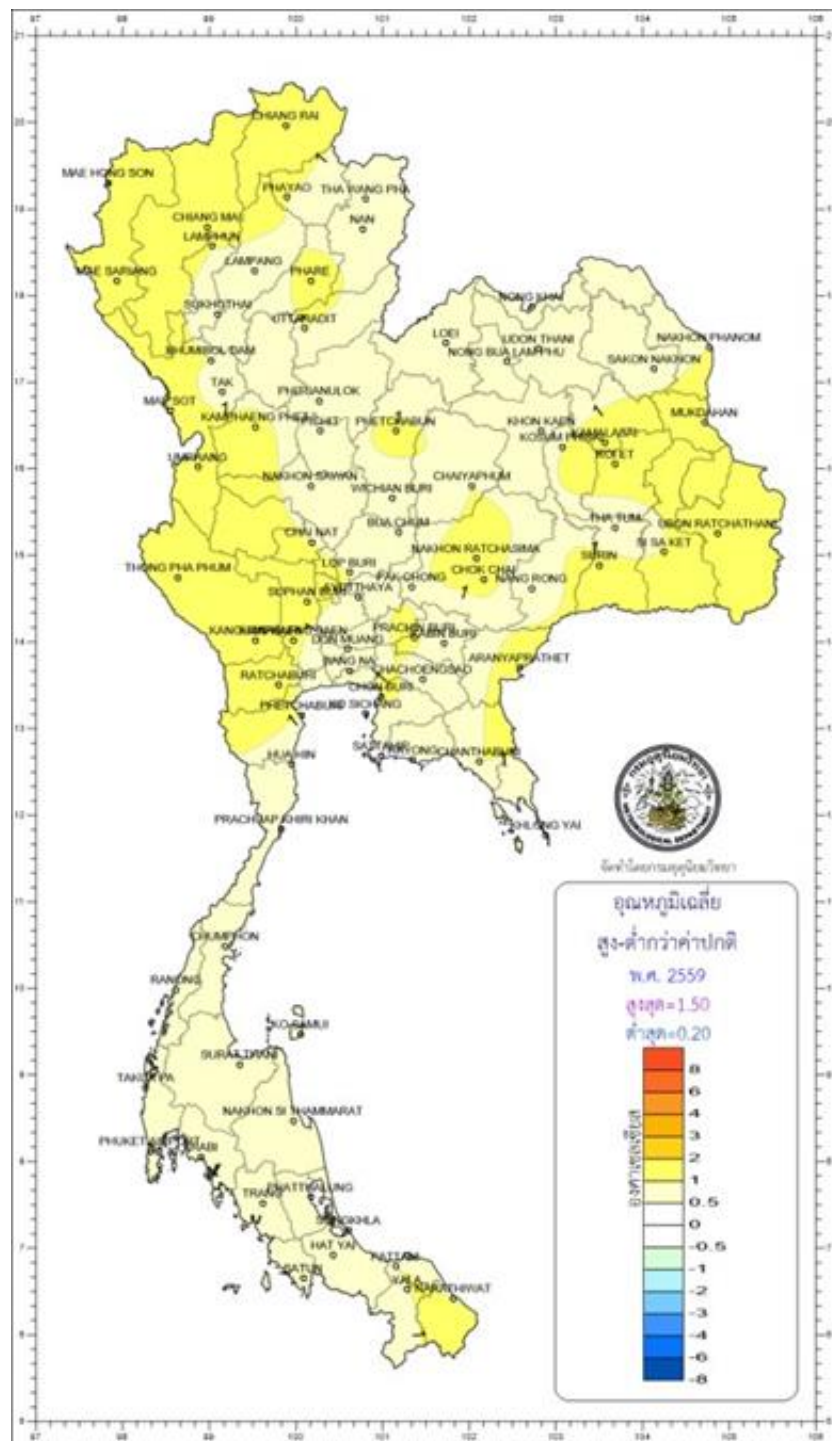


Figure 16 Annual Mean Temperature anomalies (°C) in 2016

90 Annual rainfall across Thailand in 2016 averaged 1,718.1mm, this being 130.4mm (8%) above the 1981-2010 means. Figure 17 and Figure 18 show monthly mean and mean rainfall anomalies in 2016 respectively. Within the project area, there were upward and downward anomalies.

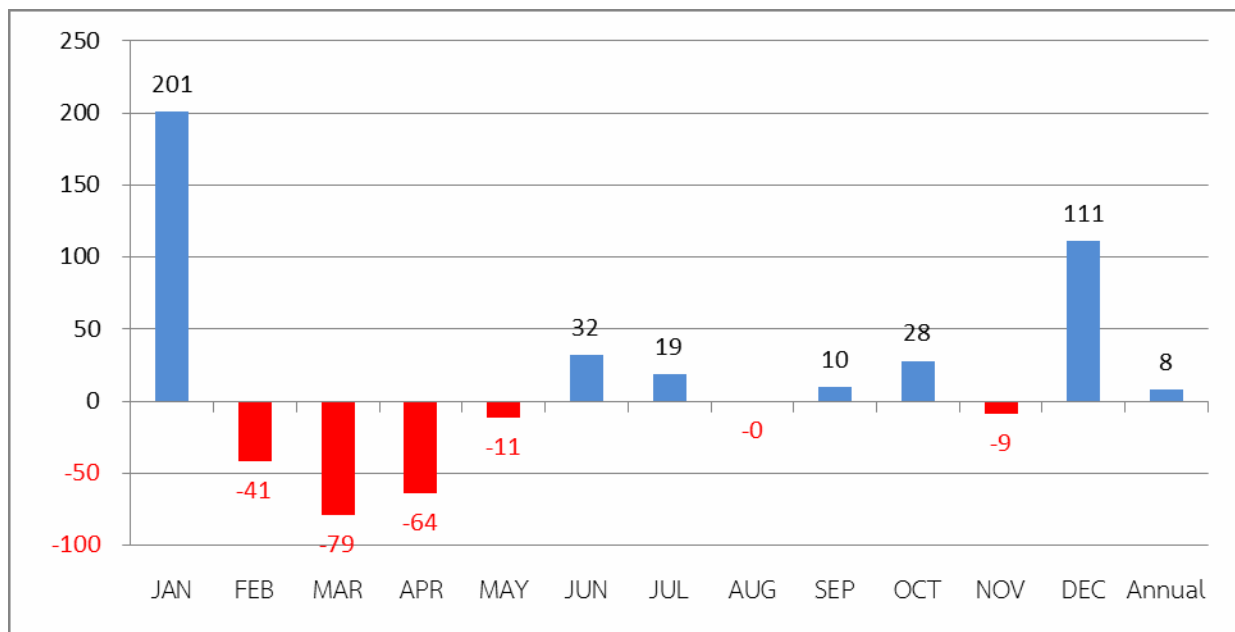


Figure 17 Thailand's Monthly Rainfall Anomalies (%) in 2016

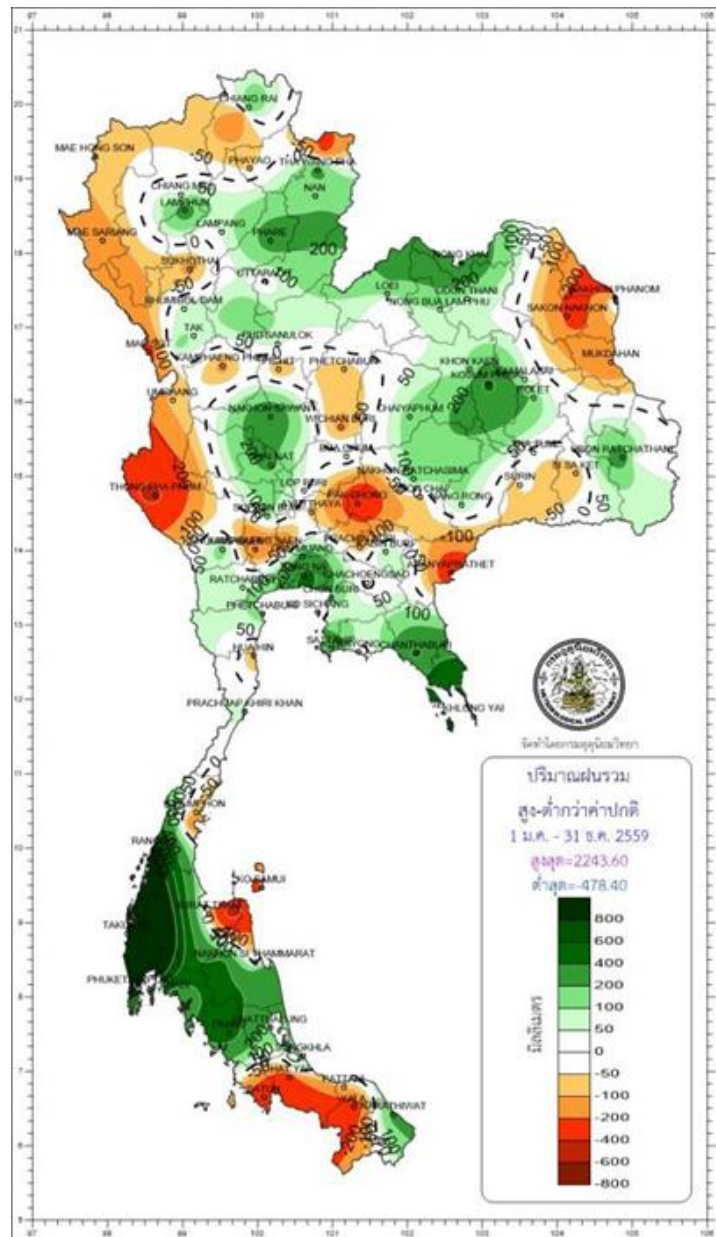


Figure 18 Annual Rainfall Anomalies (mm) in 2016

### 3.4 AIR QUALITY

- 91 The major source of air pollution in Thailand is from vehicle emissions (carbon monoxide (CO), nitrogen oxides (NOx), sulphur dioxide (SO<sub>2</sub>), hydrocarbons (volatile organic compounds and methane), soot, benzoapyrene and carbon dioxide (CO<sub>2</sub>), lead).
- 92 No air quality data has been collect for the preparation of the ESMF. However, due to the limited urban development and heavy industry, air quality is considered to be relatively good.

### 3.5 AMBIENT NOISE

- 93 No noise data has been collected for the preparation of the ESMF. However, due to the limited urban development and heavy industry, environmental noise is considered to be relatively low.

### 3.6 VISUAL AMENITY

- 94 No visual amenity assessment has been conducted for the preparation of the ESMF. However, due to the limited urban development and heavy industry, and that the majority of the area is under agricultural land with existing structures, any change to visual amenity is considered to be relatively low.

### 3.7 HYDROLOGY

- 95 Based on the annual runoff data between 1972 and 2014 after the completion of Sirikit Dam, the changing trend of runoff during the 42-year period was analysed by linear method. The results suggest that the runoff has increased on average by 7.83%/year, and the moving average for every 10 years tends to increase by 0.08% per year on average. When rainfall tends to increase, runoff will increase accordingly.
- 96 Based on the flood data at different return periods from May to November for the 42-year period (1972–2014), the flood frequency analysis was performed using the Gumbel Distribution method. The result revealed that the flood volume in 2011 was 41,127.25 million m<sup>3</sup> which corresponded to the 130-year return period.
- 97 An analysis of natural runoff in the sub-basins during the 30-year period (1985-2014), the average annual runoff in the project area is 36,545.01 million m<sup>3</sup>, of which, 86% is generated in the rainy season (May–October). The maximum runoff is observed in September and the minimum runoff in March.
- 98 Due to the topographic conditions, in the rainy season every year, the project area is generally inundated from the overbank flow, especially in the convergence of major rivers, where the water level is higher. In years of high rainfall, large area of lands will be flooded with the depth of 0.5m to 3m for many days.

### 3.8 SURFACE WATER

- 99 There are two major rivers in the project area. These include the Yom and Nan Rivers.

#### 3.8.1 Yom River

- 100 The Yom River is a flood plain river. The Yom River basin has an average elevation of 60–30 m above mean sea level. The Yom River flows mainly from the north to the south; however, it flows north to the northeast from about Mueang Sukhothai district to Bang Rakam district, Phitsanulok province before returning to its southerly direction until it converges with the Nan River in Chum Saeng district, Nakhon Sawan province.
- 101 The Yom River has a number of medium and small-scale reservoirs and weirs that block natural water flows. The river has also been channelized which creates different channel capacities. The upstream channel capacity ranges from 1,000-2,000cm/s and gradually reduces until the confluence with Nan River which has the channel capacity of 400-600cm/s. As a consequence, floodwater cannot be drained in time in the event of overbank flooding of the Yom River, especially in Si Samrong and Mueang Sukhothai districts in Sukhothai province; and Bang Rakam district in Phitsanulok province which are flooded every year.



102 Based on the Regional Environmental Office 2's surface water quality report, the overall water quality in the Yom River in 2016 was "fair" and considered as the surface waters class 3. The major parameters which affected the surface water quality included Total Coliform Bacteria (TCB), Ammonia, Biological Oxygen Demand (BOD), and Fecal Coliform Bacteria (FCB). The surface water quality, especially in the river section that traverses densely-populated communities, e.g. Mueang Sukhothai district, was highly deteriorated throughout the year due to low water volume in the river course. Water quality problems were also observed in other areas when water volume was low. In the upstream farmlands, water quality deterioration was found during flood occurrence as sediments flowed into water sources.

### 3.8.2 Nan River

103 Like the Yom River, the Nan River is a flood plain river. Again like the Yom, the river flows from the north to the south until it converges with the Ping River in Mueang Nakhon Sawan district, which is the start of the Chao Phraya River. The average elevation of the project area from the north to the south before it converges with the Nan River is 50–20 m above mean sea level. Natural rivers, such as the Khwae Noi River, the Wang Thong River, the Wang Chompu River, the Yom River flow into the Nan River.

104 The Nan River has numerous human made structures along its length that restrict flow. The Sirikit, Naresuan and Khwae Noi Bamrungdan Dam are very important reservoirs. Discharges from the reservoirs during floods and water volume from emergency spillway are often uncontrollable. The downstream channel capacity ranges from 1,222-1,500cm/s, which is not sufficient to store water, leading to overbank flooding and severe damage in Phrom Phiram, Mueang Phitsanulok, Mueang Phichit, Bang Mun Nak, Chum Saeng, and Mueang Nakhon Sawan districts.

105 The Regional Environmental Office 3 monitored the water quality of the Nan River in Phitsanulok and Phichit provinces. The overall water quality in Phitsanulok province in February 2016 suggested water quality had deteriorated. BOD and the lead concentration exceeded the established standards in the waterway in front of Sawangarom Temple and Phothiyan Temple in Mueang Phitsanulok district. The cadmium concentration was also found higher than the standards. The overall water quality in May 2016 was fair and the cadmium concentration in waterway in front of Phothiyan Temple in Mueang Phitsanulok district was greater than the standards. In August 2016 (the rainy season), the overall water quality was good; however, in Phichit province, the overall water quality in February 2016 (dry season) had deteriorated from previous sampling.

106 While no sampling and analysis has been undertaken in the preparation of this ESMF, it is likely that the water quality within the canals has been somewhat contaminated through the use of agricultural fertilisers, pesticides and herbicides that are used by landholders in the region and the overland flow of these attached to soils during high rainfall events.

## 3.9 GROUNDWATER

107 Aquifers in the project area include Younger Terrace Deposits Aquifer (Qyt) and Floodplain Deposits Aquifer (Qfd). Some parts of the project area are formed by Permian Carbonate Aquifer (Pc) and Colluvial Deposits Aquifer (Qcl).

108 Groundwater has been assessed both during the dry and rainy seasons. During the rainy season, groundwater samples were contaminated with heavy metals, including iron. The concentration of manganese exceeds the groundwater quality standards at one sampling location. Turbidity exceeded the Ministry of Natural Resources and Environment's Notification on Criteria and Preventive Measures with Respect to Public Health and Prevention of Polluted Environment B.E. 2551 (2008) groundwater

quality standards for consumption. Further, total coliform, E.coli, and bacteria exceeded standards at numerous locations. Similar results were observed in the dry season.

109 The project is unlikely to interact with groundwater.

### 3.10 TERRESTRIAL FLORA AND FAUNA

110 There are over 300 plant species in the project area. The species include 100 species of trees (Indian Mulberry, Cape of Good Hope, Java Plum, Neem Tree, Manila Tamarind, Indian Almond, etc.); 147 species of shrubs/herbs (Orchid Tree, Rose of Sharon, Brinjal, Thai Basil, Bitter Bush, etc.); 13 climbing species (Ivy Gourd, Butterfly Pea, Dragon Fruit, Bitter Gourd, etc); 33 species of grasses including Ya Preak (*Cynodon dactylon*), Ya Kha (*Imperata cylindrica*), Ya Khachon Chob (*Pennisetum pedicellatum*), Ya Tin Nok (*Eleusine indica*, etc.); four species of ferns including Kare Karon (*Cymbidium aloifolium*), Kratae Tai Mai (*Drynaria quercifolia*), Ya Yai Phao (*Lygodium flexuosum*), and Ho Khao Sida (*Platynerium coronarium*); and six species of palms (Mak Nuan (*Veitchia merrillii*), Mak Luang (*Dypsis lutescens*), Tan Tanot (*Borassus flabellifer*).

111 A study of plant status in the project area pursuant to the Royal Decree Prescribing Prohibited Woods B.E. 2530 (1987), indicated that there were no prohibited wood type B. Prohibited wood is rare wood or wood worth of conservation. Logging of this type of wood is prohibited unless the Minister grants permission which is only given in special cases.

112 Prohibited wood type A is a tree species that requires permission from a competent official to be logged or is subject to a concession under the provision of the Forest Act. There are 36 species are found, all being perennial trees, including but not limited to Tako Na (*Diospyros rhodocalyx*), Ratcha Phruek (*Cassia fistula*), Sattaban (*Alstonia scholaris*), Daeng (*Xylia xylocarpa*), Tiew Khao (*Cratogeomys formosum*), Krathom Mu (*Mitragyna rotundifolia*), Chanuan (*Dalbergia nigrescens*), Inthanin Bok (*Lagerstroemia macrocarpa*), Yom Hin (*Chukrasia velutina*), and Khang (*Albizia lebbbeckoides*).

#### 3.10.1 Amphibians and Reptiles

113 The project area is known to be the home to at least 17 species of reptiles including the Indo-chinese Rat Snake (*Ptyas korros*), Common House Gecko (*Hemidactylus frenatus*), Flat-tailed house gecko (*Hemidactylus platyurus*), Tokay Gecko (*Gekko gecko*), Variable Skink (*Mabuya macularia*), Garden Lizard (*Calotes mystaceus*), Amboina box turtle (*Cuora amboinensis*) the Indo-Chinese forest lizard (*Calotes mystaceus*) Oriental garden lizard (also known as the eastern garden lizard or changeable lizard - *Calotes versicolor*) Asian water monitor (*Varanus salvator*), sunbeam snake (*Xenopeltis unicolor*). A number of these species are protected.

114 There are 11 species of amphibians found in the project area including the Marsh Frog (*Fejervarya limnocharis*), Paddyfield Puddle Frog (*Occidozyga lima*), Paddyfield Puddle Frog (*Occidozyga lima*), Marten's Puddle Frog (*Occidozyga martensii*), Dark-sided Chorus Frog (*Microhyla heymonsi*), Berdmores Chorus Frog (*Microhyla berdmorei*), Lowland Frog (*Hoplobatrachus rugulosa*), Paddy field Green Frog (*Rana erythraea*), and Noisy Frog (*Microhyla butleri*). Ten of them are regarded as Least Concern species.

#### 3.10.2 Avian Fauna

115 Approximately 122 bird species are known to occur in the project area. Species include the Great Egret (*Casmerodius albus*), Black-shouldered Kite (*Elanus caeruleus*), falcated duck (*Anas falcata*), Baya Weaver (*Ploceus philippinus*), Intermediate Egret (*Mesophoyx intermedia*), Asian openbill (*Anastomus oscitans*), and Red-wattled Lapwing (*Vanellus indicus*).

116 Of the 122 species, 116 species are protected animals and 2 species, the Barn Owl (*Tyto alba*) and Baya Weaver (*Ploceus philippinus*) are near threatened.

### 3.10.3 Terrestrial Mammals

117 There are 12 species of mammals within the project area including the Northern Treeshrew (*Tupaia belangeri*), Asiatic Greater Yellow House Bat (*Scotophilus heathii*), Common Rat (*Rattus rattus*), Lesser Ricefield Rat (*Rattus losea*), Pacific Rat (*Rattus exulans*) Pallas's Squirrel (*Callosciurus erythraeus*), and Indochinese Ground Squirrel (*Menetes berdmorei*). The Asiatic Greater Yellow House Bat (*Scotophilus heathii*), and Variable Squirrel (*Callosciurus finlaysoni*) are listed protected animals.

118 There are two protected areas in proximity to the project area; however no activities will be undertaken in the two protected areas. Figure 19 shows the national parks in the project area while Figure 20 shows the national reserved forests in the project area.







GREEN  
CLIMATE  
FUND

## Annex 6(b) – Environmental and Social Management Framework

Green Climate Fund Funding Proposal

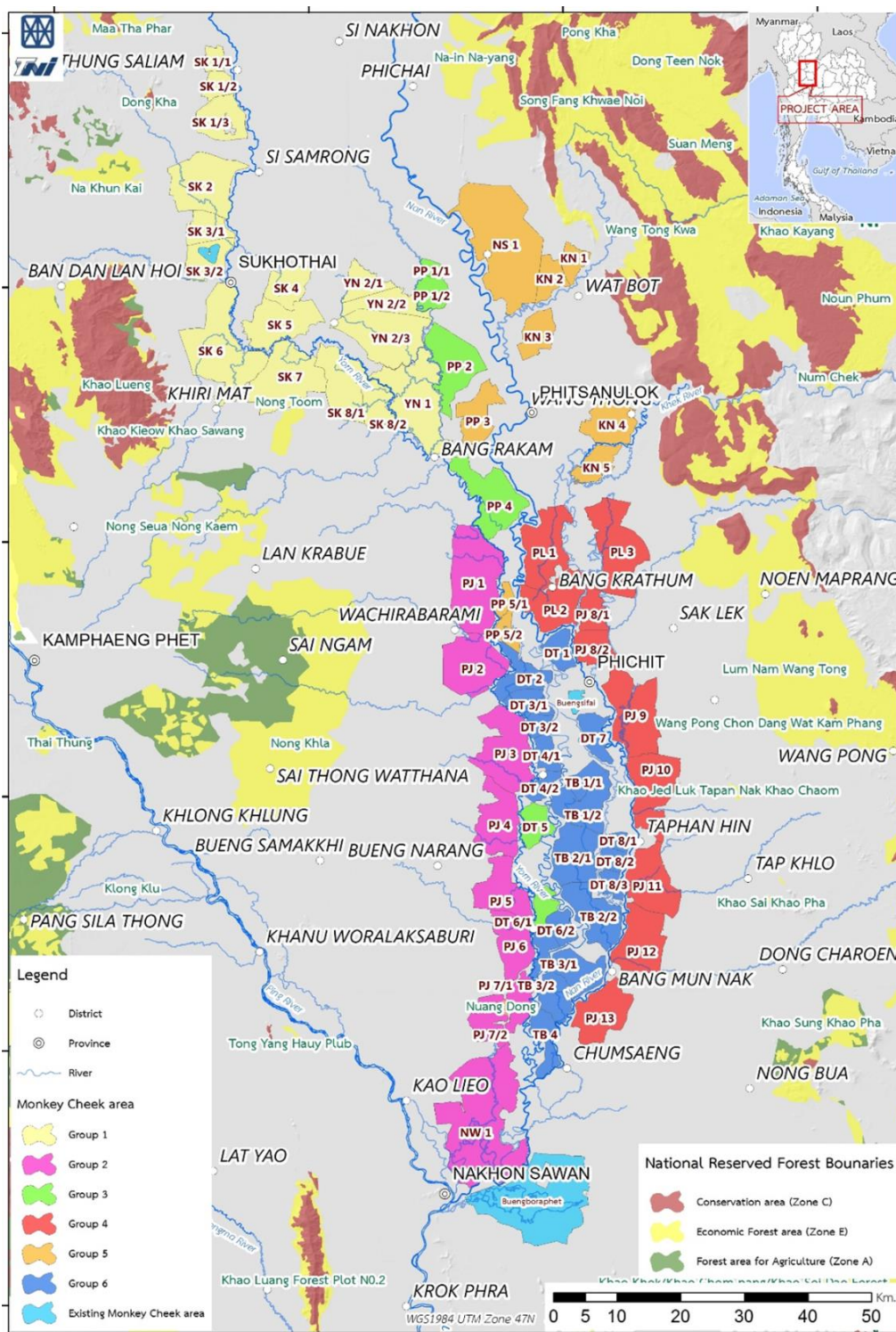


Figure 20 National Reserved Forest Boundaries in the Project Area



### 3.11 AQUATIC FLORA AND FAUNA

- 119 Surveys of aquatic ecology and fish in the project area have previously been conducted in the three seasons: summer, rainy season, and winter. The surveys were undertaken at ten sites.
- 120 Benthos observed during the surveys include freshwater crabs (*Siamthelphusa* spp.), shrimps (*Macrobrachium* spp.), Oligochaeta, gastropods; bivalves, Chironomidae and naiad dragonflies
- 121 The highest fish diversity was observed in winter (November 2016). During the surveys, 70 species in 21 families were observed, 31 species of which in Cyprinidae family, seven species in Bagridae family, six species in Osphronemidae family, four species in Cobitidae family, and three species in Mastacembelidae family. In March 2017, there are 54 fish species in 17 families, 27 species of which in Cyprinidae family, five species in Cobitidae family, four species in Osphronemidae family, and three species in Gobiidae family. In July 2016 (rainy season), there are 52 fish species in 19 families, 22 species of which in Cyprinidae family, 6 species in Osphronemidae family, 4 species in Mastacembelidae family, and 3 species in Schilbeidae family. The fish in Cyprinidae family are the most common as this family consists of many species and can live in both still and running water. Besides, they can eat various kinds of food, including phytoplankton and small aquatic animals.
- 122 Most of fish species observed are generally found in the natural water body in the project area. Rare fish species or native-fish species were observed.
- 123 There are no Ramsar sites listed under the Ramsar Convention in the project area.
- 124 The project area contains a number of wetland areas according to the Cabinet resolution dated 1 August 2000 and 3 November 2009. The internationally listed wetlands are Yom River Floodplain, Beung Si Fai and Beung Boraphet, while the nationally listed wetland is Yom River. The Yom Basin includes the Bueng Takhreng, Bueng Raman, Nong Thale Kaeo, and Bueng Mae Rahan wetland areas; often know as monkey cheeks. They are important habitats for wetland avian species.
- 125 As an example, Bueng Boraphet is economically significant, especially for fishery. With high biodiversity, there are swamp forest, scrub forest and field of lotus flowers. Sediments and plant nutrients are carried with water from various channels flowing into the swamp, bringing about abundant aquatic plants and animals. It is also the place for birds to lay eggs and seek for food. Approximately 44 fish species, including Siamese tigerfish, burnt-tailed barb, and small scale mud carp have been observed. At least 73 species of plants are present. Currently, Bueng Boraphet is the tourist site and ecosystem learning site. It has been declared as a non-hunting area and only fishery by using the designated fishing gears is allowed. Figure 21 shows the wetlands in the project area.

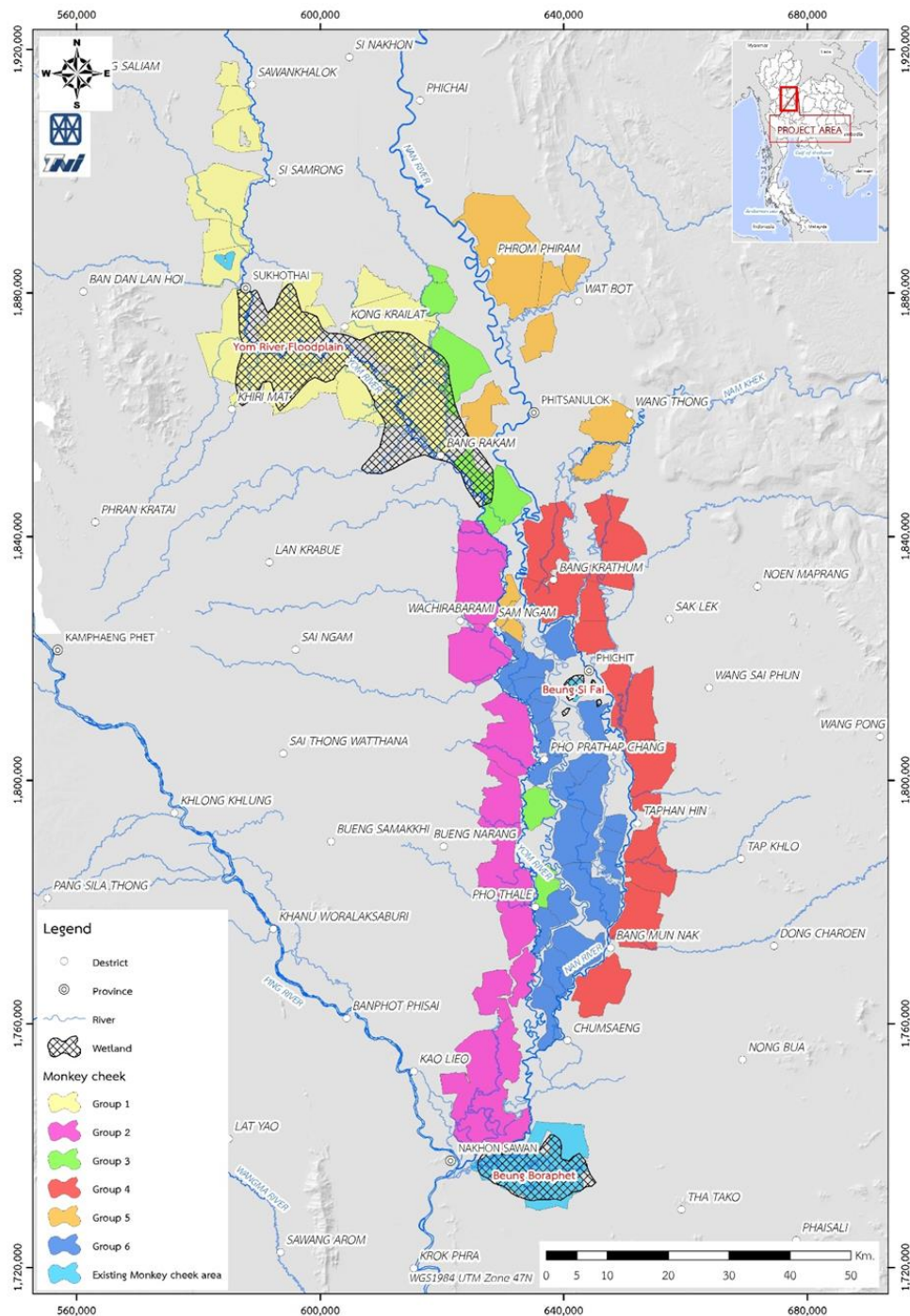


Figure 21 Wetlands in the Project Area

### 3.12 FISHERIES

126 Fishery is conducted in local communities especially around the Yom River in Sukhothai and Phitsanulok provinces. Twelve kinds of fishing gears are used in the project area, including casting net, gill net, longline, seine, set bag net, fish trap, push net, fish trap, bamboo fish trap and single hook. Casting net and gill net are generally used. April provides the lowest productivity while December is when the fisheries are at their highest productivity.

127 Aquaculture is undertaken in the project area. Fish farming is undertaken in earthen and/or cement ponds. Fish species generally reared are Nile Tilapia, Common Carp, Silver Barb, Striped Catfish, Hybrid Catfish, etc. Around Bueng Boraphet wetland, there are numerous rearing ponds for Silver Barb, Nile Tilapia, Seven-striped Barb, Catfish, Striped Catfish, and small scale Mud Carp.

### 3.13 LAND USE

128 The land surround the project intervention sites is predominantly agricultural land, particularly rice paddy fields, with some orchards and field crops.

129 The project area is classified as rural area and agricultural land where agricultural development undertaken in accordance with the provincial comprehensive plan. Some areas are designated as urban development/community zone pursuant to the provincial comprehensive plan.

130 According to the survey of agriculture in the project area, major cash crops include rice, corn, and sugarcane. Important fruits are mango and pomelo. Most farmland is mainly composed of in-season rice field, followed by lowland rice field, cultivated areas for vegetables, field crops, fruit-trees, tree crops, areas for animal husbandry and aquaculture respectively.

131 Planting season and plant varieties are different across the project area. Interviews with local farmers suggested that the average cost of rice farming is about 3,600-4,250 Baht/rai. The rent of paddy fields is about 1,000-1,200 Baht/time/rai. The average yields of in-season rice are 600-770 kg/rai and those of off-season rice are 655-790 kg/rai. The prices are in a range of 9,800–11,000 Baht/ton or about 5,900–8,500 Baht/rai (in-season rice) and 6,400-8,700 Baht/rai (off-season rice).

### 3.14 POPULATION AND GENDER

132 The project areas and the beneficial areas are included in three provinces: Sukhothai, Phitsanulok, and Utharadit. According to 2015, census data, there are 62,000 direct beneficiaries living in 20,000 households. The disaggregated data indicated that there are 29,896 males and 32,104 females. Table 1 shows the disaggregated data across the project area. The average household size is three to four persons, with two to three persons earning an income

Table 1 Population and Gender Data for the Project Area

Beneficiary areas			Number of household and population			
Province	District	Sub-district	Household	Population	Male	Female
Utharadit	Phichai	Thamafuang	1,286	3,987	1,920	2,067
		Korrum	695	2,155	1,034	1,121
		Phrayaman	1,361	4,219	2,025	2,194

Sukhothai	Srinakorn	Klongmaplup	23	71	34	37
		Nongbuo	105	325	156	169
	Khongkairas	Kokrat	1,320	4,092	1,967	2,125
		Krainok	1,744	5,407	2,595	2,812
		Kraiklang	723	2,241	1,070	1,171
		Krainai	317	983	472	511
		Baanmaisukasem	1,272	3,943	1,899	2,044
		Dongdoei	44	136	65	71
	SawankhaLok	Paknam	431	1,336	645	691
Phitsanulok	Promphiram	Nongkham	852	2,641	1,268	1,373
		Wangwoon	2,453	7,604	3,670	3,934
		Sriphirom	1,568	4,861	2,385	2,476
		Thaloktiem	1,260	3,906	1,875	2,031
		Matong	121	375	180	195
		Thachang	485	1,504	722	782
	Bangrakham	Thanangngam	1,834	5,685	2,749	2,936
		Choomsaeng songklam	1,381	4,281	2,085	2,196
		Bangrakham	99	307	147	160
	Muang	Baankrang	626	1,941	932	1,009
Total			20,000	62,000	29,896	32,104

### 3.15 EMPLOYMENT, LABOUR AND WORKING CONDITIONS

133 No specific data is available for employment numbers in the project areas. Notwithstanding, the activities will predominantly be undertaken around agricultural areas.

### 3.16 ECONOMIC ASPECTS AND LIVELIHOODS

- 134 The project area is predominantly rural in nature. Agriculture is the major occupation, representing 88% of the total occupation. The main occupation is rice farming, followed by sugarcane, banana, vegetable, fruit, lemon, maize, cassava, and animal farming. The population are employed doing general works and agricultural services as a secondary occupation. Each household possesses, on average 20.64- to 34.59 rai. The average income is in a range of 15,214–21,376 baht.
- 135 Local people experienced water shortage (41.95–92.42%) and floods (84.63-100%) during the past decade. The major causes of floods were local rains for several consecutive days and high water level in water bodies and floodwater could not be drained into. In 2011, damages from flood impacts on agriculture averaged between 61,841-119,560 baht/household.

### 3.17 INDIGENOUS PEOPLES AND ETHNIC MINORITIES

- 136 Thailand has a rich and ethnically diverse population with ethnic minorities making up around 15% of the total population. Although the Government recognises the UN Declaration on the Rights of Indigenous Peoples (UNDRIP), it does not consider ethnic minorities as indigenous peoples.
- 137 Research undertaken by Naresuan University in Phisanulok province, surveyed Tai Khrang” communities/villages and seek for the identity Tai Khrang” ethnicity in the lower northern region (general project area). Data was collected by surveying, in-dept interviewing, eliciting, participating and observing, as well as from local documents and social media. The result indicated that there are, at a minimum, 171 communities/villages located in six (6) provinces, these being Kamphaeng Phet, Uthai Thani, Nakhon Sawan, Phichit, Phisanulok and Sukhothai. The population’s identity was found as the integration of various aspects including historical background from Luang Prabang and Vientiane in Lao PDR from about 200 years ago, Teen Chok sarong with the red lower part, various ethnic names and the current tonal system.
- 138 There are no indigenous peoples and/or ethnic minorities within the project area. Thai Khrang communities/villages in Phichit, Phisanulok, Sukhothai live in highland area away from the project sites. Although this ethnic group is not in the project site, the RID will extend knowledge on EbA and smart farming to this group. Where possible, these people will be involved in project design and implementation particularly with respect to the ecosystem based adaptation activities.
- 139 All persons benefiting from the project use Thai as their native language.

### 3.18 ARCHAEOLOGICAL AND CULTURAL HERITAGE

- 140 There are 51 historical sites (47 temples and 4 religious places), three ancient places and three archaeological remains in proximity of the project area. Specifically, there are three sites within the overall project footprint.
- 141 When the level of detained water in each monkey cheeks is compared with the height of historic sites, ten temples, namely Wat Tawet Nai, Wat Thung, Wat Mem Suwannaram, Wat Mai Pho Thong, Wat Kok Rat, Wat Lang Thanon Prachasawan, Wat Tha Lor, Wat Kriang Krai Nue, Wat Bang Khian, Wat Bueng Change and two religious places, these being Mae Lon House of Priest and Ban Nong Lahan 1 House of Priest are lower than flood level. Protection for these sites will be maintained for a 1 in 50 year event.
- 142 There is one tourism popular cultural heritage sites located in the project area (Bang Kaeo Ancient Community). The Bang Kaeo Ancient Community is located in the Yom Nan Operation and Maintenance Project area (YN1), Bang Rakam sub-district, Bang Rakam district, Phitsanulok province. In the past, it was passed by the route for transportation of porcelain. At present, the ancient community is visited predominantly by tourists.



143 The location of Archaeological and Cultural Heritage sites is shown in Figure 22. A Chance Find Procedure has included in Annexure Six.

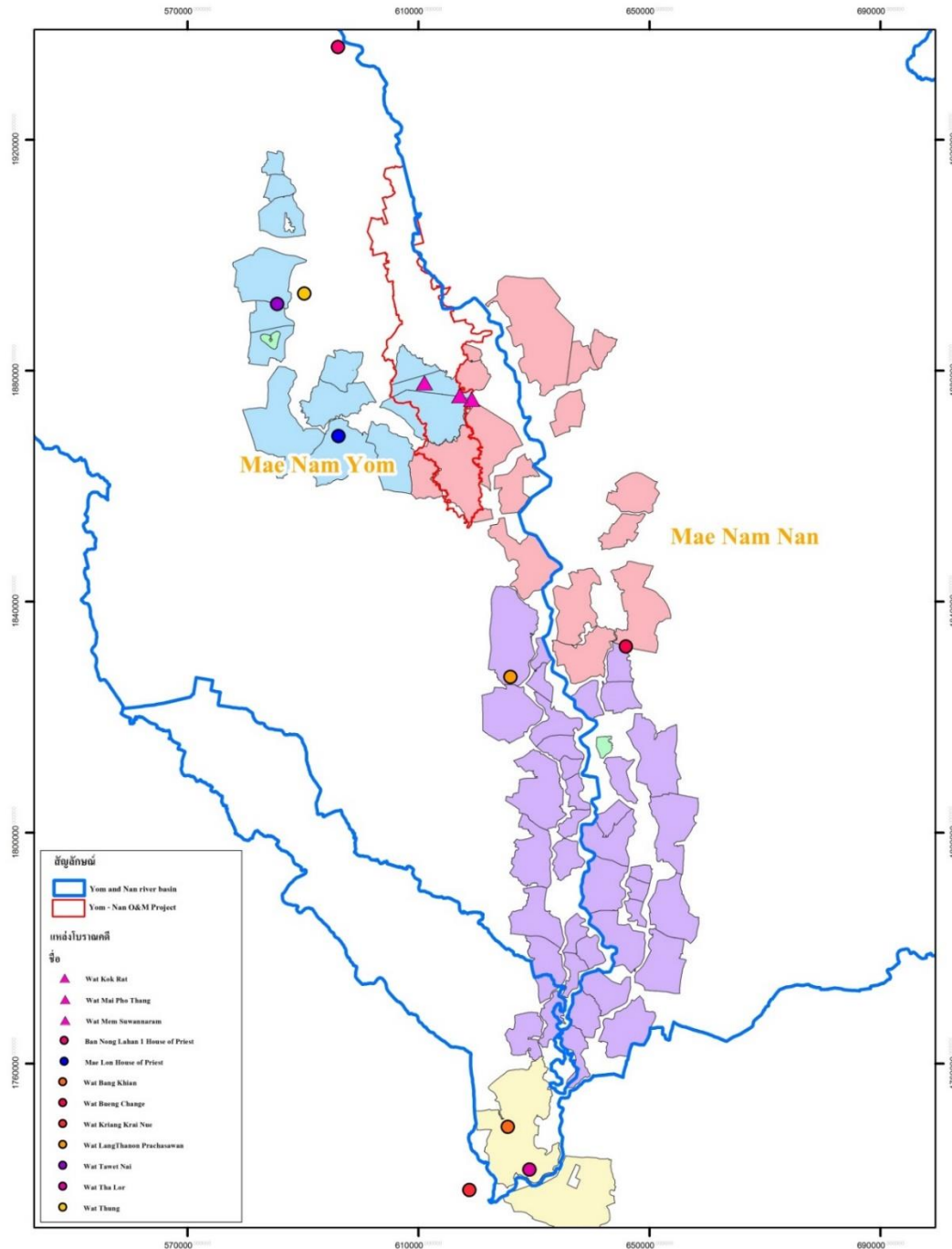


Figure 22 Archaeological and Cultural Heritage sites in the project area

## 4 ENVIRONMENTAL AND SOCIAL RISK ASSESSMENT

### 4.1 ASSUMPTIONS UNDERPINNING THE DEVELOPMENT OF THE ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK

144 The following assumptions have been made in the preparation of this ESMF:

- a. none of the interventions will require the displacement of people and/or the need for land acquisition;
- b. none of the interventions will be conducted in protected areas or sensitive locations;
- c. all material removed from the works will be remediated as required to ensure limited impact on the surrounding environment;
- d. none of the water used to recharge the groundwater aquifer will be contaminated;
- e. hydrological studies where necessary will be conducted prior to the final design to ensure stability and efficiency of the bank protection structures;
- f. none of the interventions will be in proximity to any archaeological and/or culturally sensitive location
- g. all material removed from the works for example, the river restoration works will be made available (beneficial reuse) for the use in agricultural systems or other activities following any necessary remediation;
- h. appropriate erosion and sediment control will be undertaken during all stages of the projects; and
- i. there will be no release of pollution and/or chemicals as a result of the projects.

### 4.2 IMPACT ASSESSMENT METHODOLOGY

145 An impact risk assessment was undertaken using the UNDP Social and Environmental Screening Procedure to assess the probability (expected, highly likely, moderately likely, not likely) and the impact of the risk (critical, severe, moderate, minor, negligible). From this, a significance value was attributed to the potential impact (negligible, low, medium, high and extreme).

Score	Rating
5	Expected
4	Highly Likely
3	Moderately likely
2	Not Likely
1	Slight

Table 2 Rating of Probability of Risk

Score	Rating	Definition
5	Critical	Significant adverse impacts on human populations and/or environment. Adverse impacts high in magnitude and/or spatial extent (e.g. large geographic area, large number of people, transboundary impacts, cumulative impacts) and duration (e.g. long-term, permanent and/or irreversible); areas impacted include areas of high value and sensitivity (e.g. valuable ecosystems, critical habitats); adverse impacts to rights, lands, resources and territories of indigenous peoples; involve significant displacement or resettlement; generates significant quantities of greenhouse gas emissions; impacts may give rise to significant social conflict
4	Severe	Adverse impacts on people and/or environment of medium to large magnitude, spatial extent and duration more limited than critical (e.g. predictable, mostly temporary, reversible). The potential risk impacts of projects that may affect the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples are to be considered at a minimum potentially severe.
3	Moderate	Impacts of low magnitude, limited in scale (site-specific) and duration (temporary), can be avoided, managed and/or mitigated with relatively uncomplicated accepted measures
2	Minor	Very limited impacts in terms of magnitude (e.g. small affected area, very low number of people affected) and duration (short), may be easily avoided, managed, mitigated
1	Negligible	Negligible or no adverse impacts on communities, individuals, and/or environment

Table 3 Rating of Impact of Risk

146

Impact	5					
	4					
	3					
	2					
	1					
		1	2	3	4	5
Probability						
Green = Low, Yellow = Moderate, Red = High						

Table 4 UNDP Risk matrix

147 The following section provides an overview of the likely potential impacts, both direct and indirect as well as highlighting the beneficial impacts from the project. If the avoidance and mitigation measures as highlighted below and within the ESMP are followed (see Section 8), then the project is unlikely to have a significant impact on the environment and social fabric of the project areas.

### 4.3 DIRECT IMPACTS

148 The activities will be undertaken in locations that are disturbed both natural and anthropogenic. The environmental and social impacts envisaged for the project are predominantly temporary in nature and are associated with construction activities for the river works, and access to land for both river works and forestry activities. It is currently proposed that all early warning system components will be constructed on Government land.

149 The most significant environmental and social impacts are likely to be attributed to the implementation of the priority risk reduction interventions at the thirteen (13) sites<sup>2</sup> as contained within Section 1.2.1 (Probability: 5; Impact: 3 and therefore a Risk Level: Medium). All other activities are considered to be low risk level.

150 This activity will require channel/river bank works and potential road closures to access the rivers. It will involve the removal of sediment from these environments. This might also require the relocation of services.

151 There are a number of potential impacts associated with the works including but not limited to the potential erosion and sediment movement during rainfall events and as a result of dust, all of which could have impacts on water quality, noise impacts from the use of trucks and excavators, the potential leakage of chemicals and oils, and other potential impacts. The construction activities could also result in changes to people's ability to move within the region. There is also the potential for the construction activities to generate sediment that may increase silt load through overland flow to other environments.

152 The vast majority of construction works involve the building of the river infrastructure. It is anticipated that some of the material to be used for the construction of the river works will where possible, be pre-fabricated and brought in from other locations in Thailand. The proper handling of this material, and where possible, recycling and reuse of any local materials should be considered.

153 As part of the construction of the river infrastructure that will increase water storage capacity, there will be a need to remove between 1,602,000m<sup>3</sup> and 2,670,000m<sup>3</sup> of sediment to increase the depth and water storage volume (26.7km \* between 25m and 30m wide \* between 2m and 4m deep). All of these environs are significantly disturbed from past activities. It is likely that a high percentage of the sediment to be removed will be that deposited from overland flow during flood events. Prior to the removal of any sediment, sampling and lab analysis will be undertaken to determine if any of the sediment is contaminated with anything that could cause concern for the beneficial re-use of the material. Samples will be analysed in an accredited laboratory and assessed for their suitability for future use. Given that the sediments are likely to be somewhat contaminated through the use of agricultural fertilisers, pesticides and herbicides that are used by landholders in the region and the overland flow of these attached to soils during high rainfall events, the re-use of this sediment will provide a benefit to farmers in that they will not need to use fertilisers, pesticides and herbicides in the same quantities as the soils will retain these properties.

154 The proposed river works are unlikely to impact on important ecosystems and/or habitats. The rivers have been significantly impacted by climate induced events in the past and the activities will reduce the damage caused by future events. Much of the vegetation in this area are grasses and/or agricultural crops.

<sup>2</sup> Note only 2 are proposed for the GCF project

155 All construction and operation activities have the potential to cause noise nuisance. Vibration disturbance to nearby residents and sensitive habitats is likely to be caused through the use of vibrating equipment. Blasting is not required to be undertaken as part of this project. The use of machinery or introduction of noise generating facilities could have an adverse effect on the environment and residents if not appropriately managed. The detail, typical equipment sound power levels, provides advice on project supervision and gives guidance noise reduction. Potential noise sources during construction may include:

- a. heavy construction machinery;
- b. power tools and compressors;
- c. delivery vehicles;

156 Heavy machinery and haul trucks can generate high noise levels within and along the project area and route. All machinery and vehicles used will be restricted to 7am to 5pm.

157 Air quality is unlikely to be affected due to the limited exhaust emissions from construction vehicles and machinery such as plant for excavating foundations, concrete mixers, water tankers, small cranes, dumpers, forklift for the block work and fugitive emissions from aggregates, dust from exposed soils and stock piles.

158 The project is very unlikely to result in any significant risk to water pollution from oil, grease and fuel spills, and other materials from vehicles working on site. Construction vehicles could affect water quality by accidents from vehicles carrying hazardous substances (chemicals and fuel). Oil and grease from engine leaks can pollute surface water. While it is unlikely that there will be an impact as a result of a chemical, fuel and oil spill, these lubricants need to be handled with caution and importantly, where possible, should not be brought on site. In the case of a spill, every effort must be made that it does not enter the coastal environment.

159 The project has the potential generate quantities of waste, although the quantities are unlikely to cause an environmental impact as it is anticipated some of the construction materials will be prefabricated although there may be waste from sections of the building that are built on site. The removal of existing infrastructure is likely to result in concrete and steel being removed. Where possible, large piece of concrete should be used as riverbank protection downstream of the infrastructure. Any other material from previous infrastructure should be recycled where possible including steel and concrete. There is unlikely to be contaminated material from the existing infrastructure.

160 There is the potential for impacts to people's land as a result of the need to utilise the land for access to the river works. This could result in the loss of livelihood and damage to the land. The project has developed a Livelihood Restoration Plan which should be followed. Further, access should not be undertaken with a fully signed voluntary agreement allowing access. Likewise with the ecosystem based adaptation activities, there is the potential for impacts to people's land as a result of the need to utilise the land and/or use the land for the purposes of access. This could result in the loss of livelihood and damage to the land. The project has developed a Livelihood Restoration Plan which should be followed. Access should not be undertaken with a fully signed voluntary agreement allowing access.

161 No activities will be undertaken on private property without the express approval of any land holder. No compensation will be paid to any land holder. Where agreement without compensation cannot be agreed upon, no work will be undertaken. The selection of specific sites will be based on a climate vulnerability analysis (though prioritisation) that includes interviews with the potential beneficiaries. In the case of ecosystem based adaptation activities, the analysis includes documentation of livelihoods and climate vulnerability, and soil quality and cover etc. Access to and storage of water will be a factor in determining sites. Further, ecological and physical environmental benefits will also be a factor in determining sites.

162 With respect to the installation of equipment, the main impacts associated with this activity are the installation of equipment to collect data and then the dissemination of that information in real time as



needed. As such, the activity is unlikely to have any significant impact although there is the potential, albeit small to impact the environment or land during the installation of loggers.

163 Given that the proposed EbA intervention sites are to be determined during the first year of implementation, a separate assessment will be undertaken for each site based on the information contained within this ESMF and any additional baseline data obtained consistent with para 78 of this ESMF

164 The project will not create temporary and/or permanent habitats for mosquito breeding and/or any other pests.

#### 4.4 INDIRECT IMPACTS

165 There are unlikely to be any real indirect impacts associated with the project if general care and maintenance are considered. Primarily, the project will require the importation of materials and equipment to the intervention sites. Special attention should be considered in the movement of this material including the organisation of the deliveries to reduce the number of transportation movements required and moreover to reduce material remaining on site for extended periods. All material should be moved away from the rivers as soon as possible to remove the potential impacts should a storm or disaster event occur.

166 There are unlikely to be any adverse impacts on hydropower projects as a result of the projects. The location of the existing hydropower plants is upstream of the project area.

#### 4.5 CUMULATIVE IMPACTS

167 The proposed two (2) river interventions will be undertaken in in the Yom and Nan basins. There is the potential for limited cumulative impacts, these being impacts on sediment movement during the construction activities. These impacts will be limited temporally. Conversely, the activities will significantly reduce on-going cumulative impacts by reducing the loss of sediment and bank erosion during large flooding events.

168 As part of the baseline collection, a subsequent analysis and then cumulative impact assessment will be undertaken and the ESMF and ESMP updated accordingly.

169 With respect to the EbA activities, there is the potential for cumulative impacts through the loss of usable land. However, the impacts is considered to both very small spatial scale and temporal in nature. Landholders will gain long term benefits from the restoration activities. As with the above, following the collection of baseline data, a subsequent analysis and then cumulative impact assessment of the impacts of the EbAs will be undertaken and the ESMF and ESMP updated accordingly.

#### 4.6 TRANSBOUNDARY IMPACTS

170 Given the locations of the interventions, there is unlikely to be any transboundary impacts.

#### 4.7 POTENTIAL BENEFICIAL IMPACTS

171 The project has very significant direct beneficial impacts to 62,000 people directly and 25 million people indirectly. The activities will significantly reduce the impact of flooding on people and their assets and will provide long term water sustainability for food security.

172 An additional benefit will be the beneficial re-use of the sediment removed from the canals, which will likely result in a significant reduction in the amount of fertiliser, pesticides and herbicides used by the farmers that are provided access to the sediment.

## 5 AVOIDANCE AND MITIGATION MEASURES

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- 173 There are a range of options to avoid and/or mitigate the environmental and social impacts associated with the proposed interventions. The ESMP contained in Chapter Eight (8) of the ESMF sets out appropriate and comprehensive mitigation measures for the potential impacts of the activity in the channels of the rivers and forestry activities. With compliance with the ESMP, the project is unlikely to have any significant impacts/risks.
- 174 The most appropriate mitigation measure is to ensure project activities to do not occur during periods of rainfall which could significantly increase sediment discharges and erosion. All works should comply with the EDSCP. Further, prior to any works, sediments should be tested for contamination. Where any sediment is found to contain any contaminants, work should stop and appropriate remediation should be undertaken to reduce the release of these contaminants etc into the environment. Any additional sediment should be made available to the community, including but not limited to agricultural activities. All areas should be revegetated as soon as possible to reduce erosion and sediment loss.
- 175 Prior to any activity being carried out, the project should ensure equitable participation of men and women in all project activities. Further, the project should ensure it undertakes an assessment of sex-disaggregated data and the gender analysis. Further, the project should ensure women's participation in identifying best practices in agro-productive and ecosystem based adaptation activities and stimulate non-traditional occupations through the work programme. This should also include undertaking an assessment of the involvement of women within agricultural systems, prior to planning measures. Compliance with the Livelihood Restoration Plan will ensure impacts are mitigated.
- 176 Any access requirements to any land should be undertaken in full compliance with a voluntary land access agreement that should be signed before any activities on private land are undertaken.

## 6 STAKEHOLDER ENGAGEMENT AND PUBLIC PARTICIPATION

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### 6.1 PUBLIC CONSULTATION AND ENVIRONMENTAL AND SOCIAL DISCLOSURE

177 The ESMF includes public consultation as part of the stakeholder engagement plan. The project was discussed with a wide range of stakeholders including relevant government departments, industry groups, NGOs, and individual community members and approved by Government. Extensive on-ground consultation has been undertaken during the design of the project (as well as during the earlier projects that this project is aiming to upscale) and it is expected that consultation with any affected communities will continue. It is anticipated that based on the communities' needs, the projects will be fully accepted.

178 The UNDP, MOAC and MONRE will develop and release updates on the project on a regular basis to provide interested stakeholders with information on project status. Updates may be via a range of media eg print, radio, social media or formal reports. A publicized telephone number will be maintained throughout the project to serve as a point of contact for enquiries, concern, complaints and/or grievances. All enquiries, concern, complaints and/or grievances will be recorded on a register and the appropriate manager will be informed. All material must be published in English and Thai.

179 Where there is a community issue raised, the following information will be recorded:

- a. time, date and nature of enquiry, concern, complaints and/or grievances;
- b. type of communication (e.g. telephone, letter, personal contact);
- c. name, contact address and contact number;
- d. response and investigation undertaken as a result of the enquiry, concern, complaints and/or grievances; and
- e. actions taken and name of the person taking action.

180 Some enquiries, concern, complaints and/or grievances may require an extended period to address. The complainant(s) will be kept informed of progress towards rectifying the concern. All enquiries, concerns, complaints and/or grievances will be investigated and a response given to the complainant in a timely manner. A grievance redress mechanism has been included in the ESMF and ESMP to address any complaints that may not be able to be resolved quickly.

181 Nominated PMU/contractor staff will be responsible for undertaking a review of all enquiries, concern, complaints and/or grievances and ensuring progress toward resolution of each matter.

## 7 FINDINGS AND RECOMMENDATIONS

- 182 This ESMF was prepared in support of a project proposal entitled “*Enhancing climate resilience in Thailand through effective water management and sustainable agriculture*”. The project is submitted by the ONEP in the MONRE and RID under the MOAC to the GCF. This project is supported by the UNDP in its role as a GCF Accredited Entity. The project has been screened against the UNDP’s Social and Environmental Standards Procedure and deemed a Moderate Risk (World Bank/International Finance Corporation Category B) project. As such, an ESMF has been prepared for the project. Chapter Eight (8) of the ESMF provides the ESMP for the project.
- 183 The MONRE is the National Designated Authority, with the MOAC being the Executing Agency. A Project Management Unit (PMU) will be established for the implementation of the project and to manage compliance with the ESMF and ESMP.
- 184 The project will target farmers directly (62,000 people, of which 32,104 are women) affected by the impacts of climate change; and 25 million indirect beneficiaries of the lower Chao Phraya River Basin area. The project involves three outputs; these being improved climate and risk informed planning in the water and agricultural sectors; strengthening water infrastructure and management for greater resilience to projected climate change through both hard and soft activities; and increased resilience of agriculture livelihoods in drought and flood prone areas. The project is fully aligned with Thailand’s priorities as outlined in its Nationally Determined Contribution to the Paris Agreement and Thailand’s Country Work Programme as submitted to the GCF.
- 185 The project has the potential to cause moderate environmental and social impacts. These include impacts to water quality through sediment movement during the replacement of existing infrastructure, channel and retention basin works; and ecosystem based adaptation activities for monkey cheek and wetland restoration. Noise and air quality may also be impacted during these works. Minor impacts also include increased waste from the removal of existing structures.
- 186 The project does not require any land acquisition and/or resettlement. None of the interventions will require the displacement of people, involve economic displacement or will be conducted in protected areas or sensitive locations. It may be necessary to utilise areas of land adjacent to where the structural interventions will be undertaken so as to access water courses. The land is currently under agricultural production. Where access is required, the land will be returned in the same condition if not better than it was prior to any access. Access to this land will only be undertaken through voluntary agreements with landholders. Where a voluntary agreement cannot be established, the land will not be used.
- 187 Appropriate and relevant avoidance and mitigation options have been proposed in the ESMF, which if put in place, will significantly reduce the potential impacts of the project to an acceptable level. The mitigation measures include the development of site-specific erosion, drainage and sediment control plans that will be developed and implemented as a mitigation measure. The plans will include disposal plans for soil and silt removed during earthworks to restore monkey cheeks and wetlands, ensuring that the surrounding communities and environment are not adversely impacted. Where possible, the project will undertake beneficial reuse of any excess sediment. Measures to avoid this impact include the prefabrication of materials, including for example, the water control infrastructure to reduce this risk of waste being generated. While the project does not require any land acquisition and/or resettlement or will be conducted in protected areas or sensitive locations, and none of the interventions will require the displacement of people. However, there may be some minor impact with respect to economic displacement during project implementation (eg through the use of land for the construction of infrastructure that would otherwise be used for land production). As such, the project includes a Livelihood Restoration Plan where access is needed that might impact on current economic activities and then restore the land to its previous condition.
- 188 Thailand currently has an established regime for grievances. Notwithstanding, an independent two tier Grievance Redress Mechanism structure was developed to address all complaints and/or grievances



## **Annex 6(b) – Environmental and Social Management Framework**

Green Climate Fund Funding Proposal

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in the project. This Grievance Redress Mechanism complies with Thailand and UNDP Safeguard procedures.

189 Budgeting for environmental interventions and the application of mitigation measures to enhance positive impacts within the main river basins of Thailand is an investment in the future as it will reduce the environmental and social liability at local, regional and national levels.



## 8 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

190 This section identifies the key environmental and social indicators identified for the project and outlines respective management objectives, potential impacts, control activities and the environmental performance criteria against which these indicators will be judged (i.e. audited).

191 Consistent with paragraph 78 of the ESMF, prior to the implementation of the outputs and activities, the GNHC and UNDP will assess the need for any additional information and baseline data that may be required on project specific sites based on project activities. This data may include but not be limited to sediment and soil samples, and the collection of biological data, and the collection and modelling as necessary of hydrology and water quality. This information will be used to assess any potential site-specific impacts and then develop site specific ESMPs based on this current ESMP. The current ESMP will be continually updated throughout project implementation.

192 This section further addresses the need for monitoring and reporting of environmental performance with the aim of communicating the success and failures of control procedures, distinguish issues that require rectification and identify measures that will allow continuous improvement in the processes by which the projects are managed.

### 8.1 OVERVIEW AND OBJECTIVES OF THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

193 An ESMP is a management tool used to assist in minimising the impact to the environment and socially; and establish a set of environmental and social objectives. To ensure the environmental and social objectives of the projects are met, the ESMP will be used by the project implementers to structure and control the environmental and social management safeguards that are required to avoid or mitigate adverse effects on the environment and communities.

194 The environmental and social objectives of the projects are to:

- a. improve the availability of water in the targeted areas and introduce water conservation measures;
- b. address the broader climate change adaptation challenges impacting in the area through the introduction of an integrated basin management planning process;
- c. minimise or prevent the pollution of land, air and water pollution;
- d. protect native flora, fauna and important ecosystems;
- e. ensure gender equality and inclusion across all facets of the project;
- f. encourage good management practices through planning, commitment and continuous improvement of environmental and social practices and the impacts of climate change;
- g. describe monitoring procedures required to identify impacts on the environment;
- h. strengthen the capacity of the Thai Government and communities to manage the flooding and drought impacts of rural communities of the Yom and Nan River basins;
- i. adopt the best practicable means available to prevent or minimise environmental and social impacts; and
- j. align with Thailand's priorities as outlined in its Nationally Determined Contribution to the Paris Agreement, as well as with Thailand's Country Work Programme as submitted to the GCF.

195 The ESMP will be updated from time to time and particularly prior to the implementation of all activities as per paragraph 78 of the ESMF by the implementing Project Management Unit (PMU)/contractor in consultation with the UNDP staff, MRDI and MoENRP to incorporate changes in the detailed design phase of the projects

## 8.2 OVERVIEW OF INSTITUTIONAL ARRANGEMENTS FOR THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

196 The ESMP will be assessed by the MOAC, MONRE and UNDP prior to any works being undertaken. The ESMP identifies potential risks to the environment and social matters from the projects and outlines strategies for managing those risks and minimising undesirable environmental and social impacts. Further, the ESMP provides a Grievance Redress Mechanism for those that may be impacted by the projects that do not consider their views have been heard.

197 The RID will be responsible for the supervision of the ESMP. The UNDP will gain the endorsement of the RID and will ensure the ESMP is adequate and followed. The PMU will ensure timely remedial actions are taken by the contractor where necessary.

### 8.2.1 Ministry of Agriculture and Cooperatives

198 The Ministry of Agriculture and Cooperatives has the powers and duties with respect to agriculture, water sourcing and irrigation development, agriculturist promotion and development, cooperative system promotion and development, including production process and agricultural commodities, and such other governmental tasks legally designated to be the powers and duties of the Ministry of Agriculture and Cooperatives or government sections under it.

### 8.2.2 Ministry of Natural Resources and Environment

199 MONRE's powers and duties relate to the preservation, conservation, rehabilitation of natural resources and environment, management and sustainable use of resources and implementation of other government services, according to the law that prescribes the powers and duties of MONRE and other government agencies affiliated with it. MONRE's general powers and duties include to:

- a. develop an appropriate standards, tools and mechanism for pollution management in relation to economic, social and technological phenomenon;
- b. enhance staff's capacity, information technology and innovation on pollution management;
- c. communicate, expand cooperation and strengthen stakeholder's participation on pollution management;
- d. control, supervise and develop environmental laws regarding to pollution management;
- e. coordinate cooperation on pollution management with related organizations both national and international levels;
- f. establish basin-based water resources management system in order to be able to supply adequate water for consumption and production;
- g. conserve and rehabilitate water resources and to provide surveillance and warning system for water disaster, which emphasizes on participation of all stakeholders in all sectors;
- h. formulate policy and integrated strategic plan and recommend measures and mechanism in natural resources and environmental management; and
- i. coordinate with relevant agencies in order to implement strategic plan.

### 8.2.3 Royal Irrigation Department

200 The RID will be the implementing agency and will be responsible for the implementation and compliance with the ESMP via the collaborating partners and contractors. The ESMP will be part of any tender documentation.

201 The RID plays a vital role in water management in Thailand and is the most important and critical department in terms of water management and provision. RID is the main agency involved in water project investment planning, design and construction in Thailand.

202 Under *Ministerial Regulation of the Ministry of Agriculture and Cooperatives B.E. 2554*, RID's responsibilities include the implementation of activities aimed at achieving, collecting, storing, controlling, distributing, draining or allocating water for agricultural, energy, household consumption or industrial purposes under irrigation laws, ditch and dike laws and other related laws; the implementation of activities related to prevention of damages from water; safety of dams and related structures; safety of navigation in commanded areas; and the implementation of land consolidation for agriculture under the *Agricultural Land Consolidation Act*.

203 RID is a member of the sub-committee on integrated policy and planning for climate change, which sits under the national climate change committee chaired by the Prime Minister, as well as the National water management and disaster risk management committees. RID's tasks include to implement

- a. activities aimed at achieving, collecting, storing, controlling, distributing, draining or allocating water for agricultural, energy, household consumption or industrial purposes under irrigation laws, ditch and dike laws and other related laws;
- b. activities related to prevention of damages from water; safety of dams and appurtenant structures; safety of navigation in commanded areas and other related activities that may not be specified in annual plan;
- c. land consolidation for agriculture under the Agricultural Land Consolidation Act; and
- d. other activities designated by laws or properly assigned by Cabinet or Minister.

### 8.2.4 Administration

204 The MOAC and MONREC will be responsible for the revision or updates of this document during the course of work. It is the responsibility of the person to whom the document is issued to ensure it is updated.

205 The site supervisor will be responsible for daily environmental inspections of the construction site. The MOAC and MONREC will cross check these inspections by undertaking monthly audits.

206 The contractor will maintain and keep all administrative and environmental records which would include a log of complaints together with records of any measures taken to mitigate the cause of the complaints.

207 The contractor will be responsible for the day to day compliance of the ESMP.

208 The MOAC and MONREC will be the implementing agency and will be responsible for the implementation and compliance with the ESMP via the collaborating partners and contractors. The ESMP will be part of any tender documentation. General clauses related to environmental and social issues are contained within Annexure Five of the ESMF.

209 The Supervising Engineer/Project Manager will supervise the contractor, while the MOAC and MONREC will be responsible for environment and social issues.

## 8.3 GENERAL MANAGEMENT STRUCTURE AND RESPONSIBILITIES

210 The proposed project's implementation arrangements will be designed consistent with lessons learned in the several successfully-implemented climate change projects in Thailand. The project will be implemented following UNDP's NIM, according to the Standard Basic Assistance Agreement (SBAA) between UNDP and the Government of Thailand and as policies and procedures outlined in the UNDP POPP.

211 The National Implementing Partner/Executing Entity for this project is the RID which is accountable to UNDP for managing the project, including the monitoring and evaluation of project interventions, achieving project outcomes, and for the effective use of resources made available by UNDP.

212 The duration of the proposed GCF project is 5 years while the whole project will be undertaken over 20 years. The management arrangements for this project are summarised below:

### 8.3.1 Project Board

213 The project will be governed by a Project Board. The Project Board is responsible for making, by consensus, management decisions when guidance is required by the National Project Director. Project Board decisions will be made in accordance with standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. In case a consensus cannot be reached within the Board, final decision shall rest with the UNDP Programme Country Director. The Project Board will meet every six months.

- a. The Board will consist of a group of representatives responsible for making consensus-based strategic and management decisions for the project. It will oversee the project implementation; review compliance with Government of Thailand, UNDP and GCF requirements; and ensure implementation of the management plan for the risks identified. The Board will be comprised of an Executive (role represented by National Implementing Partner) that holds the project ownership and chairs the Board. The Executive will be the Minister of the MOAC. The Board will include
- b. A Senior Supplier representative providing guidance regarding the technical feasibility of the project, compliance with donor requirements, and rules pertaining to use of project resources. This role will be fulfilled by UNDP in its capacity as GCF AE
- c. Senior Beneficiary representatives who ensures the realization of project benefits from the perspective of project beneficiaries; and,
- d. The National Project Director and Project Assurance who will be responsible for overall direction, strategic guidance, and timely delivery of project outputs.

214 The Board will also include additional membership including representatives from relevant Government of Thailand ministries, Development Partners, NGOs and the Thai NDA for the GCF.

215 Specific responsibilities of the Project Board include:

- a. Provide overall guidance and direction to the project, ensuring it remains within any specified constraints;
- b. Address project issues as raised by the project manager;
- c. Provide guidance on new project risks, and agree on possible countermeasures and management actions to address specific risks;
- d. Review the project progress, and provide direction and recommendations to ensure that the agreed deliverables are produced satisfactorily per plans;
- e. Appraise the annual project implementation report, including the quality assessment rating report; make recommendations for the work plan;
- f. Provide ad hoc direction and advice for exceptional situations when the project manager's tolerances are exceeded; and,
- g. Assess and decide to proceed on project changes through appropriate revisions.

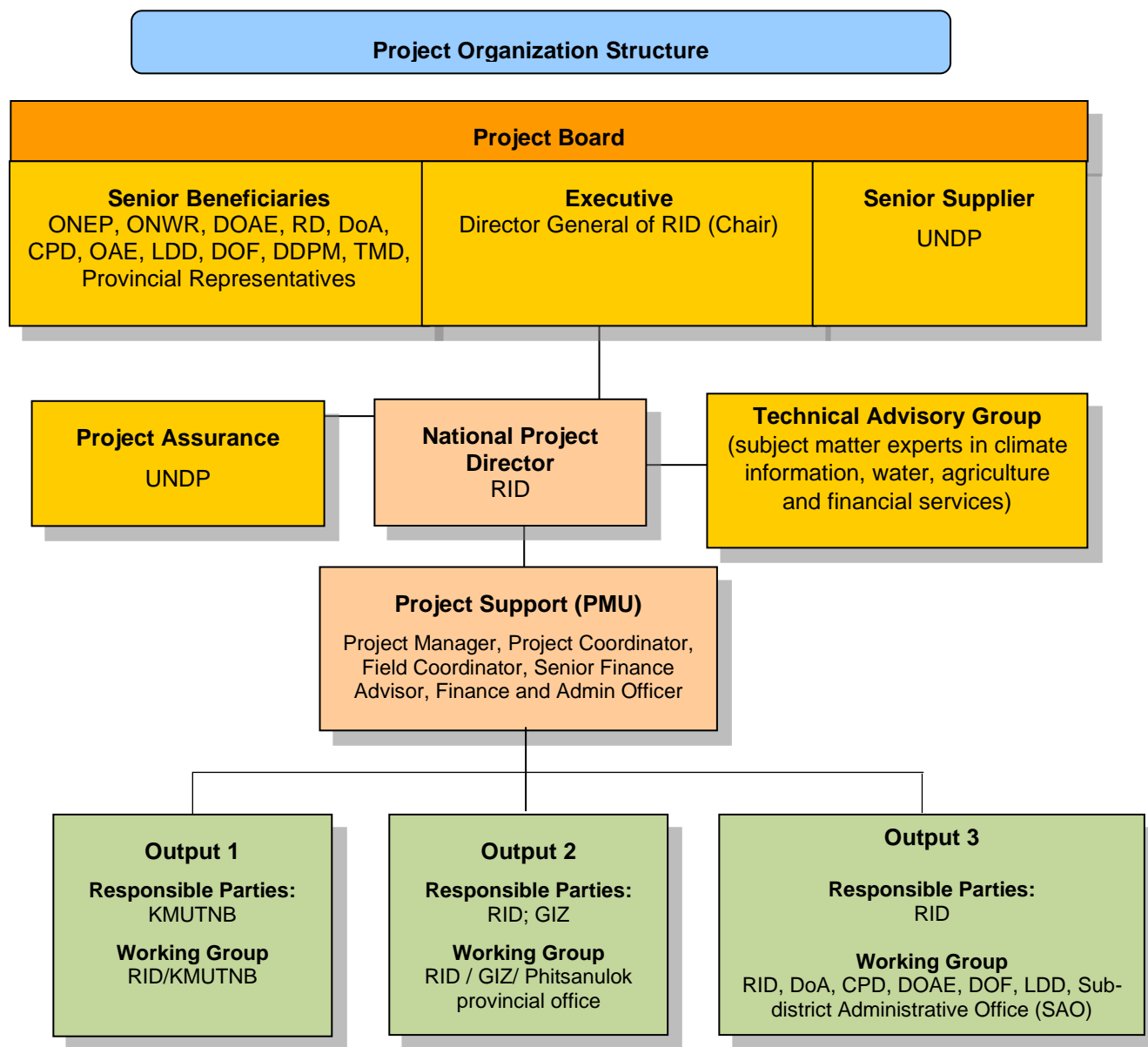


Figure 23: Project organisation structure

### 8.3.2 National Project Director

216 The National Project Director will run the project on a day-to-day basis within the parameters laid down by the Project Board. The National Project Director will end when the final project terminal evaluation report, and other documentation required by the GCF and UNDP, has been completed and submitted to UNDP. The National Project Director is responsible for day-to-day management and decision-making for the project. The National Project Director's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost.



## 8.4 PROJECT DELIVERY AND ADMINISTRATION

### 8.4.1 Project Management Unit (PMU)

217 The PMU is composed of the National Project Manager, Finance and Administrative Associate, a Monitoring, Evaluation and Reporting Officer. The PMU is responsible for the day to day management of the project activities and is accountable to the Project Board. The Project Management Unit's overall role will be to ensure comprehensive technical and management support is provided to project activities and local beneficiaries, such as overseeing knowledge management and Monitoring and Evaluation. The PMU must have adequate multi-disciplinary technical capacity to be able to support technical, financial and climate change adaptation-related activities. Thus, the PMU team must be able to work with a large range of natural resources, economic, policy and organisational issues, and can ensure that activities are designed and implemented in-line with national and international best practices.

### 8.4.2 Project Team

218 RID will recruit a Project Manager (PM) who will be responsible for day-to-day operations and the management of a team of professionals and technical staff (who will also be recruited by UNDP to implement the project).

219 The PM will be supported by a core team of technical and support staff forming the Project Implementation Unit (PIU) located at the MWRI to execute project activities, including day-to-day operations of the project, and the overall operational and financial management and reporting.

### 8.4.3 Project Assurance

220 UNDP provides a three – tier oversight and quality assurance role involving UNDP staff in Country Offices and at regional and headquarters levels. The quality assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. Project Assurance must be independent of the Project Management function; the Project Board cannot delegate any of its quality assurance responsibilities to the Project Manager. The project assurance role is covered by the accredited entity fee provided by the GCF.

221 As an Accredited Entity to the GCF, UNDP is required to deliver GCF-specific oversight and quality assurance services including:

- a. Day-to-day oversight supervision;
- b. Oversight of project completion;
- c. Oversight of project reporting.

222 The 'senior supplier' role of UNDP is to represent the interests of the parties, which provide funding and/or technical expertise to the project (designing, developing, facilitating, procuring, implementing). The senior supplier's primary function within the Board is to provide guidance regarding the technical feasibility of the project.

### 8.4.4 Administration of Environmental and Social Management Plan

223 As the implementing agency, MONRE will be responsible for the implementation of the ESMP with the MOAC via the delivery organisations. The RID, MONRE and MOAC have extensive experience in the implementation and management of water infrastructure projects, including related to environmental and social matters as required by the ESMF and ESMP. During project development, UNDP staff (30 years' experience) assessed the capacity of RID, MONRE and MOAC staff as to their knowledge, skills and understanding of environmental and social issues and found them to be highly competent. UNDP will provide advice as needed during the project implementation and on any revisions needed to the ESMF and ESMP.

224 The ESMP will be part of any tender documentation. The MONRE will be responsible for the revision or updates of this document during the course of work. It is the responsibility of the person to whom the document is issued to ensure it is the most up to date version.

225 The UNDP, MOAC and MONRE are accountable for the provision of specialist advice on environmental and social issues to the delivery organisations (eg contractors and/or NGOs) and for environmental and social monitoring and reporting. MONRE or its delegate will assess the environmental and social performance of the delivery organisations (eg contractors) in charge of delivering each component throughout the project and ensure compliance with the ESMP. During operations the delivery organisations will be accountable for implementation of the ESMP. Personnel working on the projects have accountability for preventing or minimising environmental and social impacts.

226 The MOAC and MONRE will be responsible for the revision or updates of this document during the course of work. It is the responsibility of the person to whom the document is issued to ensure it is updated. The project manager will be responsible for daily environmental inspections of the construction site. The MOAC and MONRE will cross check these inspections by undertaking monthly audits.

227 The contractor must maintain and keep all administrative and environmental records which would include a log of complaints together with records of any measures taken to mitigate the cause of the complaints. The contractor will be responsible for the day to day compliance of the ESMP. The Project Manager will supervise the contractor, while the MONRE will be responsible for environment and social issues.

228 The delivery organisation eg RID/contractor will maintain and keep all administrative and environmental records, which would include a log of complaints together with records of any measures taken to mitigate the cause of the complaints.

229 The delivery organisation will be responsible for the day to day compliance of the ESMP

### 8.4.5 Environmental procedures, site and activity-specific work plans/instructions

230 Environmental procedures provide a written method describing how the management objectives for a particular environmental element are to be obtained. They contain the necessary detail to be site or activity-specific and are required to be followed for all construction works. Site and activity-specific work plans and instructions are to be issued and will follow the previously successful work undertaking similar projects by the UNDP.

### 8.4.6 Environmental incident reporting

231 Any incidents, including non-conformances to the procedures of the ESMP are to be recorded using an Incident Record and the details used in a register. For any incident that causes or has the potential to cause serious environmental harm, the contractor shall notify the Project Manager as soon as possible. The delivery organisation/contractor must cease work until remediation has been completed as per the approval of MOAC and MONRE.

### 8.4.7 Daily and weekly environmental inspection checklists

232 A daily environmental checklist is to be completed at each work site by the relevant state project manager and maintained within a register. A weekly environmental checklist is to be completed and will include reference to any issues identified in the daily checklists completed by the field officers. The completed checklist is to be forwarded to MOAC and MONRE for review and follow-up if any issues are identified.

### 8.4.8 Corrective Actions

233 Any non-conformances to the ESMP are to be noted in weekly environmental inspections and logged into the register. Depending on the severity of the non-conformance, the camp officer may specify a corrective action on the weekly site inspection report. The progress of all corrective actions will be tracked using the register. Any non-conformances and the issue of corrective actions are to be advised to MOAC and MONRE.

### 8.4.9 Review and auditing

234 The project will be audited in accordance with UNDP policies and procedures on audits, informed by and together with any specific requirements agreed in the AMA. Per the current audit policies, UNDP will be appointing the auditors. In UNDP scheduled audits are performed during the programme cycle as per UNDP assurance/audit plans, based on the implementing partner's risk rating and UNDP's guidelines. A scheduled audit is used to determine whether the funds transferred to the implementing partner were used for the appropriate purpose and in accordance with the work plan. A scheduled audit can consist of a financial audit or an internal control audit.

235 The ESMP and its procedures are to be reviewed at least every two months by UNDP staff and MOAC and MONRE. The objective of the review is to update the document to reflect knowledge gained during the course of project delivery/construction and to reflect new knowledge and changed community standards (values).

236 The ESMP will be reviewed and amendments made if:

- a. there are relevant changes to environmental conditions or generally accepted environmental practices; or
- b. new or previously unidentified environmental risks are identified; or
- c. information from the project monitoring and surveillance methods indicate that current control measures require amendment to be effective; or
- d. there are changes to environmental legislation that are relevant to the project; or
- e. there is a request made by a relevant regulatory authority.

237 Any changes are to be developed and implemented in consultation with MOAC, MONRE and UNDP. When an update is made, all site personnel are to be made aware of the revision as soon as possible eg through a tool box meeting or written notification.

## 8.5 TRAINING

238 Delivery organisations have the responsibility for ensuring systems are in place so that relevant employees, contractors and other workers are aware of the environmental and social requirements for construction, including the ESMP.

239 All project personnel will attend an induction that covers health, safety, environment and cultural requirements.



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240 All workers engaged in any activity with the potential to cause serious environmental harm (e.g. handling of hazardous materials) will receive task specific environmental training.

## 8.6 COMPLAINTS REGISTER AND GRIEVANCE REDRESS MECHANISM

241 During the construction and implementation phases of any project, a person or group of people can be adversely affected, directly or indirectly due to the project activities. The grievances that may arise can be related to social issues such as eligibility criteria and entitlements, disruption of services, temporary or permanent loss of livelihoods and other social and cultural issues. Grievances may also be related to environmental issues such as excessive dust generation, damages to infrastructure due to construction related vibrations or transportation of raw material, noise, traffic congestions, decrease in quality or quantity of private/ public surface/ ground water resources, loss of access etc.

242 MOAC and RID have an existing process for where an individual is not satisfied with the RID and/or wishing to express an opinion, they can do so through RID's complaint management services. A party can submit his/her complaints to three public agencies; these being MOAC, the Damrongdhama Centre of Ministry of Interior, and Office of the Permanent Secretary under the Prime's Minister Office.

243 MOAC provides eight options for people to express their opinions/file a complaint, these being:

- a. through Office of the Minister of MOAC;
- b. through MOAC website;
- c. by mail;
- d. through the MOAC call centre on 1170;
- e. walk-into a MOAC office;
- f. at a protest site;
- g. filing a complaints with the Centre of Public Service under Office of the Permanent Secretary under the Prime's Minister Office; and
- h. through the complaint management's web portal of Office of the Permanent Secretary under the Prime's Minister Office.

244 When the MOAC receives any complaints it will forward to relevant agencies. Those agencies have to regularly update progress to both petitioner and MOAC.

245 The Damrongdhama Centre of Ministry of Interior provides seven (7) methodologies for people to express their opinions/file a complaint, including by mail, e-mail, walk-in, complaints sent from other agencies, via its call centre on 1567, at a city hall or local administrative office, and through its mobile application. The Damrongdhama Centre of Ministry of Interior will then forward complaints to relevant agencies. Those agencies have to regularly update progress to both petitioner and the Damrongdhama Centre of the Ministry of Interior.

246 The Centre of Public Service under Office of the Permanent Secretary under the Prime's Minister Office provides five options for people to express their opinions/file a complaint, these being, via its hotline on 1111, through the mail to P.O. Box 1111, via its website ([www.1111.go.th](http://www.1111.go.th)), at any Centre of Public Service office, and through its mobile application. Following receipt of a complaint, the Centre of Public Service under Office of the Permanent Secretary under the Prime's Minister Office receives any complaints, it will forward them to relevant agencies. Those agencies have to regularly update progress to both petitioner and The Centre of Public Service under Office of the Permanent Secretary under the Prime's Minister Office.

247 The RID provides a complaint management system. There are nine channels options for people to express their opinions/file a complaint, these being through its hotline on 1460, via mail to P.O. Box 1460, by leaving a message on RID's voice mail, walk-into a RID office, through RID's suggestion box, talking to the media, at a public meeting, via any agricultural mobile unit, and through RID's Facebook/e-mail.



248 A complaint can be sent directly to a relevant office in any regions or headquarter (HQ) of which has to send an initial reply to a petitioner by 12 days and 22 days, respectively. The case should finally be closed by the relevant office in regions or HQ by 20 days and 45 days, respectively.

249 Notwithstanding the above, MONRE, MOAC and UNDP have developed a separate complaints and grievance redress mechanism process for the project.

250 Should such a situation arise, there must be a mechanism through which affected parties can resolve such issues in a cordial manner with the project personnel in an efficient, unbiased, transparent, timely and cost-effective manner. To achieve this objective, a grievance redress mechanism has been included in ESMP for this project.

251 Where there is a community issue raised, the following information will be recorded:

- a. time, date and nature of enquiry, concern, complaints and/or grievances;
- b. type of communication (e.g. telephone, letter, personal contact);
- c. name, contact address and contact number;
- d. response and investigation undertaken as a result of the enquiry, concern, complaints and/or grievances; and
- e. actions taken and name of the person taking action.

252 Some enquiries, concerns, complaints and/or grievances may require an extended period to address. The complainant(s) will be kept informed of progress towards rectifying the concern. All enquiries, concerns, complaints and/or grievances will be investigated and a response given to the complainant in a timely manner. A grievance redress mechanism has been included in the ESMP to address any complaints that may not be able to be resolved quickly.

253 Nominated PMU/contractor staff will be responsible for undertaking a review of all enquiries, concern, complaints and/or grievances and ensuring progress toward resolution of each matter.

254 The project allows those that have a complaint or that feel aggrieved by the project to be able to communicate their concern, complaints and/or grievances through an appropriate process. The Complaints Register and Grievance Redress Mechanism set out in this ESMP are to be used as part of the project and will provide an accessible, rapid, fair and effective response to concerned stakeholders, especially any vulnerable group who often lack access to formal legal regimes.

255 While recognising that many complaints may be resolved immediately, the Complaints Register and Grievance Redress Mechanism set out in this ESMP encourages mutually acceptable resolution of issues as they arise. The Complaints Register and Grievance Redress Mechanism set out in this ESMP has been designed to:

- a. be a legitimate process that allows for trust to be built between stakeholder groups and assures stakeholders that their concerns will be assessed in a fair and transparent manner;
- b. allow simple and streamlined access to the Complaints Register and Grievance Redress Mechanism for all stakeholders and provide adequate assistance for those that may have faced barriers in the past to be able to raise their concerns;
- c. provide clear and known procedures for each stage of the Grievance Redress Mechanism process, and provides clarity on the types of outcomes available to individuals and groups;
- d. ensure equitable treatment to all concerned and aggrieved individuals and groups through a consistent, formal approach that, is fair, informed and respectful to a concern, complaints and/or grievances;

- e. to provide a transparent approach, by keeping any aggrieved individual/group informed of the progress of their complaint, the information that was used when assessing their complaint and information about the mechanisms that will be used to address it; and,
- f. enable continuous learning and improvements to the Grievance Redress Mechanism. Through continued assessment, the learnings may reduce potential complaints and grievances.

256 Eligibility criteria for the Grievance Redress Mechanism include:

- a. Perceived negative economic, social or environmental impact on an individual and/or group, or concern about the potential to cause an impact;
- b. clearly specified kind of impact that has occurred or has the potential to occur; and explanation of how the project caused or may cause such impact; and,
- c. individual and/or group filing of a complaint and/or grievance is impacted, or at risk of being impacted; or the individual and/or group filing a complaint and/or grievance demonstrates that it has authority from an individual and or group that have been or may potentially be impacted on to represent their interest.

257 Local communities and other interested stakeholders may raise a grievance/complaint at all times to the MOAC and MONRE. Affected local communities should be informed about the ESMP provisions, including its grievance mechanism and how to make a complaint.

### 8.6.1 Complaints Register

258 Where there is a community issue raised, the following information will be recorded:

- a. A complaints register will be established as part of the project to record any concerns raised by the community during construction. Any complaint will be advised to the UNDP, MOAC and MONRE within 24 hours of receiving the complaint. The complaint will be screened. Following the screening, complaints regarding corrupt practices will be referred to the UNDP for commentary and/or advice along with the MOAC and MONRE;
- b. Wherever possible, the project team will seek to resolve the complaint as soon as possible, and thus avoid escalation of issues. However, where a complaint cannot be readily resolved, then it must be escalated; and
- c. A summary list of complaints received and their disposition must be published in a report produced every six months.

### 8.6.2 Grievance Redress Mechanism

259 The Grievance Redress Mechanism has been designed to be problem-solving mechanism with voluntary good-faith efforts. The Grievance Redress Mechanism is not a substitute for the legal process. The Grievance Redress Mechanism will as far as practicable, try to resolve complaints and/or grievances on terms that are mutually acceptable to all parties. When making a complaint and/or grievance, all parties must act at all times, in good faith and should not attempt to delay and or hinder any mutually acceptable resolution.

260 In order to ensure smooth implementation of the Project and timely and effectively addressing of problems that may be encountered during implementation, a robust Grievance Redress Mechanism, which will enable to the Project Board to address the grievances of the stakeholders of the project has been established.

261 All complaints and/or grievances regarding social and environmental issues can be received either orally (to the field staff), by phone, in complaints box or in writing to the UNDP, MOAC and MONRE or the Construction Contractor. A key part of the grievance redress mechanism is the requirement for the MOAC and MONRE/PMU and construction contractor to maintain a register of complaints and/or

grievances received at the respective project site offices. All complainants shall be treated respectfully, politely and with sensitivity. Every possible effort should be made by the MOAC and MONRE/PMU and construction contractor to resolve the issues referred to in the complaint and/or grievance within their purview. However, there may be certain problems that are more complex and cannot be solved through project-level mechanisms. Such grievances will be referred to the Grievance Redress Committee. It would be responsibility of the MOAC and MONRE to solve these issues through a sound / robust process.

262 The Grievance Redress Mechanism has been designed to ensure that an individual and/or group are not financially impacted by the process of making a complaint and/or grievance. The Grievance Redress Mechanism will cover any reasonable costs in engaging a suitably qualified person to assist in the preparation of a legitimate complaint and/or grievance. Where a complaint and/or grievance is seen to be ineligible, the Grievance Redress Mechanism will not cover these costs.

263 Information about the Grievance Redress Mechanism and how to make a complaint and/or grievance must be placed at prominent places for the information of the key stakeholders.

264 The Safeguards officer in the PMU will be designated as the key officer in charge of the Grievance Redress Mechanism. The Terms of Reference for these positions (as amended from time to time) will have the following key responsibilities:

- a. coordinate formation of Grievance Redress Committees before the commencement of constructions to resolve issues;
- b. act as the focal point at the PMU on Grievance Redress issues and facilitate the resolution of issues within the PMU;
- c. create awareness of the Grievance Redress Mechanism amongst all the stakeholders through public awareness campaigns;
- d. assist in redress of all grievances by coordinating with the concerned parties;
- e. maintain information on grievances and redress;
- f. monitor the activities of MOAC and MONRE on grievances issues; and
- g. prepare the progress for monthly/quarterly reports.

265 A two tier Grievance Redress Mechanism structure has been developed to address all complaints and/or grievances in the project. The first tier redress mechanism involves the receipt of a complaint and/or grievance at the village/town and/or sub-district level. The stakeholders are informed of various points of making a complaint and/or grievance (if any) and the PMU collect the complaints and/or grievances from these points on a regular basis and record them. This is followed by coordinating with the concerned people to redress the grievances. The Safeguards Officer of the PMU will coordinate the activities at the respective District level to address the grievances and would act as the focal point in this regard. The Chief Administrator of the Local Authority or in the absence of the Chief Administrator of the Local Authority, any officer given the responsibility of this would coordinate with the Project Manager of the PMU, MOAC and MONRE in redressing the grievances. The designated officer of the Local Authority is provided with sufficient training in the procedure of redress to continue such systems in future.

266 The grievance can be made orally (to field staff), by phone, or in writing in complaints box, or via email to the UNDP, MONRE, MOAC or the Construction Contractor. Complainants may specifically contact the Project Manager and request confidentiality if they have concerns about retaliation. In cases where confidentiality is requested (e.g. not revealing the complainant's identity to UNDP, MONRE, MOAC and/or the Construction Contractor). In these cases, the Project Manager will review the complaint and/or grievance, discuss it with the complainant, and determine how best to engage project executing entities while preserving confidentiality for the complainant.

- 267 As soon as a complaint and/or grievance is received, the Project Manager would issue an acknowledgement. The field staff receiving the complaint and/or grievance should try to obtain relevant basic information regarding the grievance and the complainant and will immediately inform the Project Manager in the PMU.
- 268 The PMU will maintain a Complaint / Grievance Redress register at the sub-district level. Keeping records collected from relevant bodies is the responsibility of PMU.
- 269 After registering the complaint and/or grievance, the Project Manager will study the complaint and/or grievance made in detail and forward the complaint and/or grievance to the concerned officer with specific dates for replying and redressing the same. The Project Manager will hold meetings with the affected persons/complainant and then attempt to find a solution to the complaint and/or grievance received. If necessary, meetings will be held with the concerned affected persons / complainant and the concerned officer to find a solution to the problem and develop plans to redress the grievance. The deliberations of the meetings and decisions taken are recorded. All meetings in connection with the Grievance Redress Mechanism, including the meetings of the Grievance Redress Committee, must be recorded. The Project Manager for the Grievances Redress Mechanism will be actively involved in all activities.
- 270 A Community Project Implementation Committee would be formed to oversee the first tier of the Grievance Redress Mechanism. The Community Project Implementation Committee would include:
- Representatives of the District Chief Officer;
  - Representatives from Women Development Committee at district level;
  - Representatives from trained youth in irrigation areas;
  - Representative from provincial farmer council;
  - Representative from Friend in Need “Pa” Volunteers Foundation; and
  - Project Manager from the PMU.
- 271 The resolution at the first tier will normally be completed within 15 working days and the complaint and/or grievance will be notified of the proposed response through a disclosure form. The resolution process should comply with the requirements of the Grievance Redress Mechanism in that it should, as far as practicable, be informal with all parties acting in good faith. Further, the Grievance Redress Mechanism should, as far as practicable, achieve mutually acceptable outcomes for all parties.
- 272 Should the grievance be not resolved within this period to the satisfaction of the complainant, the grievance will be referred to the next level of Grievance Redress Mechanism. If the District Chief Officer feels that adequate solutions can be established within the next five working days, the District Chief Officer can decide on retaining the issue at the first level by informing the complainant accordingly. However, if the complainant requests for an immediate transfer to the next level, the matter must be referred to the next tier. In any case, where the issue is not addressed within 20 working days, the matter is referred to the next level.
- 273 Any grievance related to corruption or any unethical practice should be referred immediately to the National Anti-Corruption Commission; the Public Sector Anti-Corruption Commission; the Thailand Office of the Attorney General and the Office of Audit and Investigation within the UNDP in New York.
- 274 The Grievance Redress Committee formed at provincial level would address the grievance in the second tier. A Grievance Redress Committee will be constituted for every related province by the circulars issued by the legal representative of Governor, who would also be the Chairman of the Committee.
- 275 The Structure of the committee would be:
- Chairman: Governor of Province;

- b. District Chief Officer from relevant province (Phisanulok, Uthradit, and Sukhothai)
- c. MOAC/MONRE representative;
- d. Representatives from Yom/Nan River Basin Committee;
- e. Member from Provincial Farmer Council; and
- f. Delegate from Think Earth Foundation and/or Thailand Environment Institute Foundation.

276 The Project Manager from the PMU will coordinate with the respective Governor in getting these Committees constituted for each province and get the necessary circulars issued in this regard so that they can be convened whenever required.

277 The Terms of Reference for the Grievance Redress Committee are:

- a. providing support to the affected persons in solving their problems;
- b. prioritise grievances and resolve them at the earliest;
- c. provide information to the PMU, MOAC and MONRE on serious cases at the earliest opportunity;
- d. Coordinate with the aggrieved person/group and obtain proper and timely information on the solution worked out for his/her grievance; and
- e. study the normally occurring grievances and advise PMU, National and District Steering Committee on remedial actions to avoid further occurrences.

278 The Grievance Redress Committee will hold the necessary meetings with the aggrieved party/complainant and the concerned officer and attempt to find a solution acceptable at all levels. The Grievance Redress Committee would record the minutes of the meeting.

279 Grievance Redress Committee will communicate proposed responses to the complainant formally. If the proposed response satisfies the complainant, the response will be implemented and the complaint and/or grievance closed. In cases where a proposed response is unsatisfactory to the complainant, the Grievance Redress Committee may choose to revise the proposed response to meet the complainant's remaining concerns, or to indicate to the complainant that no other response appears feasible to the Grievance Redress Committee. The complainant may decide to take a legal or any other recourse if s/he is not satisfied with the resolutions due to the deliberations of the three tiers of the grievance redress mechanism.

280 In addition to the project-level and national grievance redress mechanisms, complainants have the option to access UNDP's Accountability Mechanism, with both compliance and grievance functions. The Social and Environmental Compliance Unit investigates allegations that UNDP's Standards, screening procedure or other UNDP social and environmental commitments are not being implemented adequately, and that harm may result to people or the environment. The Social and Environmental Compliance Unit is housed in the Office of Audit and Investigations, and managed by a Lead Compliance Officer. A compliance review is available to any community or individual with concerns about the impacts of a UNDP programme or project. The Social and Environmental Compliance Unit is mandated to independently and impartially investigate valid requests from locally impacted people, and to report its findings and recommendations publicly.

281 The Stakeholder Response Mechanism offers locally affected people an opportunity to work with other stakeholders to resolve concerns, complaints and/or grievances about the social and environmental impacts of a UNDP project. Stakeholder Response Mechanism is intended to supplement the proactive stakeholder engagement that is required of UNDP and its Implementing Partners throughout the project cycle. Communities and individuals may request a Stakeholder Response Mechanism process when they have used standard channels for project management and quality assurance, and are not satisfied with the response (in this case the project level grievance redress mechanism). When a valid Stakeholder Response Mechanism request is submitted, UNDP focal points at country, regional and



headquarters levels will work with concerned stakeholders and Implementing Partners to address and resolve the concerns. Visit [www.undp.org/secu-srm](http://www.undp.org/secu-srm) for more details. The relevant form is attached at Annexure One of the ESMP.

### 8.7 BUDGET

282 A budget has been prepared for the implementation of the ESMP as follows:

Item	Cost
ESMP Updating and Auditing	\$10,000
General ESMP Expenses	\$20,000
Ecological Monitoring (39 sites - two assessments/year over five years)	\$120,000
Water Quality Monitoring (monitoring to be undertaken over five years)	\$150,000
Water Quality Sample Laboratory Analysis (monitoring to be undertaken over five years)	\$60,000
Sediment Sample Field Testing (monitoring to be undertaken over five years)	\$90,000
Sediment Sample Laboratory Analysis (monitoring to be undertaken over five years)	\$90,000
Erosion, Drainage and Sediment Control	\$75,000
Stakeholder Engagement Workshop	\$100,000
Grievance Redress Mechanism	\$50,000
<b>Total</b>	<b>\$765,000</b>

### 8.8 KEY ENVIRONMENTAL AND SOCIAL INDICATORS

283 The ESMP identifies the key environmental and social indicators identified for the project and outlines respective management objectives, potential impacts, control activities and the environmental and social performance criteria against which these indicators will be judged (eg audited).

284 This section addresses the need for monitoring and reporting of environmental and social performance with the aim of communicating the success and failures of control procedures, distinguish issues that require rectification and identify measures that will allow continuous improvement in the processes by which the projects are managed.

### 8.9 TOPOGRAPHY, GEOLOGY AND SOILS

#### 8.9.1 Performance Criteria

285 Activities that have the potential to cause erosion should be undertaken with the likely weather conditions in mind. The following performance criteria are set for the projects:

- no build-up of sediment in the aquatic environments and/or surface and/or groundwater as a result of construction and operation activities;
- no degradation of water quality on or off site of all projects;

- c. all water exiting the project site and/or into groundwater systems is to have passed through best practice erosion, drainage and sediment controls; and
- d. effective implementation of site-specific EDSCP

286 By following the management measures set out in the ESMF and ESMP, construction and operation activities of the projects will not have a significant impact as a result of sedimentation across the broader area.

### 8.9.2 Monitoring

287 A standardised sediment control monitoring program has been developed for the projects (Table 5). The program is subject to review and update at least every two months from the date of issue. The camp officer will be required to:

- a. conduct site inspections on a weekly basis or after rainfall events exceeding 20mm in a 24 hour period;
- b. develop a site-specific checklist to document non-conformances to this ESMP or any applicable EDSCPs; and
- c. communicate the results of inspections and/or water quality testing and ensure that any issues associated with control failures are rapidly rectified and processes are put in place to ensure that similar failures are not repeated.

### 8.9.3 Reporting

288 All sediment and erosion control monitoring results and/or incidents will be tabulated and reported as outlined in the ESMP. The MOAC and MONRE must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to erosion and sediment control is exceeded.

Table 5 Erosion, Drainage and Sediment Control Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring reporting &
E1: Loss of soil material and sedimentation to the surface and/or groundwater systems from site due to earthwork activities	E1.1: Develop and implement an EDSCP for any surface works, embankments and excavation work, water crossings and stormwater pathways.	Construction phase	All Personnel	Maintain records
	E1.2: Ensure that erosion and sediment control devices are installed, inspected and maintained as required.	Construction phase	All Personnel	Maintain records
	E1.3: Schedule/stage works to minimise cleared areas and exposed soils at all times.	Pre and during construction	Contractor	Maintain records
	E1.4: Incorporate the design and location of temporary and permanent EDSC measures for all exposed areas and drainage lines. These shall be implemented prior to pre-construction activities and shall remain onsite during work	Pre and during construction	Contractor	Maintain records
	E1.5: Schedule/stage proposed works to ensure that major vegetation disturbance and earthworks are carried out during periods of lower rainfall and wind speeds.	Pre and during construction	Contractor	Maintain records
	E1.6: Strip and stockpile topsoil for use during revegetation and/or place removed soils back on to agricultural lands.	Pre and during construction	Contractor	Maintain records
	E1.7: Schedule/stage works to minimise the duration of stockpiling topsoil material. Vegetate stockpiles if storage required for long periods.	During construction	All Personnel	Maintain records
	E1.8: Locate stockpile areas away from drainage pathways, waterways and sensitive locations.	Pre and during construction	Contractor	Maintain records

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
E1: Loss of soil material and sedimentation to the surface and/or groundwater systems from site due to earthwork activities	E1.9: Design stormwater management measures to reduce flow velocities and avoid concentrating runoff.	Pre and during construction	Contractor	Maintain records
	E1.10: Include check dams in drainage lines where necessary to reduce flow velocities and provide some filtration of sediment. Regularly inspect and maintain check dams.	Pre and during construction	Contractor	Maintain records
	E1.11: Mulching shall be used as a form of erosion and sediment control and where used on any slopes (dependent on site selection), include extra sediment fencing during high rainfall.	During construction	All Personnel	Maintain records
	E1.12: Bunding shall be used either within watercourses or around sensitive/dangerous goods as necessary.	During construction	All Personnel	Maintain records
	E1.13: Grassed buffer strips shall be incorporated where necessary during construction to reduce water velocity.	During construction	Contractor	Maintain records
	E1.14: Silt fences or similar structures to be installed to protect from increased sediment loads.	During construction	Contractor	Maintain records
	E1.15: Excess sediment in all erosion and sediment control structures (eg. sediment basins, check dams) shall be removed when necessary to allow for adequate holding capacity.	During construction	Contractor	Maintain records
	E1.16 Ensure all residual contaminated sediment is not released into the environment.	During construction	Contractor	Maintain records

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
E2: Contamination	Soil E2.1: If contamination is uncovered or suspected (outside of the project footprints), undertake a Stage 1 preliminary site contamination investigation. The contractor should cease work if previously unidentified contamination is encountered and activate management procedures and obtain advice/permits/approval (as required).	Construction phase	All Personnel	Daily and maintain records
	E2.2: Adherence to best practice for the removal and disposal of contaminated soil/ material from site (if required), including contaminated soil within the project footprints.	Construction phase	All Personnel	Daily and maintain records
	E2.3: Drainage control measures to ensure runoff does not contact contaminated areas (including contaminated material within the project footprints) and is directed/diverted to stable areas for release.	Construction phase	All Personnel	Daily and maintain records
	E2.4: Avoid importing fill that may result in site contamination and lacks accompanying certification/documentation. Where fill is not available through on site cut, it must be tested in accordance with geotechnical specifications.	Construction phase	All Personnel	Daily and maintain records
E3: Disposal of excess soil/silt	E3.4: Silt removed from dams/canals/weirs during rehabilitation / maintenance is to be beneficially reused eg composted, returned to farm land, brick making etc. Silt should be tested to confirm suitability for proposed use	Construction and operation phases	MOAC and MONRE	Maintain records



## 8.10 AIR QUALITY

### 8.10.1 Performance Criteria

289 The following performance criteria are set for the construction of the projects:

- a. release of dust/particle matter must not cause an environmental nuisance;
- b. undertake measures at all times to assist in minimising the air quality impacts associated with construction and operation activities; and
- c. corrective action to respond to complaints and/or grievances is to occur within 48 hours.

### 8.10.2 Monitoring

290 A standardised air monitoring program has been developed for the projects (Table 6). The program is subject to review and update at least every two months from the date of issue. Importantly:

- a. the requirement for dust suppression will be visually observed by site personnel daily and by MOAC, MONRE and UNDP staff when undertaking routine site inspections; and
- b. Vehicles and machinery emissions – visual monitoring and measured when deemed excessive.

### 8.10.3 Reporting

291 All air quality monitoring results and/or incidents will be tabulated and reported as outlined in the ESMP. The MOAC and MONRE must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to air quality is exceeded.

Table 6 Air Quality Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
A.1 Increase in dust levels at sensitive receptors	A1.1: Implement effective dust management measures in all areas during design, construction and operation.	Pre and during construction	All Personnel	Daily and maintain records
	A1.2: Restrict speeds on roads and access tracks.	During construction	Contractor	Daily and maintain records
	A1.3: Manage dust/particulate matter generating activities to ensure that emissions do not cause an environmental nuisance at any sensitive locations	During construction	Contractor	Daily and maintain records
	A1.4: Construction activities should minimise risks associated with climatic events (check forecasts).	During construction	Contractor	Daily and maintain records
	A1.5: Implement scheduling/staging of proposed works to ensure major vegetation disturbance and earthworks are minimised.	Entire construction	Contractor	Daily and maintain records
	A1.6: Locate material stockpile areas as far as practicable from sensitive receptors. Cover if appropriate.	During construction	Contractor	Daily and maintain records
	A1.7: Source sufficient water of a suitable quality for dust suppression activities complying with any water restrictions.	During construction	Contractor	Daily and maintain records
	A1.8: Schedule revegetation activities to ensure optimum survival of vegetation species.	During construction	Contractor	Maintain records
	A1.9: Rubbish receptacles should be covered and located as far as practicable from sensitive locations	During construction	Contractor	Maintain records

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
A2. Increase in vehicle / machinery emissions	A2.1 Ensure vehicles/machines are switched off when not in use.	During construction	Contractor	Daily and maintain records
	A2.2 Ensure only vehicles required to undertake works are operated onsite.	During construction	Contractor	Daily and maintain records
	A2.3 Ensure all construction vehicles, plant and machinery are maintained and operated in accordance with design standards and specifications.	During construction	Contractor	Daily and maintain records
	A2.4 Develop and implement an induction program for all site personnel, which includes as a minimum an outline of the minimum requirements for environmental management relating to the site.	Pre and during construction	Contractor	Daily and maintain records
	A2.5 Locate construction vehicle/plant/equipment storage areas as far as practicable from sensitive locations.	During construction	Contractor	Daily and maintain records
	A2.6 Direct exhaust emissions of mobile plant away from the ground.	During construction	Contractor	Daily and maintain records

## 8.11 NOISE AND VIBRATION

### 8.11.1 Performance Criteria

292 The following performance criteria are set for the construction of the projects:

- a. selection of efficient equipment and maintenance in accordance with manufacturers manuals;
- b. noise from construction and operational activities must not cause an environmental nuisance at any noise sensitive place;
- c. ear protection PPE to be used by workers near noise/vibration generating equipment;
- d. undertake measures at all times to assist in minimising the noise associated with construction activities;
- e. no damage to off-site property caused by vibration from construction and operation activities; and
- f. corrective action to respond to complaints and/or grievances is to occur within 48 hours.

### 8.11.2 Monitoring

293 A standardised noise monitoring program has been developed for the projects (Table 7). The program is subject to review and update at least every two months from the date of issue. Importantly, the site supervisor will:

- a. ensure equipment and machinery is regularly maintained and appropriately operated; and
- b. carry out potentially noisy construction activities during 'daytime' hours only.

### 8.11.3 Reporting

294 All noise monitoring results and/or incidents will be tabulated and reported as outlined in the ESMP. The MOAC and MONRE must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to noise is exceeded

Table 7 Noise and Vibration Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
N1: Increased noise levels	N1.1: Select plant and equipment and specific design work practices to ensure that noise emissions are minimised during construction and operation including all pumping equipment.	All phases	Contractor	Maintain records
	N1.2: Specific noise reduction devices such as silencers and mufflers shall be installed as appropriate to site plant and equipment.	Pre and during construction	Contractor	Maintain records
	N1.3 Minimise the need for and limit the emissions as far as practicable if noise generating construction works are to be carried out outside of the hours: 7am-5.30pm	Construction phase	All Personnel	Daily and maintain records
	N1.4: Consultation with nearby residents in advance of construction activities particularly if noise generating construction activities are to be carried out outside of 'daytime' hours: 7am-5.30pm.	Construction phase	All Personnel	Daily and maintain records
	N1.5 The use of substitution control strategies shall be implemented, whereby excessive noise generating equipment items onsite are replaced with other alternatives.	Construction phase	All Personnel	Daily and maintain records
	N1.6 Provide temporary construction noise barriers in the form of solid hoardings where there may be an impact on specific residents.	Construction phase	Contractor	Daily and maintain records
	N1.7 All incidents complaints and non-compliances related to noise shall be reported in accordance with the site incident reporting procedures and summarised in the register.	Construction phase	Contractor	Maintain records



Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
N1: Increased noise levels	N1.8 The contractor should conduct employee and operator training to improve awareness of the need to minimise excessive noise in work practices through implementation of measures.	Pre and during construction	Contractor	Maintain records
N2. Vibration due to construction	N2.1: Identify properties, structures and habitat locations that will be sensitive to vibration impacts resulting from construction and operation of the project.	Pre and during construction	Contractor	Maintain records
	N2.2: Design to give due regard to temporary and permanent mitigation measures for noise and vibration from construction and operational vibration impacts.	Pre-construction	Contractor	Maintain records
	N2.3: All incidents, complaints and non-compliances related to vibration shall be reported in accordance with the site incident reporting procedures and summarised in the register.	Construction phase	Contractor	Maintain records
	N2.4: During construction, standard measure shall be taken to locate and protect underground services from construction and operational vibration impacts.	Construction phase	Contractor	Maintain records

## 8.12 SURFACE WATER

### 8.12.1 Performance Criteria

1. The following performance criteria are set for the construction of the projects:
  - a. no significant decrease in water quality as a result of construction and operational activities;
  - b. water quality shall conform to any approval conditions stipulated by UNDP, MOAC, MONRE and/or other government departments, or in the absence of such conditions follow a 'no worsening' methodology;
  - c. no off site impact will occur; and
  - d. effective implementation of site-specific EDSCPs.

### 8.12.2 Monitoring

2. Having water of a quality that is fit for purpose is important. Water quality can affect agriculture, plant growth, livestock health, soil quality, farm equipment and domestic use. The quality of a water source is also variable depending upon weather and external inputs.
3. Evaporation increases the concentrations of salts while a flush of water dilutes salts but may increase sediment and fertilisers, and manure or nutrient runoff. Monitoring should be done regularly and more frequently in summer or in periods of prolonged moisture stress.
4. Table 8 outlines the monitoring required.

### 8.12.3 Reporting

5. All water quality monitoring results and/or incidents will be tabulated and reported as outlined in the ESMP. The MOAC and MONRE must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to water quality is exceeded.

Table 8 Water Quality Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
W1: Elevated suspended solids and other contaminants in surface water systems.	W1.1: Develop and implement a site specific Erosion, Drainage and Sediment Control Plan (EDSCP) to address drainage control, sediment and erosion controls and stockpiling of materials including soil during construction of all components of the projects. EDSCP measures to be inspected regularly to ensure all devices are functioning effectively.	Pre Earthworks	Constructors	Initial set up and then as required with reporting to MOAC, MONRE and UNDP
	W1.2: Designated areas for storage of fuels, oils, chemicals or other hazardous liquids should have compacted impermeable bases and be surrounded by a bund to contain any spillage. Refuelling to be undertaken in areas away from water systems.	Entire construction and operation phase	All Personnel	Weekly with reporting to MOAC, MONRE and UNDP
	W1.3: Conduct regular surface and groundwater quality monitoring in location where the groundwater is likely to be impacted including assessing the changes to groundwater quality.	Entire construction and operation phase	Constructors	Weekly and as required with reporting to MOAC, MONRE and UNDP
	W1.4: Schedule works in stages to ensure that disturbed areas are revegetated and stabilised progressively and as soon as practicable after completion of works.	Avoid undertaking bulk earthworks during wet season	MOAC, MONRE and Constructors	Maintain records
	W1.5: Construction materials will not be stockpiled in proximity to aquatic environment that may allow for release into the environment. Construction equipment will be removed from in proximity to the aquatic environment at the end of each working day or if heavy rainfall is predicted	Entire construction and operation phase	Constructors	Maintain daily records

## 8.13 GROUNDWATER

### 5.3.1 Performance Criteria

6. The following performance criteria are set for the project:
  - a. no significant decrease in the quality and quantity of groundwater as a result of construction and operational activities in proximity to the projects;
  - b. effective implementation of site-specific EDSCPs and other measures to protect groundwater.
7. By following the management measures set out in the ESMP the project will not have a significant impact on water quality across the broader area.

### 8.13.1 Monitoring

8. Refer to Table 9 for the monitoring requirements for groundwater.
9. During the project groundwater quality should be assessed initially and then at least every two months. Initial assessment should cover a wide range of parameters (eg depth to water, pH, DO, conductivity, nitrates, phosphates, faecal coliforms, heavy metals, turbidity, hydrocarbons) to provide a baseline and to confirm suitability for intended use. Subsequent monitoring parameters will be determined on need.
10. Ongoing monitoring should form part of the operation of the boreholes.

### 8.13.2 Reporting

- 295 All water quality monitoring results and/or incidents will be tabulated and reported as outlined in the ESMP. The MOAC and MONRE must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to water.

Table 9 Groundwater management measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
GW 1: Increase of gross pollutants, hydrocarbons, metals and other chemical pollutants into the groundwater environment.	GW1.1: Conduct regular surface and groundwater quality monitoring in location where the groundwater is likely to be impacted, including assessing the changes to groundwater quality.	Construction and operation phase	Camp officer	Weekly and as required with reporting to MOAC, MONRE and UNDP
	GW1.2: Prevent contaminated surface water from entering aquifers via boreholes and wells - protect from runoff and flooding and keep surrounds clean.	All phases	All Personnel	Weekly
	GW1.3: Designated areas for storage of fuels, oils, chemicals or other hazardous liquids should have compacted impermeable bases and be surrounded by a bund to contain any spillage. Refuelling to be undertaken in areas away from water systems.	Entire construction and operation phase	All Personnel	Weekly with reporting to MOAC, MONRE and UNDP
	GW1.4: Check all vehicles, equipment and material storage areas daily for possible fuel, oil and chemical leaks. Undertake refuelling at designated places away from water systems.	All phases	All Personnel	Daily and maintain records
	GW 1.5: Minimise the use of herbicides, pesticides and other chemicals and use only biodegradable herbicides that have minimal impact on water quality and fauna. Use only as per directions	All phases	All Personnel	Daily and maintain records

## 8.14 TERRESTRIAL AND AQUATIC FLORA AND FAUNA

### 8.14.1 Performance Criteria

296 The following performance criteria are set for the construction of the projects:

- a. no clearance of vegetation outside of the designated clearing boundaries;
- b. no death to native fauna as a result of clearing activities;
- c. no death of important aquatic fauna as a result of water infrastructure removal and construction;
- d. no deleterious impacts on aquatic environments and terrestrial habitats;
- e. no introduction of new weed species as a result of construction and/or ecosystem based adaptation activities ; and
- f. no increase in existing weed proliferation within or outside of any project footprint as a result of construction and/or ecosystem based adaptation activities.

### 8.14.2 Monitoring

297 A flora and fauna monitoring program will be implemented (Table 10).

298 Weed monitoring will be undertaken and appropriate action taken in the event of alien or noxious species being identified.

299 The delivery organisation will when undertaking works, compile a weekly report to MOAC and MONRE outlining:

- a. any non-conformances to this ESMP;
- b. the areas that have been rehabilitated during the preceding week; and
- c. details of the corrective action undertaken.

### 8.14.3 Reporting

300 All flora and fauna monitoring results and/or incidents will be tabulated and reported as outlined in the ESMP. The MOAC and MONRE must be notified in the event of any suspected instances of death to native fauna and where vegetation is detrimentally impacted.



Table 10 Flora and Fauna Management Measures

Issue	Control Activity (and Source)	Action Timing	Responsibility	Monitoring and Reporting
FF1. Habitat loss and disturbance of fauna	FF1.1 Limit vegetation clearing and minimise habitat disturbance through adequate protection and management of retained vegetation.	During construction	Contractor	Daily and maintain records
	FF1.2: Minimise noise levels and lighting intrusion throughout construction and operation in the vicinity of any sensitive locations.	During construction	Contractor	Daily and maintain records
	FF1.3: Ensure that all site personnel are made aware of sensitive fauna/habitat areas and the requirements for the protection of these areas.	During construction	Contractor	Daily and maintain records
	FF1.4 Minimise disturbance to on-site fauna and recover and rescue any injured or orphaned fauna during construction and operation.	During construction	Contractor	Daily and maintain records, report
	FF1.5 Where necessary and practicable, relocate native fauna to the closest river where works are being undertaken	During construction	Contractor	Daily and maintain records, report
	FF1.6 Where earthworks are undertaken, rehabilitate the site with local provenance vegetation that provides habitat for fauna	During and post construction	Contractor	Daily and maintain records, report
FF2. Introduced flora and weed species	FF2.1: Implement an ESCP to reduce the spread of weeds through erosion and sediment entering any waterways and therefore spreading.	Pre and during construction	Contractor	Maintain records
	FF2.2: Revegetate disturbed areas using native and locally endemic species that have high habitat value.	During construction	Contractor	As required and maintain records
	FF2.3: Minimise disturbance to mature remnant vegetation, particularly canopy trees.	During construction	Contractor	Daily and maintain records

FF2.4: Seed is to be weed free

Operation

Contractor

Maintain records

Issue	Control Activity (and Source)	Action Timing	Responsibility	Monitoring and Reporting
FF2. Introduced flora and weed species	FF2.5: Small trees and shrubs shall be removed in preference to large trees.	During construction	Contractor	Daily and maintain records
	FF2.6: Environmental weeds and noxious weeds within the project footprints shall be controlled.	During and post construction	Contractor	Weekly and maintain records

## 8.15 LAND OWNERSHIP AND CUSTOMARY TENURE

### 8.15.1 Performance Criteria

11. The following performance criteria are set for the project:
  - a. no resettlement will occur as a result of the project
  - b. where there is the need for access to land for any project activity, the land will be returned in the same condition as it was prior to any access;
  - c. in the case of ecosystem based adaptation interventions, all land needs will ensure beneficial use by existing land holders;
  - d. ecosystem based adaptation activities will only be undertaken following the signing of a voluntary agreement;
  - e. in the case of the need to access land for the purposes of undertaking water infrastructure works, access will only be undertaken through voluntary agreements with landholders. Where a voluntary agreement cannot be established, the land will not be used;
  - f. ensure full compliance with the UNDP Social and Environmental Standards Guidance Note for Standard Five (5) on Displacement and Resettlement;
  - g. complaint and grievance mechanisms are put in place and proactively managed; and
  - h. long-term social benefits are achieved.
12. Local stakeholders and community members have a key role to play in the implementation and monitoring of the project.
13. Consultation with stakeholders will continue. This will help ensure that stakeholders continue to be aware of the project, its progress and any changes in the project. It will also assist in identifying any issues as they arise.
14. The MOAC and MONRE will be responsible for advisory support and extensions services to local beneficiaries along with being responsible for distributing material inputs and providing technical training and backstopping in the implementation of programme activities.

### 8.15.2 Reporting

15. Records of all consultations are to be kept and reported on monthly basis.
16. The MOAC and MONRE must be notified in the event of any individual or community complaint or dissatisfaction and ensure the Grievance Redress Mechanism is complied with.

Table 11 Land Ownership Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring reporting	&
LO1: Ensure no impact on Land Ownership	LO 1.1: Carry out community consultation on the purpose and benefits of making changes to land use	Pre-construction	MOAC MONRE	and	Maintain records
	LO 1.1: Ensure all access is undertaken consistent with signed voluntary agreements	Pre-construction	MOAC MONRE	and	Maintain records
	LO 1.3: Ensure full compliance with the UNDP Social and Environmental Standards Guidance Note for Standard Five (5) on Displacement and Resettlement	Entire construction and operation phase	MOAC MONRE	and	Maintain records
	LO 1.4: Ensure compliance with the Grievance Redress Mechanism process	Entire construction and operation phase	MOAC MONRE	and	Maintain records

## 8.16 GENDER

### 8.16.1 Performance Criteria

17. The following performance criteria are set for the project:
  - a. ensure the project has gender equality and women empowerment within all activities;
  - b. ensure the project does not have any gender-based discrimination and/or inequalities;
  - c. where practicable, preference should be given to women for any employment;
  - d. complaint and grievance mechanisms are put in place and proactively managed; and
  - e. long-term social benefits are achieved.
18. Local stakeholders and community members have a key role to play in the implementation and monitoring of the project.
19. Consultation with stakeholders will continue. This will help ensure that stakeholders continue to be aware of the project, its progress and any changes in the project. It will also assist in identifying any issues as they arise.
20. The MOAC and MONRE will be responsible for advisory support and extensions services to local beneficiaries along with being responsible for distributing material inputs and providing technical training and backstopping in the implementation of programme activities.

### 8.16.2 Reporting

21. Records of all consultations are to be kept and reported on monthly basis.
22. The MOAC and MONRE must be notified in the event of any individual or community complaint or dissatisfaction and ensure the Grievance Redress Mechanism is complied with.

Table 12 Gender Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring reporting	&
GE1: Gender Equality and Women Empowerment	GE 1.1: Ensure the project has gender equality and women empowerment within all activities	Entire construction and operation phase	MOAC MONRE	and	Maintain records
	GE 1.2: Ensure the project does not have any gender-based discrimination and/or inequalities	Entire construction and operation phase	MOAC MONRE	and	Maintain records
	GE 1.3: Where practicable, preference should be given to women for any employment	Entire construction and operation phase	MOAC MONRE	and	Maintain records



## 8.17 EMPLOYMENT, LABOUR AND WORKING CONDITIONS

23. The project has been designed with the assistance of stakeholders and aims to provide benefits to the broader community who will be involved in the construction of project interventions. Notwithstanding, as with any project that involves construction, some dissatisfaction can occur and conflicts may arise where individuals are unable to be provided employment. It is important that potential areas of tension are recognised early and appropriate actions taken to avoid or minimise conflict.

### 8.17.1 Performance Criteria

24. The following performance criteria are set for the project:
- a. ensure compliance with Thai labour and occupational health and safety laws, with obligations under international law, and consistency with the principles and standards embodied in the International Labor Organisation fundamental conventions, including freedom of association, elimination of discrimination in employment and occupation, elimination of forced or compulsory labour, and
  - b. ensure no forms of child labour;
  - c. where possible, local residents will be employed first for all construction activities;
  - d. all employees and contractors will be paid equally;
  - e. where practicable, preference should be given to women for any employment;
  - f. ensure workers' health and safety is protected and overall well-being benefits derived from the project;
  - g. ensure workers are trained in occupational health and safety;
  - h. ensure workers are provided appropriate personal protective equipment suitable for their duties; and
  - i. complaint and grievance mechanisms are put in place and proactively managed.
25. Local stakeholders and community members have a key role to play in the implementation and monitoring of the project and therefore preference should be given to them with respect to employment.
26. MOAC and MONRE will be responsible for advisory support and extensions services to local beneficiaries along with being responsible for distributing material inputs and providing technical training and backstopping in the implementation of programme activities.

### 8.17.2 Reporting

27. Records of all consultations are to be kept and reported on monthly basis.
28. The MOAC and MONRE should keep records on local employment and pay conditions;
29. The MOAC and MONRE must be notified in the event of any individual or community complaint or dissatisfaction and ensure the Grievance Redress Mechanism is complied with.

Table 13 Employment, Labour and Working Conditions Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring reporting	&
WC1: Employment, Labour and Working Conditions	WC 1.1: Ensure compliance with Thai labour and occupational health and safety laws,	Entire construction and operation phase	MOAC MONRE	and	Maintain records
	WC 1.2: Employ local residents and women first where practicable	Entire construction and operation phase	MOAC MONRE	and	Maintain records
	WC 1.3: Ensure workers' health and safety is protected and overall well-being benefits derived from the project	Entire construction and operation phase	MOAC MONRE	and	Maintain records
	WC 1.4: Ensure workers are trained in occupational health and safety	Entire construction and operation phase	MOAC MONRE	and	Maintain records
	WC 1.5: Ensure workers are provided appropriate personal protective equipment suitable for their duties	Entire construction and operation phase	MOAC MONRE	and	Maintain records

## 8.18 ARCHAEOLOGICAL AND CULTURAL HERITAGE

301 The following performance criteria are set for cultural heritage issues related to the project:

- a. There will be no impact on any important Archaeological and/or Cultural Heritage sites;
- b. Manage any specific sites of important Archaeological and/or Cultural significance (significant sites);
- c. Where there is a mix of modern development and traditional areas within villages use community engagement to confirm options of enabling future development as nominated by the participants and protecting culturally significant traditional areas;
- d. Work with the village communities to differentiate between traditional village areas of cultural significance (uses and physical form) within each of the village boundary areas during the construction phase of the project; and
- e. Monitoring.

302 Local stakeholders and community members have a key role to play in the implementation and monitoring of the project.

303 Consultation with stakeholders will continue. This will help ensure that stakeholders continue to be aware of the project, its progress and any changes in the project. It will also assist in identifying any issues as they arise.

304 MOAC and MONRE will be responsible for advisory support and extensions services to local beneficiaries along with being responsible for distributing material inputs and providing technical training and backstopping in the implementation of programme activities.

### 8.18.1 Reporting

305 Records of all consultations are to be kept and reported on monthly basis.

Table 14 Archaeological and Cultural Heritage

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
CH1: Damage or disturbance to significant important Archaeological, Indigenous and/or Cultural Heritage during the earth disturbances and land clearing activities	CH1.1: Should any important Archaeological and/or Cultural Heritage sites, immediately cease work within the area that the site has been observed and consult with the relevant Museum, UNDP, MONRE and archaeologist available for implementation during construction.	Pre and during construction	Contractor	Daily, maintain records and immediately notify UNDP and MONRE of any find

## 8.19 WASTE MANAGEMENT

### 8.19.1 Background

306 As the implementing agency, the MOAC and MONRE advocate good waste management practice. The preferred waste management hierarchy and principles for achieving good waste management is as follows:

- a. waste avoidance (avoid using unnecessary material on the projects);
- b. waste re-use (re-use material and reduce disposing);
- c. waste recycling (recycle material such as cans, bottles, etc.); and
- d. waste disposal (all petruscible and/or contaminated waste to be dumped at approved landfills).

307 The key waste streams generated during construction are likely to include residual sediment and construction wastes such as:

- a. the excavation wastes unsuitable for reuse during earthworks;
- b. previous water infrastructure that will be removed and replaced;
- c. wastes from construction and drilling equipment maintenance. Various heavy vehicles and construction equipment will be utilised for the duration of the construction and drilling phase. Liquid hazardous wastes from cleaning, repairing and maintenance of this equipment may be generated. Likewise leakage or spillage of fuels/oils within the site needs to be managed and disposed of appropriately;
- d. non-hazardous liquid wastes will be generated through the use of workers' facilities such as toilets; and
- e. general wastes including scrap materials and biodegradable wastes.

308 Key waste streams generated during operations are likely to include:

- a. excavated sediment (primarily sand and coral, which can be used for concrete or spread on suitable areas); and
- b. used oil and machinery parts.

309 Workers involved in construction and operational activities should be familiar with methods minimising the impacts of clearing vegetation to minimise the footprint to that essential for the works and rehabilitate disturbed areas. By doing these activities, the projects should minimise the impact of waste generated by the project.

### 8.19.2 Performance Criteria

310 The following performance criteria are set for the construction of the projects:

- a. waste generation is minimised through the implementation of the waste hierarchy (avoidance, reduce, reuse, recycle);
- b. no litter will be observed within the project area or surrounds as a result of activities by site personnel;
- c. no complaints received regarding waste generation and management;
- d. any waste from on-site portable sanitary facilities will be sent off site for disposal by a waste licensed contractor; and



## Annex 6(b) – Environmental and Social Management Framework

Green Climate Fund Funding Proposal

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- e. waste oils will be collected and disposed or recycled off-site, local oil companies or shipped for recycling.

### 8.19.3 Monitoring

311 A waste management monitoring program has been developed for the projects (Table 15). The program is subject to review and update at least every two months from the date of issue.

### 8.19.4 Reporting

312 The MOAC and MONRE as implementing agency must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to waste is exceeded.



Table 15 Waste Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
WT1: Production of wastes and excessive use of resources	WT1.1: Preference shall be given to materials that can be used to construct the project that would reduce the direct and indirect waste generated.	Pre and during construction	Contractor	Maintain records
	WT1.2: Daily waste practices shall be carried out unless these are delegated to the activities of external waste management bodies.	During construction	Contractor	Daily and maintain records
	WT1.3: The use of construction materials shall be optimised and where possible a recycling policy adopted.	During construction	Contractor	Weekly and maintain records
	WT1.4: Separate waste streams shall be maintained at all times i.e. general domestic waste, construction and contaminated waste. Specific areas on site shall be designated for the temporary management of the various waste streams.	During construction	Contractor	Weekly and maintain records
	WT1.5: Any contaminated waste shall be disposed of at an approved facility.	During construction	Contractor	Weekly and maintain records
	WT1.6: Recyclable waste (including oil and some construction waste) shall be collected separately and disposed of correctly.	During construction	Contractor	Weekly and maintain records
	WT1.7: Waste sites shall be sufficiently covered to ensure that wildlife does not have access.	During construction	Contractor	Daily
	WT1.8: Disposal of waste shall be carried out in accordance with the Government of Thailand requirements.	During construction	Contractor	Weekly and maintain records

WT1.9: Fuel and lubricant leakages from vehicles and plant shall be immediately rectified. During construction Contractor Daily and maintain records

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
WT1: Production of wastes and excessive use of resources	WT1.10: Major maintenance and repairs shall be carried out off-site whenever practicable.	During construction	Contractor	Weekly and maintain records
	WT1.11: Where possible, fuel and chemical storage and handling shall be undertaken at central fuel and chemical storage facilities, such as petrol stations.	During Construction	Contractor	Daily and maintain records
	WT1.12: On-site storage of fuel and chemicals shall be kept to a minimum.	During Construction	Contractor	Daily, maintain records and report any incidents
	WT1.13: Any waste oils and lubricants are to be collected and transported to recyclers or designated disposal sites as soon as possible.	During Construction	Contractor	Daily and maintain records
	WT1.14: Any dangerous goods stored on site shall be stored in accordance with Georgian regulations.	During Construction	Contractor	Daily and maintain records

## 8.20 EMERGENCY MANAGEMENT MEASURES

313 In the event of actions occurring, which may result in serious health, safety and environmental (catastrophic) damage, emergency response or contingency actions will be implemented as soon as possible to limit the extent of environmental damage.

314 The delivery organisation will need to incorporate emergency responses into the project complying with the requirements under the Occupational, Health and Safety Policy of the delivery organisation and the relevant Thai legislation.

### 8.20.1 Performance Criteria

315 The following performance criteria are set for the construction of the projects:

- a. no incident of fire outbreak;
- b. no failure of water retaining structures;
- c. no major chemical or fuel spills;
- d. no preventable industrial or work related accidents;
- e. provide an immediate and effective response to incidents that represent a risk to public health, safety or the environment; and
- f. minimise environmental harm due to unforeseen incidents.

### 8.20.2 Monitoring

316 An emergency response monitoring program has been developed for the project (Table 16). The program is subject to review and update at least every two months from the date of issue. Importantly, visual inspections will be conducted by MOAC and MONRE daily with reporting to UNDP staff on a weekly basis (minimum) noting any non-conformances to this ESMP.

### 8.20.3 Reporting

317 The MOAC, MONRE and UNDP staff must be notified immediately in the event of any emergency, including fire or health related matter including those that have resulted in serious environmental harm.

Table 16 Emergency Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
EM1: Fire and Emergency management and prevention strategies implemented	EM1.1: Flammable and combustible liquids bunding/storage areas to be designed in accordance with appropriate international standards	Pre and during construction	Contractor	Daily and maintain records
	EM1.2: Fire extinguishers are to be available on site	During construction	Contractor	Daily and maintain records
	EM1.3: No open fires are permitted within the project area	During construction	Camp officer	Daily and maintain records
	E1.4: Communication equipment and emergency protocols to be established prior to commencement of construction activities.	During construction	Camp officer	Daily and maintain records
	EM1.5: Train all staff in emergency preparedness and response (cover health and safety at the work site). Coordinate with NDMO.	During construction	Camp officer	Daily and maintain records
	EM1.6: Check and replenish First Aid Kits	During construction	Camp officer	Daily and maintain records
	EM1.7: Use of Personal Protection Equipment	During construction	All Personnel	Daily and maintain records

## Annexure One Guidance for Submitting a Request to the Social and Environmental Compliance Unit and/or the Stakeholder Response Mechanism

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*Empowered lives.  
Resilient nations.*

### Guidance for Submitting a Request to the Social and Environmental Compliance Unit (SECU) and/or the Stakeholder Response Mechanism (SRM)

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#### **Purpose of this form**

- **If you use this form, please put your answers in bold writing to distinguish text**
- **The use of this form is recommended, but not required. It can also serve as a guide when drafting a request.**

This form is intended to assist in:

- 1 Submitting a request when you believe UNDP is not complying with its social or environmental policies or commitments and you are believe you are being harmed as a result. This request could initiate a 'compliance review', which is an independent investigation conducted by the Social and Environmental Compliance Unit (SECU), within UNDP's Office of Audit and Investigations, to determine if UNDP policies or commitments have been violated and to identify measures to address these violations. SECU would interact with you during the compliance review to determine the facts of the situation. You would be kept informed about the results of the compliance review.

and/or

- 2 Submitting a request for UNDP "Stakeholder Response" when you believe a UNDP project is having or may have an adverse social or environmental impact on you and you would like to initiate a process that brings together affected communities and other stakeholders (e.g., government representatives, UNDP, etc.) to jointly address your concerns. This Stakeholder Response process would be led by the UNDP Country Office or facilitated through UNDP headquarters. UNDP staff would communicate and interact with you as part of the response, both for fact-finding and for developing solutions. Other project stakeholders may also be involved if needed.

Please note that if you have not already made an effort to resolve your concern by communicating directly with the government representatives and UNDP staff responsible for this project, you should do so before making a request to UNDP's Stakeholder Response Mechanism.

**Confidentiality** If you choose the Compliance Review process, you may keep your identity confidential (known only to the Compliance Review team). If you choose the Stakeholder Response Mechanism, you

can choose to keep your identity confidential during the initial eligibility screening and assessment of your case. If your request is eligible and the assessment indicates that a response is appropriate, UNDP staff will discuss the proposed response with you, and will also discuss whether and how to maintain confidentiality of your identity.

### Guidance

When submitting a request please provide as much information as possible. If you accidentally email an incomplete form, or have additional information you would like to provide, simply send a follow-up email explaining any changes.

### Information about You

Are you...

1. A person affected by a UNDP-supported project?

Mark "X" next to the answer that applies to you:

Yes:

No:

2. An authorised representative of an affected person or group?

Mark "X" next to the answer that applies to you:

Yes:

No:

*If you are an authorised representative, please provide the names of all the people whom you are representing; and documentation of their authorization for you to act on their behalf, by attaching one or more files to this form.*

3. First name:
4. Last name:
5. Any other identifying information:
6. Mailing address:
7. Email address:
8. Telephone Number (with country code):
9. Your address/location:
10. Nearest city or town:
11. Any additional instructions on how to contact you:
12. Country:

### **What you are seeking from UNDP: Compliance Review and/or Stakeholder Response**

You have four options:

- a. Submit a request for a Compliance Review;
  - b. Submit a request for a Stakeholder Response;
  - c. Submit a request for both a Compliance Review and a Stakeholder Response;
  - d. State that you are unsure whether you would like Compliance Review or Stakeholder Response and that you desire both entities to review your case.
13. Are you concerned that UNDP's failure to meet a UNDP social and/or environmental policy or commitment is harming, or could harm, you or your community? Mark "X" next to the answer that applies to you:      Yes:      No:
  14. Would you like your name(s) to remain confidential throughout the Compliance Review process?



Mark “X” next to the answer that applies to you:      Yes:              No:

If confidentiality is requested, please state why:

15. Would you like to work with other stakeholders, e.g., the government, UNDP, etc. to jointly resolve a concern about social or environmental impacts or risks you believe you are experiencing because of a UNDP project?

Mark “X” next to the answer that applies to you:      Yes:              No:

16. Would you like your name(s) to remain confidential during the initial assessment of your request for a response?

Mark “X” next to the answer that applies to you:      Yes:              No:

If confidentiality is requested, please state why:

17. Requests for Stakeholder Response will be handled through UNDP Country Offices unless you indicate that you would like your request to be handled through UNDP Headquarters. Would you like UNDP Headquarters to handle your request?

Mark “X” next to the answer that applies to you:      Yes:              No:

If you have indicated yes, please indicate why your request should be handled through UNDP Headquarters:

18. Are you seeking both Compliance Review and Stakeholder Response?

Mark “X” next to the answer that applies to you:      Yes:              No:

19. Are you unsure whether you would like to request a Compliance Review or a Stakeholder Response?

Mark “X” next to the answer that applies to you:      Yes:              No:

### Information about the UNDP Project you are concerned about, and the nature of your concern:

20. Which UNDP-supported project are you concerned about? (if known):

21. Project name (if known):

22. Please provide a short description of your concerns about the project. If you have concerns about UNDP’s failure to comply with its social or environmental policies and commitments, and can identify these policies and commitments, please do (not required). Please describe, as well, the types of environmental and social impacts that may occur, or have occurred, as a result. If more space is required, please attach any documents. You may write in any language you choose

j.

k.

l.

23. Have you discussed your concerns with the government representatives and UNDP staff responsible for this project? Non-governmental organisations?

Mark “X” next to the answer that applies to you:      Yes:              No:

If you answered yes, please provide the name(s) of those you have discussed your concerns with

Name of Officials You have Already Contacted Regarding this Issue:

First Name	Last Name	Title/Affiliation	Estimated Date of Contact	Response of Individual	from the
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24. Are there other individuals or groups that are adversely affected by the project?

Mark "X" next to the answer that applies to you: Yes: No:

25. Please provide the names and/or description of other individuals or groups that support the request:

First Name	Last Name	Title/Affiliation	Contact Information
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Please attach to your email any documents you wish to send to SECU and/or the SRM. If all of your attachments do not fit in one email, please feel free to send multiple emails.

### Submission and Support

To submit your request, or if you need assistance please email: [project.concerns@undp.org](mailto:project.concerns@undp.org)

## Annexure Two: Stakeholder Engagement Plan

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### **Enhancing climate resilience in Thailand through effective water management and sustainable agriculture**

#### **Stakeholder Engagement Plan**

The proposed GCF project has been developed in close discussion and participation among a range of stakeholder groups. The Royal Irrigation Department (RID) has played a vital role in leading the discussions on the proposal identification and formulation process with the engagement and guidance of the Office of Natural Resources and Environmental Policy and Planning (ONEP)/GCF National Designated Authority, Office of National Water Resources (ONWR), Thai Meteorological Department (TMD), Land Development Department (LDD), Department of Agricultural Extension (DOAE), Office of the National Economic and Social Development Board (NESDB), and other stakeholder ministries and agencies. Key stakeholders to be involved in the project implementation were identified during the process consistent with government mandates related to areas of work, as well as stakeholder expertise and comparative advantage. Private sector and civil society organizations were also engaged in the process, in line with shared objectives of stakeholders/partners and co-benefits of collaboration.

Stakeholders contributed to the design of the project, across three project outputs: 1) Enhance climate and risk informed planning in the water and agricultural sectors through improved climate information and cross sectoral coordination, 2) Improve water management through strengthened infrastructure complemented by EbA measures, for greater resilience to climate change impacts, and 3) Reduce volatility of agriculture livelihoods in drought and flood prone areas through strengthened extension support and local planning, investment in on-farm adaptation measures and greater access to finance and markets.

Engagement with stakeholders will occur through various means – through the regular consultations and engagement planned during implementation of project activities, as well as through formal mechanisms related to the project's organizational structure. During project inception, Working Groups will be established to support implementation across the 3 Outputs based on roles and responsibilities: Output 1 - KMUTNB and RID; Output 2 – RID, GIZ, provincial offices; Output 3 – RID, DoA, CPD, DoAE, DoF, LDD, Sub-district Administrative Offices. Further a Technical Advisory Group will be established that will include technical expertise from government, as well as representation of private/finance sector and CSOs. Please see B4 Implementation Arrangements of the funding proposal for further details.

The following Stakeholder Engagement Plan provides an indicative list of stakeholders for the Outputs and Activities for the lifetime of this project. The plan will be reviewed and updated as necessary during the project inception period, as well as regularly throughout implementation as additional stakeholders (particularly private sector and CSOs) are identified.

Outputs	Activity	Stakeholders
Output 1: Enhance climate and risk informed planning in the water and agricultural sectors through improved climate information and cross sectoral coordination	Activity 1.1. Strengthening capacity to generate tailored climate information to inform water management and agriculture planning	<p>Royal Irrigation Department (RID)</p> <p>Office of National Water Resources (ONWR)</p> <p>Ministry of Natural Resources and Environment (MONRE)</p> <p>Thai Meteorological Department (TMD)</p> <p>Hydro and Agro Informatics Institute (HAI)</p> <p><b>Responsible party:</b> King Mongkut's University of Technology North Bangkok (KMUTNB)</p> <p>KMUTNB is a current partner of RID. They have developed the information system of water management (macro scale) for farmers funded by national research center. Hence, RID has selected KMUTNB to tailor the climate change and water management information in the project area (Yom and Nan River Basin) and assume role in upgrading the national water irrigation management system.</p>
	Activity 1.2. Facilitating inter-ministerial coordination for climate-informed and integrated planning	<p>Royal Irrigation Department (RID)</p> <p>Office of National Water Resources (ONWR)</p> <p>Ministry of Natural Resources and Environment (MONRE)</p> <p>Thai Meteorological Department (TMD)</p> <p>Hydro and Agro Informatics Institute (HAI)</p> <p>King Mongkut's University of Technology North Bangkok (KMUTNB)</p>
	Activity 1.3. Expanding access to climate information for application at the household level	<p>Royal Irrigation Department (RID)</p> <p>Ministry of Natural Resources and Environment (MONRE)</p> <p>Water User Groups (WUG)</p> <p>Disaster of Disaster Prevention and Mitigation, Ministry of Interior</p> <p>Ministry of Public Health</p> <p>Ministry of Agriculture and Cooperatives (MOAC)</p>
Output 2: Improve water management through	Activity 2.1. Climate-informed engineering	Royal Irrigation Department (RID)

Outputs	Activity	Stakeholders
strengthened infrastructure complemented by EbA measures, for greater resilience to climate change impacts	designs for the 13 schemes of the Yom-Nan river basin and upgrade of 2 water infrastructure	<p>Office of National Water Resources (ONWR)</p> <p>Ministry of Natural Resources and Environment (MONRE)</p> <p>Thai Army</p> <p>Local Administrative Organization, Ministry of Interior (MOI)</p> <p>Water User Groups (WUG)</p> <p>Communities</p> <p>Local communities in the Yom-Nan river basin will be engaged according to the existing ministerial regulations issued by the Prime Minister Office. The focal agency is the Office of National Water Resources (ONWR). Regulations apply for the 25 river basins nationwide to facilitate enhancement of cooperation in water resource management as well as flood and drought preparedness sand response. The RID local offices are members of the river basin committee, and will help coordinate the project team, RPs in their engagement with committee members, including the representatives from villages/water users.</p> <p>Further, several of the 11 regulations address selection of river basin committee members, setting up of water user organizations and their roles and responsibilities. This involves rules and guidelines for state measures to compensate people affected floods and water shortages. ONWR will also help to involve the civil sector in water resource management, enhance cooperation across government agencies and help authorities better manage floods and/or droughts.</p>
	Activity 2.2. Complementing of grey infrastructure with EbA measures and integration of EbA approaches into water management policy and planning	<p>Royal Irrigation Department (RID)</p> <p>Office of National Water Resources (ONWR)</p> <p>Ministry of Natural Resources and Environment (MONRE)</p> <p>GIZ</p> <p>Communities in the Yom, Nan River Basins</p>

Outputs	Activity	Stakeholders
		<p>(See comment above on engagement with communities)</p> <p><b>Responsible party:</b> Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) GmbH</p> <p>As a partner for sustainable development with worldwide operations, the German government owned Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) GmbH operates on behalf of German Ministries, the governments of other countries and international clients.</p> <p>With support from the German Federal Ministry for Environment, Nature Conservation and Nuclear Safety (BMU), Thai-German Climate Programme (TGCP), and implementation by GIZ from 2018-2021 is promoting an EbA roadmap in Thailand (from policy to action). Engagement with GIZ ensures complementarity and cost-efficiencies.</p>
Output 3: Reduce volatility of agriculture livelihoods in drought and flood prone areas through strengthened extension support and local planning, investment in on-farm adaptation measures and greater access to finance and markets	Activity 3.1. Application of climate information in household agriculture planning and strengthening of related support through extension services	<p>Royal Irrigation Department (RID)</p> <p>Ministry of Natural Resources and Environment (MONRE)</p> <p>Ministry of Agriculture and Cooperatives (MOAC): Land Development Department (LDD), Department of Fisheries (DOF), Department of Agricultural Extension (DOAE), Department of Agriculture (DOA), Rice Department, Office of Agricultural Economics (OAE), Department of Livestock Development (DLD)</p> <p>Ministry of Public Health (MOPH)</p> <p>Local Administrative Organization, Ministry of Interior (MOI)</p>
	Activity 3.2. Implementation of on-farm climate resilient measures to improve drought and flood resilience and improved access to	<p>Royal Irrigation Department (RID)</p> <p>Ministry of Natural Resources and Environment (MONRE)</p> <p>Ministry of Agriculture and Cooperatives (MOAC): Land Development Department</p>



Outputs	Activity	Stakeholders
	finance for sustainable agriculture	<p>(LDD), Department of Fisheries (DOF), Department of Agricultural Extension (DOAE), Department of Agriculture (DOA), Rice Department, Office of Agricultural Economics (OAE), Department of Livestock Development (DLD)</p> <p>Local Administrative Organization, Ministry of Interior (MOI)</p>
	Activity 3.3. Capacity building for farmers to support market access for climate resilient agriculture products	<p>Royal Irrigation Department (RID)</p> <p>Ministry of Natural Resources and Environment (MONRE)</p> <p>Ministry of Agriculture and Cooperatives (MOAC): Land Development Department (LDD), Department of Fisheries (DOF), Department of Agricultural Extension (DOAE), Department of Agriculture (DOA), Rice Department, Office of Agricultural Economics (OAE), Department of Livestock Development (DLD)</p> <p>Ministry of Commerce (MOC)</p> <p>Local Administrative Organization, Ministry of Interior (MOI)</p> <p>Krungsri Bank</p> <p>Bank for Agriculture and Agriculture Cooperatives (BAAC)</p> <p>Finance/Private sector partners</p> <p>CSOs and social enterprise</p> <p><u>Note:</u> Krungsri Bank is an important partner for Output 3, providing financial literacy training to project beneficiaries. Krungsri Bank has offered an in-kind contribution to the project. Through parallel finance, BAAC will make USD 16 million credit available to farmers seeking to invest in climate resilient, sustainable agriculture and adaptation measures.</p>

## Annexure Three: Livelihood Restoration Plan

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### Introduction

The section should include:

- a. Brief project description;
- b. Purpose of the Livelihood Restoration Plan, and
- c. Scope of the livelihood impact management plan.

### Project Description

- a. Provide a comprehensive description of the project ;
- b. Include an overview of the project and subsequently describe the pre-construction, construction, and operational phases and other activities of the project;
- c. Key aspects relevant to farming resources, farming based livelihoods restoration of project-affected communities should be described in detail.

### Statutory and Regulatory Framework

#### Livelihood Systems of Project-Affected Communities

- a. Describe the livelihood systems of project-affected farming communities.

#### Local Resources and Activities

- a. Describe local resources and activities that are both impacted by and at risk from project activities.
- b. Describe the range of activities used by individuals, households, and communities impacted by the project. Include postharvest processing and sale, including the value chain of produce.

#### Identification of Stakeholders

- a. Identify the various stakeholders who may be impacted or may be involved in the process of development, implementation, and monitoring of the programs.

### Impact Assessment

- a. Impact Assessment
- b. Definition of Eligibility Criteria and Entitlement Matrix for Directly Affected Farming Individuals/Communities
- c. Restoration Strategy Define the overall impact management strategy.

### Program and Activity Description

- a. Provide a description of program and component activities. Include key information pertaining to target group, implementation, human resources, timeline, budget, etc.

**Project Implementation** (human resources, partners, and organisational responsibilities)

- a. Describe human resources for implementation of the plan and component programs/interventions.
- b. Clearly define roles and responsibilities and organisational structure.
- c. Describe potential partners (affected groups and communities, NGOs, government, etc.) and their respective roles and responsibilities.

**Schedule**

- a. Multi-year schedule of implementation for the component programs/ interventions and the overall plan.

**Budget**

- a. Budgets for the component programs/ interventions and the total cost of the plan.

**Monitoring and Evaluation**

- a. Overall monitoring and evaluation framework that integrates the monitoring and evaluation requirements for the component programs/ interventions

## Annexure Four: Erosion, Drainage and Sediment Control Management Plan and Contaminated Soil Disposal Management Plan Outline

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### **Project Description**

- a. Provide a comprehensive description of the project; and
- b. Include an overview of the pre-construction, construction, and operational phases of the project.

### **Purpose, Scope and Objective**

The section should include:

- a. Scope of the Erosion, Drainage and Sediment Control Management Plan (EDSCP) and Contaminated Soil Disposal Management Plan (CSDMP)
- b. Establish objectives for general EDSCP and CSDMP;
- c. Establish specific objectives for site specific EDSCP and CSDMP;
- d. Relationship to specific mitigation measures

### **Statutory and Regulatory Requirements**

- a. Legislative requirements as prescribed in the Project Environmental and Social Management Plan (ESMP)

### **Potential Impacts**

- a. Overview of impacts identified in ESMF and ESMP;



## Annex 6(b) – Environmental and Social Management Framework

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### Erosion and sediment control impacts and mitigations

Source of Impact	Potential Impact and Relevant Management Plan Objective	Mitigation and Management (Design Feature/ Specific Measure)	Mitigation Measure	Activity/ Monitoring	Frequency	Duration	Responsibility	Evidence

**Project Implementation** (human resources, partners, and organisational responsibilities)

- a. Describe human resources for implementation of the plan and component programs/interventions;
- b. Clearly define roles and responsibilities and organisational structure;
- c. Discuss training that will be provided; and
- d. Describe potential partners (NGOs, government, etc.) and their respective roles and responsibilities.

**Resources**

- a. Equipment requirements including erosion and sediment control devices (sediment fencing, silt curtains, etc) water quality monitoring equipment; and on-site weather monitoring station;
- b. Staff involved including Construction Environmental Officer; Environmental Coordinator; Monitoring Officer; Environmental and Regulatory Manager; and
- c. Registers including water quality monitoring record; and non-conformance register.

**Schedule**

- a. Multi-year schedule of implementation for the component programs/ interventions and the overall plan.

**Monitoring and Evaluation**

- a. Overall monitoring and evaluation framework that integrates the monitoring and evaluation requirements for the component programs/ interventions.

**Reporting and Notification**

- a. Contractor's monthly report including results of the surveys and inspections; and number and results of verification inspections, including but not limited to landform stability inspections, sediment control structure and stockpile inspections and control measures implemented to manage failing sediment control structures and stockpiles.

**Budget**

- a. Budgets for the component programs/ interventions and the total cost of the plan.



## Annexure Five: Standard General Environmental Contract Clauses

Generic contract clauses are provided in this annex to assist with environmental and social management works expected to have minor impacts. These mitigation measures are the core of a generic, standardised ESMP (Environmental and Social Management Plan) and the associated minor impacts typical of small works which can be routinely addressed with best industry practice. These clauses are general and may be modified to conform to applicable national laws, contract procedures and actual scope and nature of the works anticipated. These clauses are intended to be included as requirements in the works contract and shall remain in force throughout the contract period. These clauses represent the minimum standard of execution for environmental protection and include:

- 1 Permits and Approvals
- 2 Site Security
- 3 Discovery of Antiquities
- 4 Worker Occupational Health and Safety
- 5 Noise Control
- 6 Use and Management of Hazardous Materials, fuels, solvents and petroleum products
- 7 Use and Management of Pesticides
- 8 Use of Preservatives and Paint Substances
- 9 Use of Explosives
- 10 Site Stabilisation and Erosion Control
- 11 Traffic Management
- 12 Management of Standing Water
- 13 Management of Solid Wastes -trash and construction debris
- 14 Management of Liquid Wastes

### Standard Clauses

#### **1. Permits and Approvals**

The contractor shall be responsible for ensuring that he or she has all relevant legal approvals and permits required to commence works.

#### **2. Site Security**

The contractor shall be responsible for maintaining security over the construction site including the protection of stored materials and equipment. In the event of severe weather, the contractor shall secure the construction site and associated equipment in such a manner as to protect the site and adjacent areas from consequential damages. This includes the management of onsite, construction materials, construction and sanitary wastes, additional strengthening of erosion control and soil stabilization systems and other conditions resulting from contractor activities which may increase the potential for damages.

#### **3. Discovery of Antiquities**

If, during the execution of the activities contained in this contract, any material is discovered onsite which may be considered of historical or cultural interest, such as evidence of prior settlements, native or historical activities, evidence of any existence on a site which may be of cultural significance, all work shall stop and the supervising contracting officer shall be notified immediately. The area in which the material was discovered shall be secured, cordoned off, marked, and the evidence preserved for examination by the local archaeological or cultural authority. No item believed to be an artefact must be removed or disturbed

by any of the workers. Work may resume, without penalty of prejudice to the contractor upon permission from the contracting officer with any restrictions offered to protect the site.

#### **4. Worker Occupational Health and Safety**

The contractor shall ensure that all workers operate within a safe environment. Sanitation facilities shall be provided for all site workers. All sanitary wastes generated as a result of project activities shall be managed in a manner approved by the contracting officer and the local authority responsible for public health. The contractor shall ensure that there are basic medical facilities on site and that there are staff trained in basic first aid. Workers must be provided with the necessary protective gear as per their specific tasks such as hard hats, overalls, gloves, goggles, boots, etc. The contractor shall provide the contracting officer with an occupational health and safety plan for approval prior to the commencement of site activities.

The contractor must ensure that all workers operate within a safe environment. All relevant Labour and Occupational Health and Safety regulations must be adhered to ensure worker safety. Sanitary facilities must be provided for all workers on site. Appropriate posting of information within the site must be done to inform workers of key rules and regulations to follow.

#### **5. Noise Control**

The contractor shall control noise emissions generated as a result of contracting activities to the extent possible. In the case of site locations where noise disturbance will be a concern, the contractor shall ensure that the equipment is in good working order with manufacturer supplied noise suppression (mufflers etc.) systems functioning and in good repair.

Where noise management is a concern, the contractor shall make reasonable efforts to schedule activities during normal working hours (between 8 am and 5 pm). Where noise is likely to pose a risk to the surrounding community either by normal works or working outside of normal working hours or on weekends, the contractor shall inform the contracting officer and shall develop a public notification and noise management plan for approval by the contracting officer.

#### **6. Use and Management of Hazardous Materials, fuels, solvents and petroleum products**

The use of any hazardous materials including pesticides, oils, fuels and petroleum products shall conform to the proper use recommendations of the product. Waste hazardous materials and their containers shall be disposed of in a manner approved by the contracting officer in accordance with national laws. A site management plan will be developed by the contractor if the operation involves the use of these materials to include estimated quantities to be consumed in the process, storage plans, spill control plans, and waste disposal practices to be followed. Any plans required shall be approved by the contracting officer.

Elements of the hazardous materials management shall include:

- a. Contractor must provide temporary storage on site of all hazardous or toxic substances in safe containers labelled with details of composition, properties and handling information;
- b. Hazardous substances shall be placed in an leak-proof container to prevent spillage and leaching
- c. Wastes shall be transported and disposed of in a manner approved by the contracting officer compliant with national laws and policies

#### **7. Use and Management of Pesticides**

Any use of pesticides shall be approved by the contracting officer and shall conform to the manufacturers' recommendations for use and application. Any person using pesticides shall demonstrate that they have read and understood these requirements and are capable of complying with the usage recommendations to the satisfaction of the contracting officer. All pesticides to be used shall conform to the list of acceptable pesticides that are not banned by the relevant local authority.

If termite treatment is to be utilised, ensure appropriate chemical management measures are implemented to prevent contamination of surrounding areas, and use only licensed and registered pest control professionals with training and knowledge of proper application methods and techniques.

#### **8. Use of Preservatives and Paint Substances**

All paints and preservatives shall only be used with the approval of the contracting officer. Information shall be provided to the contracting officer who describes the essential components of the materials to be used so that an informed determination can be made as to the potential for environmental effects and suitability can be made.

Storage, use, and disposal of excess paints and preservatives shall be managed in conformance with the manufacturers' recommendations and as approved by the contracting officer. The contractor shall provide the contracting officer with a list of materials and estimated quantities to be used, storage, spill control and waste disposal plans to be observed during the execution of the contract. This plan is subject to the approval of the contracting officer.

#### **9. Use of Explosives**

Use of explosives shall be at the approval of the relevant local authority and shall be supervised and undertaken by a qualified explosives technician. Blasting will be limited to between the hours of 9:00 am and 4:00 pm unless specifically approved by the local authority and the contracting officer. Any use of explosives shall be permitted only after an explosives management and blasting plan has been approved by the relevant local authority and the contracting officer.

This plan shall include:

1. Description of the explosive agent, charge description, intended use.
2. Site safety plan including:
  - a. Storage of initiators, booster charges and principal blasting agents
  - b. Handling precautions to be observed
  - c. Transport to and from site
  - d. Security of stored materials
  - e. Disposal of excess or damaged explosive materials.
3. Analysis of risk to surrounding area and mitigation measures to be employed including:
  - a. Over-pressure event
  - b. Noise
  - c. Flying debris
  - d. Seismic transmission
  - e. Accidental detonation
4. Name and qualifications for all persons responsible for handling explosive agents

#### **10. Site Stabilisation and Erosion Control**

The Contractor shall implement measures at the site of operations to manage soil erosion through minimisation of excavated area and time of exposure of excavated areas, preservation of existing ground cover to the extent possible, provision of approved ground cover and the use of traps and filtration systems. Where excavations are made, contractor shall implement appropriate stabilising techniques to prevent cave-in or landslide. Measures shall be approved by the contracting officer.

The contractor must ensure that appropriate erosion control measures such as silt fences are installed. Proper site drainage must be implemented. Any drain clogged by construction material or sediment must be unclogged as soon as possible to prevent overflow and flooding. The use of retaining structures and planting with deep rooted grasses to retain soil during and after works must be considered. The use of bio-engineering methods must be considered as a measure to reduce erosion and land slippage. All slopes and excavated areas must be monitored for movement.

The contractor will establish appropriate erosion and sediment control measures such as hay bales, sedimentation basins, and / or silt fences and traps to prevent sediment from moving off site and causing excessive turbidity in nearby streams, rivers, wetlands, and coastal waters.

An erosion management plan will be required where the potential exists for significant sediment accumulation in wetlands, lakes, rivers and marine systems. This plan shall include a description of the potential threat, mitigation measures to be applied, and consideration for the effects of severe weather and an emergency response plan.

If works are along coastal marine areas or near major streams and river, water quality monitoring must be done before construction, and at regular intervals to determine turbidity levels and other quality parameters.

Construction vehicles and machinery will be washed only in designated areas where runoff will not pollute natural surface water bodies.

### **11. Air Quality**

When appropriate, the contractor shall provide an air quality management plan for contracting officer approval. This plan will include provisions for the management and control of dust and unnecessary emissions resulting from construction activities. The plan shall include control measures to be implemented including the management of dust generated from transportation and site construction activities as well as excess emissions from vehicles and equipment. Under no circumstances shall site or roadway dusts be managed using oil spray techniques.

### **12. Traffic Management**

In the event that construction activities should result in the disruption of area transportation services, including temporary loss of roadways, blockages due to deliveries and site related activities, the contractor shall provide the contracting officer with a traffic management plan including a description of the anticipated service disruptions, community information plan, and traffic control strategy to be implemented so as to minimise the impact to the surrounding community. This plan shall consider time of day for planned disruptions, and shall include consideration for alternative access routes, access to essential services such as medical, disaster evacuation, and other critical services. The plan shall be approved by the contracting officer.

Elements of the traffic management plan to be developed and implemented by contractor shall include:

- a. Alternative routes will be identified in the instance of extended road works or road blockages;
- b. Public notification of all disturbance to their normal routes;
- c. Signage, barriers and traffic diversions must be clearly visible and the public warned of all potential hazards;
- d. provision for safe passages and crossings for all pedestrians where construction traffic interferes with their normal route;
- e. Active traffic management by trained and visible staff at the site or along roadways as required to ensure safe and convenient passage for the vehicular and pedestrian public;
- f. Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement.

### ***13. Management of Standing Water***

Under no circumstances shall the contractor permit the collection of standing water as a consequence of contractor activities without the approval of the contracting officer and consultation with the relevant local environmental health authority. Recommendations from that local authority on how to manage and treat the standing water must be implemented. The condition of the standing water must be monitored by the contractor to ensure that it does not present itself as a breeding ground for any pests such as mosquitoes.

### ***14. Management of Solid Wastes and Construction Debris***

The contractor shall provide a solid waste management plan that conforms to the national solid waste management policies and regulations for approval by the contracting officer. The site waste management plan shall include a description of waste handling procedures including collection, storage and disposal through the national waste management system. There will be no open burning of waste material and the contractor shall endeavour to recycle wastes as appropriate through the national waste management system.

Under no circumstances shall the contractor allow construction wastes to accumulate so as to cause a nuisance or health risk due to the propagation of pests and disease vectors.

### ***15. Management of Liquid Wastes***

The contractor shall provide the contracting officer with a liquid waste management plan as part of a site waste management plan that conforms to the waste management policies and regulations of the relevant Saint Vincent and the Grenadines authority. Under no circumstances shall the contractor allow construction related liquid wastes to accumulate on or off the site, or to flow over or from the site in an uncontrolled manner or to cause a nuisance or health risk due to its content. The site waste management plan shall include a description of how these wastes will be stored, collected and disposed of in accordance with current law. Additionally the contractor shall provide for the regular removal and disposal of all site wastes and provide the contracting officer with a schedule for such removal.

Specific elements of the contractor's liquid waste management plan shall include: contractor to abide by all pertinent waste management and public health laws; waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities; construction and demolition wastes will be stored in appropriate bins; liquid and chemical wastes will be stored in appropriate containers separated from the general refuse; all waste will be collected and disposed of properly in approved landfills by licensed collectors; the records of waste disposal will be maintained as proof for proper management as designed; whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos); construction related liquid wastes must not be allowed to accumulate on or off the site, or to flow over or from the site in an uncontrolled manner or to cause a nuisance or health risk due to its contents.

## Annexure Six: Chance Find Procedure

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### Introduction

Cultural property includes monuments, structures, works of art, or sites of significance points of view, and are defined as sites and structures having archaeological, historical, architectural, or religious significance, and natural sites with cultural values. This includes cemeteries, graveyards and graves.

Screening for the *Enhancing climate resilience in Thailand through effective water management and sustainable agriculture* proposal indicated that Cultural Physical Resources were unlikely to be at risk as a result of the project's activities. Nonetheless, there is the possibility that unexpected cultural heritage items could be discovered during works – Chance Finds.

### Chance Finds Procedure

This procedure is to be followed in the event of a Chance Find:

- a. Stop the construction activities in the area of the chance find;
- b. Delineate the discovered site or area;
- c. Secure the site to prevent any damage or loss of removable objects.
- d. Notify the Supervisory Engineer who in turn will notify the responsible local authorities including the UNDP, the Fine Arts Department and the Office of Cultural Promotion within the Ministry of Culture as well as the Office of Natural Resources and Environmental Policy and Planning in the Ministry of Natural Resources and Environment and Royal Irrigation Department under the Ministry of Agriculture and Cooperatives;
- e. Decisions on how to handle the finding shall be taken by the responsible authorities including the Fine Arts Department and the Office of Cultural Promotion within the Ministry of Culture. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and salvage;
- f. Implementation for the authority decision concerning the management of the finding shall be communicated in writing by the Fine Arts Department and the Office of Cultural Promotion within the Ministry of Culture; and
- g. Construction works and other activities can resume only after permission is given from the responsible local authorities including the Fine Arts Department and the Office of Cultural Promotion within the Ministry of Culture concerning safeguard of the heritage.

These procedures must be referred to as standard provisions in all contracts.

### Reporting

During project supervision, the Site Supervisor shall monitor the above regulations relating to the treatment of any chance find encountered are observed. Relevant findings will be recorded in UNDP Supervision Reports and Implementation Completion Reports will assess the overall effectiveness of the project's cultural property mitigation, management, and activities, as appropriate.