

**អង្គការមរតក**  
**MORODOK ORGANIZATION**

## REPORT

### **Providing Communities Advice on Climate Change Adaptation and Mitigation and Disaster Risk Management**



**Submitted to: MORODOK Organization**

**Prepared by: PHAT Chandara**

**June 6, 2024**

## TABLE OF CONTENTS

<b>1. Introduction.....</b>	<b>6</b>
<b>2. Objective .....</b>	<b>6</b>
2.1 Specific Objectives .....	7
2.2 Study Sites and Data Collection Methods .....	7
<b>3. Results and Discussion.....</b>	<b>9</b>
3.1 Result.....	9
3.1.1 Profile of Study Area.....	9
3.1.2 Status of Climate Change Impacts on Coastal Zone around Kampong Som Bay ..	12
3.1.3 Current Policy and Strategies of Government of CCA/CCM and DRM .....	17
<b>4 Conclusion and Recommendation .....</b>	<b>23</b>
4.1 Conclusion .....	23
4.2 Recommendation .....	24
<b>reference.....</b>	<b>26</b>

## List of Abbreviation

CA	:	កសិកម្មបែបអភិរក្ស	Conservation Agriculture
CC	:	ការប្រែប្រួលអាកាសធាតុ	Climate Change
CCA	:	ការបន្ស៊ាំនឹងការប្រែប្រួលអាកាសធាតុ	Climate Change Adaptation
CCM	:	ការកាត់បន្ថយការប្រែប្រួលអាកាសធាតុ	Climate Change Mitigation
CDP	:	ផែនការអភិវឌ្ឍន៍ឃុំ	Commune Development Plan
CIP	:	ផែនការវិនិយោគឃុំ	Commune Investment Plan
CoC	:	ក្រុមប្រឹក្សាឃុំ/សង្កាត់	Commune Council
DRM	:	ការគ្រប់គ្រងហានិភ័យគ្រោះមហន្តរាយ	Disaster Risk Management
FGD	:	ការពិភាក្សាក្រុម	Focus Group Discussion
KII	:	ការសម្ភាសន៍ជនបង្គោល	Key Informant Interview
MOI	:	ក្រសួងមហាផ្ទៃ	Ministry of the Interior
NAPA	:	កម្មវិធីសកម្មភាពជាតិបន្ស៊ាំនឹងការប្រែប្រួលអាកាសធាតុ Cambodia National Adaptation Programme of Action	
NAP-DRR	:	ផែនការយុទ្ធសាស្ត្រថ្នាក់ជាតិសម្រាប់ការកាត់បន្ថយហានិភ័យគ្រោះមហន្តរាយ National Action Plan for Disaster Risk Reduction	
NCCC	:	គណៈកម្មការជាតិគ្រប់គ្រងការប្រែប្រួលអាកាសធាតុ National Climate Change Committee	
NCDDS	:	លេខាធិការដ្ឋាននៃគណៈកម្មការជាតិសម្រាប់ការអភិវឌ្ឍតាមបែបប្រជាធិបតេយ្យនៅ ថ្នាក់ក្រោមជាតិ National Committee for Sub-national Democratic Development Secretariat	
PCDM	:	គណៈកម្មការថ្នាក់ខេត្តគ្រប់គ្រងហានិភ័យគ្រោះមហន្តរាយ Provincial Committees on Disaster Management	

## List of Table

Table 1: Combined Seasonal Calendar of Selected Commune for Study Areas .....	10
Table 2: Average Mean Surface Air Temperature (°C) .....	13
Table 3: Average Annual Precipitation (mm) .....	14
Table 4: Definition of Disaster Identified by Local People.....	15
Table 5: Conclusion of the Level of Climate Change Impacts on People’s Livelihoods in Selected Sites .....	16
Table 6. Example of priorities raised in CIP, 2023-2027 .....	18
Table 7: Summary of Program to Support Risk and Climate Change Reduction and Prevention Proposed in the CIP .....	20
Table 8: Climate Change Response Measures.....	22

## List of Figure

Figure 1: Map of Study Sites .....	8
Figure 2: Monthly Climatology, 1991-2020.....	12
Figure 3: Observed Annual Average Mean Surface Air Temperature of Cambodia 1901-2022 .....	13
Figure 4: Change in Distribution of Average Mean Surface Air Temperature 1951-2020 .....	13
Figure 5: Sub-grants Transferred from District to Commune .....	21

# REPORT

## **Providing Communities Advice on Climate Change Adaptation and Mitigation and Disaster Risk Management**

### **1. Introduction**

Cambodia features forested mountains and well-watered plains. The central region forms a basin for the Tonle Sap Lake and the Mekong River. Two mountain ranges, the Cardamom and Elephant Mountains, rise sharply in the southwest. These mountains reach over 1500 meters in elevation and stretch through Koh Kong and Kampong Speu provinces. In contrast, the southwestern coast has a narrow coastal plain. This plain encompasses the Kampong Som Bay area and the Sihanoukville Peninsula, both facing the Gulf of Thailand. Kampong Som Bay itself boasts deep waters and a chain of islands protecting it from storms. Notably, Sihanoukville houses Cambodia's sole deep-water port. Mangrove forests line the bay's coast (Liu et al., 2021). The region experiences a tropical monsoon climate with two distinct seasons: wet (May to October) and dry (November to April). The wet season is influenced by the southwest monsoon, bringing moist winds from the Gulf of Thailand and Indian Ocean. The northeast monsoon ushers in the dry season, with the heaviest rainfall occurring in September and October. January and February are the driest months. Rice yields are often negatively impacted by these events, which often occur in the autumn. During the rainy season, powerful gusts from the west or sea can generate up to seven-day storms. During strong winds and storms, waves can reach 2 to 3.5 meters high, making sea transport problematic. Exposure to high sea waves also poses a significant risk. At this wind speed, sea waves can reach up to six meters high. Fishermen should not fish under these conditions (Chanrith, Naret, Try, & Nong). The area has a complex geological history. Tectonic activity and low-grade metamorphism occurred throughout the Paleozoic era. This period transitioned to marine conditions, leading to fossil formations during the Permian and Mesozoic eras. Few rocks remain from the Cenozoic era. The most prevalent exposed rocks are Quaternary alluvium and Jurassic-Cretaceous sandstone and claystone. Additionally, the northern region features Quaternary basalts, colluvium, eluvium, laterite, Jurassic-Cretaceous dacite, and rhyolites. Tidal forces primarily govern Kampong Som Bay. The average tidal range is less than 1 meter, with tides being mainly reciprocating. The falling tide is slightly stronger than the rising tide, with a maximum flow velocity near the cape (Snidvongs & Sojisuporn, 1999). Wind direction varies seasonally, with westerlies and southwesterlies prevailing during the rainy season and northerlies and southerlies dominating the dry season. The bay experiences minimal wave action due to the sheltering islands at its mouth. Wind within the bay generates the most significant waves, typically reaching only 1 meter in height under normal conditions. Two small rivers, the Srae Ambel and Preak Piphot, contribute minimal sediment to the bay. The Mekong River's sediment is blocked by Vietnam's southwestern peninsula and doesn't reach the bay. Additionally, short sandy shores with intervening capes limit effective coastal sediment transport. The near-shore area experiences strong wave action, while the inner bay has weaker hydrodynamic conditions, promoting sedimentation (Liu et al., 2021).

### **2. Objective**

In this assignment, general objective is to identify the major climate change risk and disaster risks management in the project area, to advise local communities and commune councils on

mitigation strategies, and to produce community awareness raising materials on CCA/CCM and DRM.

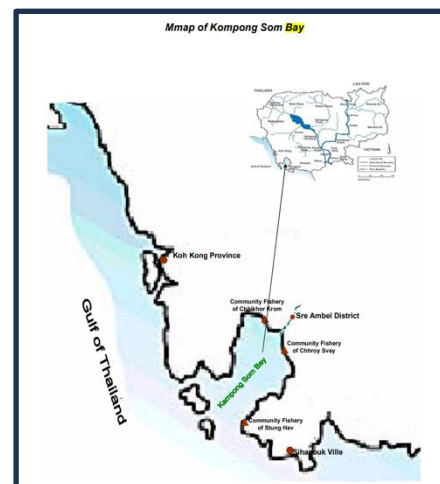
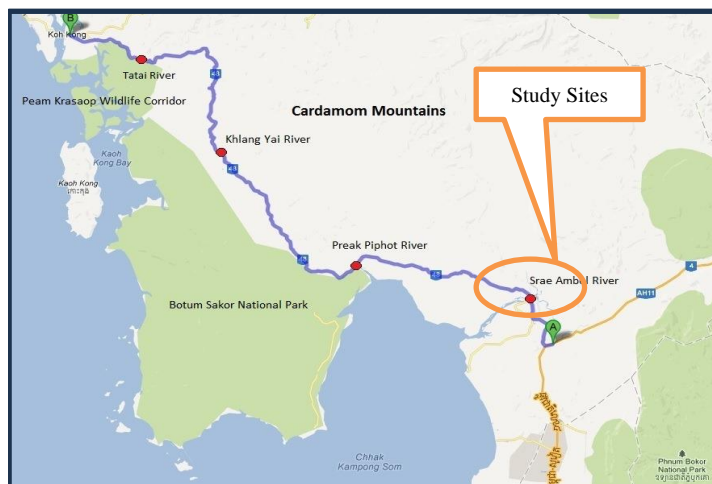
## 2.1 Specific Objectives

To identify climate change risk and disaster risks management, there are three important specific objectives as below:

1. identify the major climate change risk and disaster risks management in the project area;
2. advise local communities and commune councils on mitigation strategies; and
3. produce community awareness raising materials on CCA/CCM and DRM.

## 2.2 Study Sites and Data Collection Methods

The process of scoping and sited visit will be step by step taken in order to seek for agreement at the urban and district levels to conduct the full feasibility study. The site and scoping study in Kmpong Som bay including stakeholder's consultation conducted in May 2024.



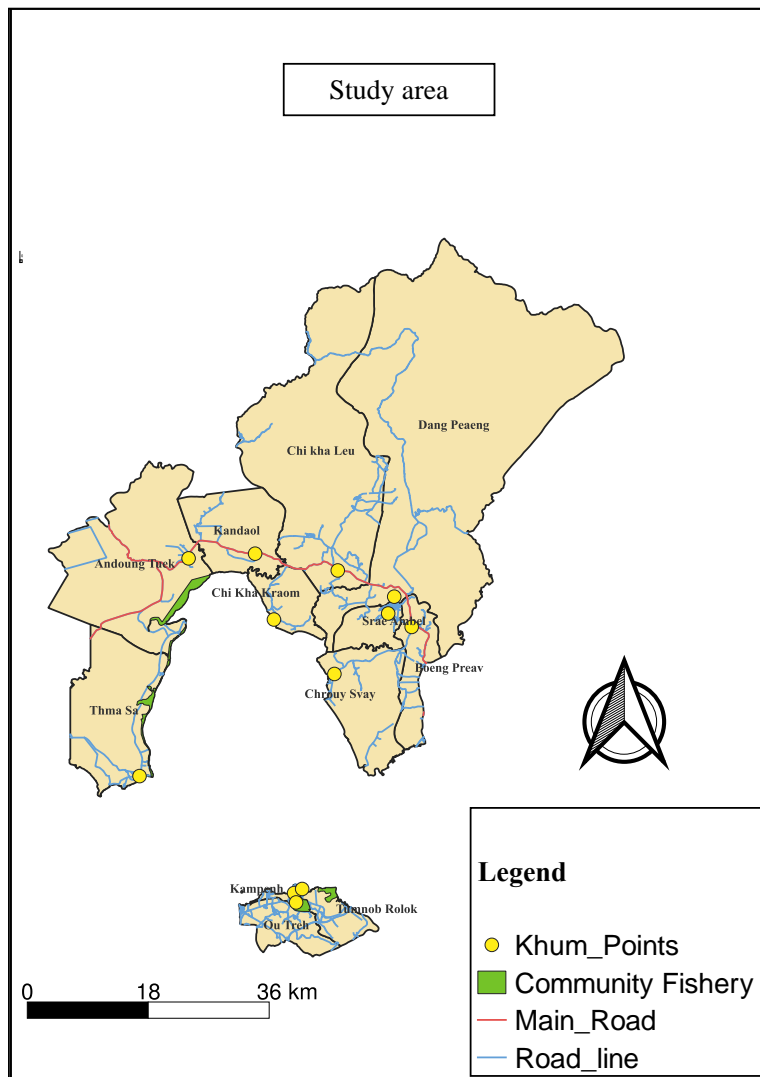


Figure 1: Map of Study Sites

The Felm-funded project focuses on the 8 communes surrounding Kampong Som Bay: namely Thma Sa, Andoung Teuk, Kandaol, Chi Kha Kraom, Chrouy Svay, Tumnob Rolok, Kampenh, and Ou Treh. As stated in the project document, the CCA/CCM and DRM research may also focus on “other mangrove areas within Morodok’s wider program area, including especially Sre Ambel, Boeng Preav, Chi Kha Leu, and Dang Peang communes.” There are 8 community fisheries and 5 community protected areas supported by Morodok within the project area. In this study, we selected 5 communes as case study including: Chrouy Svay, Tumnob Rolok, Chi Kha Kraom, Thma Sa, and Andoung Teuk. There are six specific deliverables for this assignment as below:

- 1) Desk study on climate change impacts expected for the coastal region around Kampong Som Bay.
- 2) Investigation into the situation on the ground: meeting with communities and local officials, observing the landscape, and discussing with them potential climate change adaptation and mitigation and disaster risk management measures and processes.
- 3) Identification of potential CCA/CCM and DRM measures and processes for communities, commune councils and technical officials to implement with the support of Morodok. The consultant’s recommendations will take into consideration the needs of vulnerable persons, including persons with disabilities.



- 4) Producing community awareness materials (in Khmer) on climate change adaptation and mitigation and disaster risk management.
- 5) Facilitation of a one-day workshop for communities and officials to share results of the desk study, investigation, and recommended CCA/CCM and DRM measures, and to pilot use of the awareness raising materials.
- 6) Producing a report (in Khmer) which includes results of the desk study and investigation, advice on how to use the awareness raising materials, and recommendations to communities and commune councils on appropriate CCA/CCM and DRM measures.

In this study, two specific research methods were implied such as Key Informant Interview and Focused Group Discussion, where:

**Key Informant Interviews (KII)** were used to interview related stakeholders. During the field work, the research team approached officials from relevant government agencies working on CCA/DRR for interview to understand key success, challenge and opportunity of CCA/CCM and DRM; they are as follows:

- Ministry of Environment,
- Thma Sa, Andaung Teuk, Chrouy Svay, Tumno Rolok, and Chi Kha Kraom Communes.

**Focused Group Discussions (FGD)** were employed to comprehend the understanding of CCA/CCD and DRM in targeted sites. During the FGD, the president of Commune Councilors (CoCs), village header and community leaders to understand overall and common issues concerning mainstreaming of CCA/CCD and DRM, challenges, lessons learnt, failure, opportunity for upscaling the CCA practices.

### **3. Results and Discussion**

#### **3.1 Result**

##### **3.1.1 Profile of Study Area**

Result from group discussion shows that farming is a major occupation and main income source for the majority of local people of the selected communes, followed by fishing and vegetable planting. Now, the number of locals involved in crop farming has increased, especially cash-crops (durians, cashew, green beans) has become an equally important source of income. Rice and other cash crops are cultivated to supplement subsistence, and farmer is practiced of rice cultivation as rain fed agriculture with long-term variety (6 months period from May until November). Recently, area of durian plantation is significantly increased where people generally harvested between March to May.

Traditional practices are mostly used in shallow water, mangroves, estuaries, creeks or the inter-tidal zone where biodiversity is rich, including terrestrial wildlife. Some fisheries products are collected by hand from the mudflats, beaches and mangroves. Poor fishers in particular engage in this activity, catching a variety of species such as molluscs (mud-snails, clams, cockles), crabs and shrimps; such work is mainly done by women and children. Inshore fishing is an important source of food for supporting daily subsistence. Fishing provides small-scale and poor fishers a source of income for daily basic needs and tiny savings. Fishing in the wet season can be risky but it is also offering lucrative earnings (see table 1 for details of the seasonal calendar).

Table 1: Combined Seasonal Calendar of Selected Commune for Study Areas

	Seasonal Calendar												Remarks
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	
<b>1. Cash-Crops</b>													
Cashew													Practices in year-round, except the month of April and May due to dry season period
Paddy Field													Rain Fed Rice Field during Rainy Season
Corn Field													Start from November and harvest in January and February
Mango													Harvesting period between March and April
Banana													Practice in year-round
Cashew Nut													Harvesting period between January to March
Coconut													Practice in year-round
Rambutan													Harvesting period between March to May
Durian													Harvesting period between March to May
<b>2. Vegetable</b>													
Cucumber													Start from November and harvest in May
Pumpkin													Start from November and harvest in January
Beans													Start from November and harvest in January
Eggplant													Practice in year-round
Water Morning Glory													Practice in year-round

	Seasonal Calendar												Remarks
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	
<b>3. Fishing</b>													
Marine Fishing													Practices in year-round, except August and September due to windstorm
Fresh Water Fishing													From September to November, is good season for freshwater fishing
<b>4. Others</b>													
Garment Factory													Practice in year-round
Retailor													Practice in year-round
Labour Worker													After fishing, majority of local people migrate to urban city for job
Charcoal Producer													Practices in year-round, except the month of September due to heavy rainfall period

Source: Focus Group Discussion (May 2024)

### 3.1.2 Status of Climate Change Impacts on Coastal Zone around Kampong Som Bay

Temperature and rainfall patterns in Cambodia are governed by monsoons and characterized by two major wet (May–October) and dry seasons (November–April). The average annual rainfall is 1,400 mm in the central lowland regions and may reach 4,000 mm in certain coastal zones or in highland areas. The annual average temperature is 28°C, with an average maximum temperature of 38°C in April and an average minimum temperature of 17°C in January<sup>1</sup>. Data between 1950–2001 indicated that the mean annual temperature anomaly has increased by 0.8°C with a change rate of 0.023°C per year (Climatewizard, 2009). The statistical confidence of temperature change during 1951–2001 and areas with higher statistical confidence in change are marginally significant (0.05–0.10). According to World Bank, time series data from 1901–2020 indicated that temperature has been increased by 1.04°C. The temperature increases have been observed, with an approximate increase of 0.18°C per decade since the 1960s.

Cambodia’s climate is tropical with two distinct seasons: a monsoon-driven rainy season (which covers the period May to October), and a dry season (covering the period November to April), with cooler temperatures, particularly between November and January, as shown in the latest climatology, 1991–2020 (Figure 1). Average temperatures are highest in the early summer months before the rainy season begins, when maximum temperatures often exceed 32°C. Temperatures remain between 25°C–27°C throughout the rest of the year. The annual average rainfall is typically 1,400–2,000 millimeters (mm) with higher rates in the coastal and highland areas and lower rates in other inland regions. The rainy season arrives with the summer monsoon, in May through November, bringing the heaviest rainfall to the southeast and northwest. Monthly precipitations reach on average above 240 mm in most months of the rainy season.

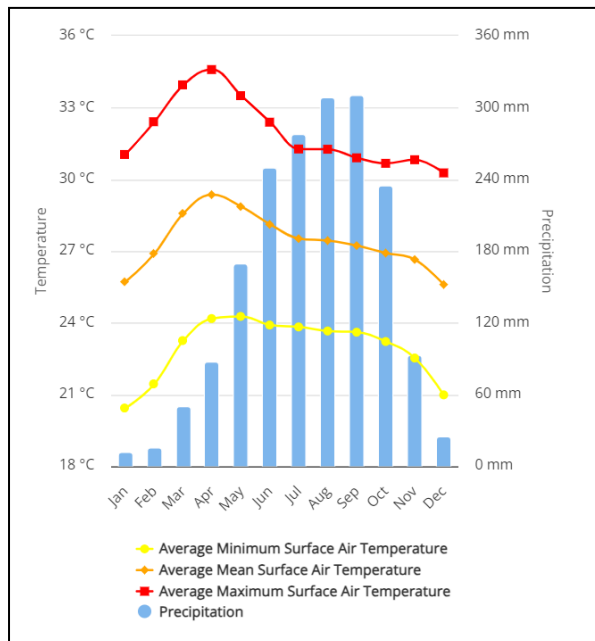


Figure 2: Monthly Climatology, 1991-2020<sup>2</sup>

<sup>1</sup> The National Committee for Disaster Management (2013). Cambodia Disaster Loss and Damage Information System: Understanding the Past, Save the Future. Phnom Penh, Cambodia.

<sup>2</sup> World Bank. Climate Change Portal. <https://climateknowledgeportal.worldbank.org/country/cambodia/climate-data-historical>. Accessed on January 30, 2024.

(i) *Temperature trends*

Figure 2 shows the trend of average annual mean surface air temperature between 1901 and 2022. While average annual temperature oscillated between 26°C and 28°C, the figure clearly illustrates an upward trend in the course in the last 4 decades. Temperature increases have reached approximately 0.18°C per decade since the 1960s. The rate of increase has accelerated in more recent decades (Figure 3)

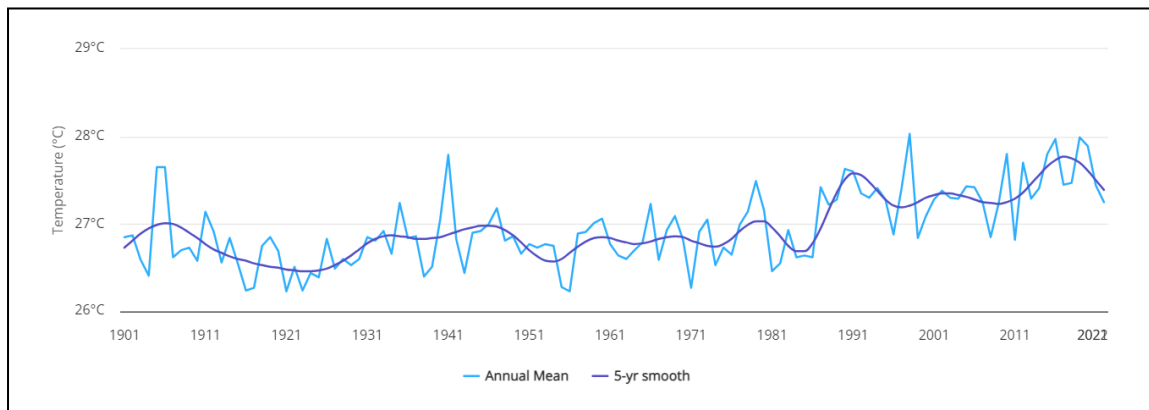


Figure 3: **Observed Annual Average Mean Surface Air Temperature of Cambodia 1901-2022<sup>3</sup>**

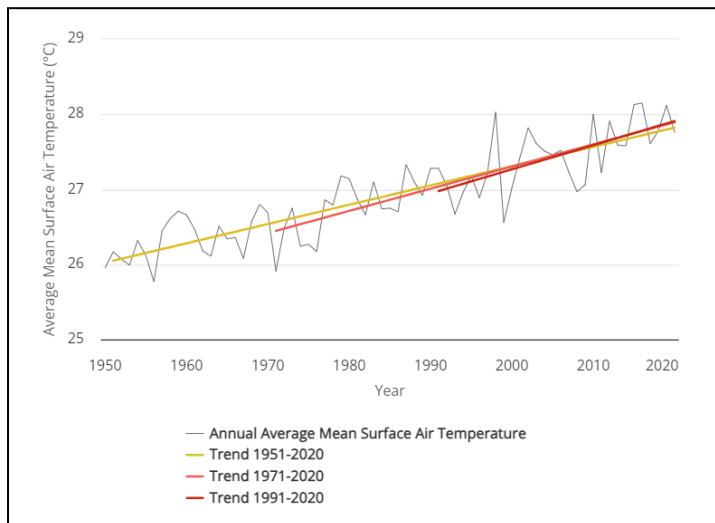


Figure 4: **Change in Distribution of Average Mean Surface Air Temperature 1951-2020<sup>4</sup>**

Temperature increases have been more rapid during the dry season (November to April) increasing by 0.20 to 0.23 per decade in than in the rainy season (May to October) increasing by 0.13 to 0.16 per decade (Table 1).

Table 2: **Average Mean Surface Air Temperature (°C)**

<sup>3</sup> World Bank. Climate Change Portal. <https://climateknowledgeportal.worldbank.org/country/cambodia/climate-data-historical>. Accessed on January 30, 2024.

<sup>4</sup> World Bank. Climate Change Portal. <https://climateknowledgeportal.worldbank.org/country/cambodia/trends-variability-historical>. Accessed on January 30, 2024.

(average over the aggregation period)<sup>5</sup>

	1901-1930	1931-1960	1961-1990	1991-2020
<b>DJF<sup>a</sup></b>	24.87	25.19	25.26	26.03
<b>MarAprMa<sup>b</sup></b>	28.45	28.55	28.53	28.93
<b>JuJulAug<sup>c</sup></b>	27.21	27.27	27.32	27.69
<b>SON<sup>d</sup></b>	26.12	26.29	26.38	26.93

<sup>a</sup> December/January/February; <sup>b</sup> March/April/May; <sup>c</sup> June/July/August; <sup>d</sup> September/October/November

Note: D=December, J=January, F=February, Mar=March, Apr=April, Ma=May, Ju=June, Jul=July, Aug=August, S=September, O=October, and N=November

The number of “hot days” in the country has increased over the last century, by as much as 46 days per year.

### (ii) Precipitation Trends

Rainfall in Cambodia varies widely across the country. Average annual rainfall can be as low as 1,400 mm in the central lowlands and as high as 4,000 mm near the Cardamom mountains and nearby coastal areas in the southwest. The country’s eastern plains receive approximately 2,000 to 2,600 mm of rainfall annually and may exceed those amounts in the mountainous areas in the Northeast. While rainfall was observed to increase in some areas of the country since the 1960s, no statistically significant changes were detected over the 20th century, either in terms of annual rainfall (Table 3) or extreme events.

Table 3: **Average Annual Precipitation (mm)**

(average over the aggregation period)<sup>6</sup>

	1901-1930	1931-1960	1961-1990	1991-2020
<b>DJF<sup>a</sup></b>	52.63	45.73	51.28	53.46
<b>MarAprMa<sup>b</sup></b>	305.7	313.32	316.69	307.92
<b>JuJulAug<sup>c</sup></b>	809.23	814.01	832.42	836.56
<b>SON<sup>d</sup></b>	618.63	640.62	638.02	638.57

<sup>a</sup> December/January/February; <sup>b</sup> March/April/May; <sup>c</sup> June/July/August; <sup>d</sup> September/October/November

Note: D=December, J=January, F=February, Mar=March, Apr=April, Ma=May, Ju=June, Jul=July, Aug=August, S=September, O=October, and N=November

Results from the FGD indicated that people in all five communes are facing with the risk of climate change-related disasters due to their incapability of mobility and wealth to deal with the loss and damage aftermath. The vulnerable people were classified into main categories such as Elderly people who are unable to generate income and have limited scale of critical nutrition requirements. They rely on the support of their relatives or neighbors to make their daily living. When their relatives encounter impacts of climate change, therefore the elderly people face the similar problems. Normally, they have lost support from their family due to migration or deceased. Furthermore, poor households (especially ID Poor I and II) are susceptible to climate change disasters due to the decay of their housing materials or their cash-crops being damaged.

<sup>5</sup> World Bank. Climate Change Portal. <https://climateknowledgeportal.worldbank.org/country/cambodia/climate-data-historical>. Accessed on January 30, 2024.

<sup>6</sup> World Bank. Climate Change Portal. <https://climateknowledgeportal.worldbank.org/country/cambodia/trends-variability-historical>. Accessed on January 30, 2024.

The observation shows that they are not able to maintain their cash-crops due to the poor and limited of financial conditions. Whether there is partial assistance from the local authority, it will not ensure them to maintain their cropping. Another category of vulnerable people is fishermen who depends on marine-fishing. Results from FGD indicated that this group mostly effected by climate-related disaster during the raining season with windstorm.

Four critical climate change disaster risks had been identified during group discussion with concerned stakeholders such as 1) drought, 2) flash-flood, 3) windstorm, and 4) salinity. Based on the discussion, the potential disaster was given common definition as beow:

**Table 4: Definition of Disaster Identified by Local People**

<b>Disaster</b>	<b>Definition</b>
Drought	is a prolonged dry period in the natural climate cycle that can occur anywhere. It is generally defined as “a deficiency of precipitation over an extended period of time (usually a season or more), resulting in a water shortage.”
Flash-flood	is a rapid flooding of low-lying areas, and it may be caused by heavy rain.
Windstorm	is a storm with high winds or violent gusts that are strong enough to cause at least some damage to trees, house nearby seashore, and buildings.
Salinity	is the accumulation of salts into soil and water to sufficient levels that impact on human and natural assets.

Based on the discussion with concerned and potential stakeholders, in study area, climate change provided significant risks to three important dimensions including 1) economic, 2) environment, and 3) health. Result from the focus group discussion pointed-out that economic losses due to climate change is recognized by local people at the study area. In this recently year 2024, majority of local people faced with drought – and approximately 50% of agricultural yield decreased and lose due to drought and water-shortage. The increasing and delaying of drought and temperature is a major occupational health hazard, especially for coastal community and workers in sectors such as agriculture, construction, and labour-intensive manufacturing, where they are exposed to hot and humid environments and perform physically demanding tasks (said by head of Chi Kha Kraom Commune, 2024).

“People observed that drought from the last decade, especially in 2024 caused server impact on majority of the farm and cropland in all of the selected communes. Shortage of water occurred in this recent year due to the delay of rainy season – caused critical damages and losses on cash-crops, including durian<sup>7</sup>. Between 2010 and 2024, in recently year, the climate-related disaster such as drought and windstorm occurred more frequent compared to 2010”.

---

<sup>7</sup> Durian is rated as majority and important cash-crop for people in all selected commune. Majority of local people in the commune plant this crop for subsistent income generation.





Photo 1: Group Discussion with between consultant team and commune head on the general climate change impacts on people livelihoods and intervention from commune level, at Chrouy Svay Commune, Koh Kong Province.

Result from consultation and discussion with concerned stakeholders indicated that Chrouy Svay Commune is ranked as most vulnerable and very high impact due to climate change and disaster. Each individual commune is facing different disasters. Chrouy Svay Commune is facing three critical climate change disasters including drought, drought damage cash-crops, and windstorm. In addition, Tumnob Rolok Commune is facing with two important disasters such as drought and flood, while Thma Sa facing with drought and windstorm; and Chi Kha Kraom and Andaung Teuk exposing to only drought (see table 5).

Table 5: Conclusion of the Level of Climate Change Impacts on People’s Livelihoods in Selected Sites

<b>Names of Sangkat (Commune)</b>	<b>Level of Impacts</b>	<b>Specific Disaster</b>
Chrouy Svay	Very High	Drought, Flood, Windstorm
Tumnob Rolok	High	Drought, Flood
Chi Kha Kraom	High	Drought
Thma Sa	High	Drought, Windstorm
Andaung Teuk	High	Drought



Source: Author Combined Results from FGD with Authority, Local NGOs, and related Affected Communities/People (May 2024)

Again, based on a comparison of total average of the exposure to climate change disaster risk among selected communes, we concluded that Chrouy Svay Commune is rated as very high-level impact due to climate change disaster, followed by Tumnob Rolok, Thma Sa, Chi Kha Kraom and Andaung Teuk (see annex 2 and annex 2.1).

### **3.1.3 Current Policy and Strategies of Government of CCA/CCM and DRM**

In order to mainstream CCA/DRR into national, provincial and district development plans as well as into CDP/CIP, several legal framework and policies i.e., National Action Plan for Disaster Risk Reduction (NAP-DRR) 2014-2018, Law on Disaster Management in Cambodia, National Climate Change Strategic Plan (2014-2023), National Democratic for Sub-national Development Programme (2010-2019), Implementation Programme First Phase (2010-2013), Implementation Programme Second Phase (2014-2016), and Implementation Programme Third Phase (2010-2013). In addition, the Annual Operation Plan and Climate Change Strategic Advocacy have been formulated by the civil society including NGOF and members of NGOs Environment and Climate Change Alliance (NECA); the meetings were regularly organized to share and to discuss sensitive information concerning on climate change and advocacy activities. At the sub-national level, CIP/CDP is a key for integration of CCA/DRR into activities in the communities (see annex 3).

Adaptation is very important for CCA/DRR to have better migration in reducing its impacts for sustainable livelihood. Yet, the adaptation capacity has been challenged with many problems and issues to maintain effectiveness of the interventions. First, the adaptive capacities require greater efforts given the growing salinization of cultivation lands in Cambodia. Innovative efforts to increase adaptive capacities of the local people who are at risk must be informed by climate-related risks and the evolving scientific research which is seeking to unravel these future scenarios. On the other hand, communities and local leaders have limited adaption capacities to cope with the negative impacts of CCA and DRR (Dator-Bercilla et al., 2013). Second, the National Climate Change Committee (NCCC) is responsible for coordinating efforts and for overseeing the implementation of Cambodia National Adaptation Programme of Action (NAPA); but most of the key adaptation activities have been implemented by NGOs at both national and local levels (Lassa and Sembiring, 2017). Third, however, if a proportion of the national budget is allocated to DRR, it can be transferred to each ministry's total budget. Today, the Provincial Committees on Disaster Management (PCDM) and Provincial governments only have a certain amount of budget assigned to disaster response. There was no specific amount under this budget is specifically allocated to DRR. The budget is most likely to be spent on humanitarian interventions, for example food distribution, or repairing roads and other infrastructure post-flood. At the commune level, there are two main financing mechanisms: the Commune Investment Plan (CIP) and the Commune Development Plan (CDP). The current CDPs and CIPs are spent is restricted by the Ministry of the Interior (MOI), and sometimes DRR planning is not well-considered (JA, 2015). As the result, activities for CCA/ DRR are then left for NGOs to pick up in the district integration workshops, meaning the NGOs may serve as gap-fillers for government (DCA/CA, 2015). Although NGOs has contributed important role in supporting community development; cooperation with the government agencies at sub-national level remained very limited (JAG, 2015).

Fourth, one aspect of mainstreaming of climate change adaptation at the commune level is still quite weak in terms of its internal monitoring system. A critical aspect of effective local level planning is knowing what exactly is the target for change and then correctly measuring the change that may be occurring as a result of a specific intervention (Carter and Sok, 2013). Communes/Sangkats have low levels of their own-sources of revenue; they rely almost entirely on the Commune/Sangkat Fund (CSF) resources from the central government. The funds transferred, a general administration component cannot be more than 33.0% of the total and a development component not less than 67.0% of the total budget (ADB, 2017). In addition, social activities proposed by local people and their community-based organization (CBOs) may make it into the commune development plan, but invariably are dropped in the investment plan, in which funds almost exclusively goes towards infrastructure. In particular, it is difficult to organize communities and provide them with sustainable income. It's a tough challenge to advocate duty bearers to assist vulnerable communities in disaster risk reduction and adaptation to climate change (Mom, 2011). Since the late 1990s, there has been increasing recognition of this demand to mainstream CCA/DRR into development projects which is to address risks emanating from natural hazards in medium-term strategic frameworks and institutional structures, in country and sectoral strategies and policies and in the design of individual projects in hazard-prone countries. As a result, the government agencies as well as a number of national and international NGOs have put their efforts to mainstream disaster risk reduction into their work, undertaking various related institutional, policy and procedural changes and adjusting operational practice (Benson et al., 2007).

### 3.1.4 Prioritization of Relevant Stakeholders in Project, Plans and Policy

According to a 5-year commune investment plan in five selected communes (2023-2027), the local people participated in various meetings organized by CoCs to develop the plan; they prioritized 13 to 14 activities needed by their community development as stated in Table 3. However, the local people seemed to pay and to select more attention on economic activities rather than environmental problems and climate change. At the first cycle of CIP development, the president of CoCs facilitated among local people to reviewing the problem or to raise their needs. The local people are able to raise issues and problem which are affected on their livelihood. Since many problems and issues were raised and annual C/S budget was as limited allocated from the MoI; the problems and issues were prioritized for the implementation of CIP. In most cases, projects related to social development and capacity building to raise awareness of climate change and natural disaster are implemented or integrated by NGOs. The local people have learned well about better environment in their communities. But they believed that socio-economic improvement, social welfare and education were more useful for their livelihood development. Projects such as physical infrastructure, health care and education for children have been the priorities for the local people because they are facilitating their income generation activities and transportation and employment. Many local people still consider that that climate change is a long-term effect. In the rural communities, the Provincial Departments of Environment and NGOs were working to raise awareness and provide services to help the local people cope with negative impacts from climate change. While NGOs were mainly providing social services; physical infrastructure development has been the most popular projects delivered by CoCs and government agencies.

*Table 6. Example of priorities raised in CIP, 2023-2027*

<p>Priorities raised by local people for commune investment plan for CIP activities in 2023-2027</p> <ol style="list-style-type: none"> <li>1. Poverty reduction and all the residents have profession and good income</li> </ol>
---

2. Promote sustainable tourism for national and international tourist
3. Sustainable livelihood development with sufficient rice consumption and surplus
4. Good condition of roads
5. Promote education and enhancing the enrollment at high school up to grade 9 at the least
6. Good health condition
7. Life with dignity for disable and vulnerable people
8. Better environment and sustainable development and natural resource protection
9. Promote efficiency of environmental protection
10. Promote and enhancing resilience capacity of local people
11. Enhancing administrative system in commune level
12. Enhancing freedom and fair treatment in commune level
13. Strengthening social and public security

Source: 5-Year Investment Plan (2023-2027)



Photos 2. Group Discussion with between consultant team and commune head on the general climate change impacts on people livelihoods and intervention from commune level, at Chi Kha Kraom Commune, Koh Kong Province

In order to strengthen capacity and reduce impacts from climate change, a certain development program has been integrated into the CIP. Table 8 shows proposed mitigation measures and plans, are participatory and inclusively formulated, implemented and monitored. It is the fact that the measures and program has been well established and proposed in the CIP, but, the CoC

could not mobilize sufficient resources and funds to implement all the activities especially social services. The largest proportion of funds for implementation of CDP/CIP has been allocated by the central government for mainly infrastructure development. As the result, planned activities proposed by local people and CoCs in relation to CCA/DRR could not mobilize sufficient financial and human resources. Each year, there were only few projects proposed for example rural road construction have funds for the implementation.

**Table 7: Summary of Program to Support Risk and Climate Change Reduction and Prevention Proposed in the CIP**

<b>Names of Sangkat (Commune)</b>	<b>Chrouy Svay</b>	<b>Tumnob Rolok</b>	<b>Chi Kha Kraom</b>	<b>Thma Sa</b>	<b>Andaung Teuk</b>
Preparing safety area/place in each village	N/A	4	6	5	4
Provide training to support adaptation and risk reduction	3	actual	5	actual	15
Promote and disseminate awareness on disasters to community	N/A	10	9	10	5
Preparation for urgent support to community	N/A	actual	actual	actual	actual
Promote awareness on drought issue	N/A	10	N/A	10	10
Develop new community pond	N/A	N/A	N/A	N/A	4
Develop new mixed well	N/A	N/A	N/A	N/A	20
Rehabilitate existing pond	N/A	N/A	N/A	N/A	4
Rehabilitate existing mixed well	N/A	N/A	N/A	N/A	20
Rehabilitate existing irrigation and canal	N/A	N/A	N/A	N/A	5
Provide concrete jar and water-tank	N/A	N/A	N/A	N/A	50
Prevention forest fire	N/A	actual	N/A	actual	actual
Prepare community water reservoir for dry season	N/A	10	N/A	10	1
Establish community disaster risk management committee	N/A	1	N/A	1	1
Advising and preparing risk management plan	N/A	actual	N/A	actual	1
Providing and strengthening capacity of community risk management committee	N/A	5	N/A	5	60
Provide training of technical report writing on disaster management	N/A	5	N/A	5	5
Provide training on crop-resilience system and adaptive crop variety to CC	N/A	N/A	3	N/A	N/A
Provide seeding (kg) that adapted to CC	N/A	N/A	1000	N/A	N/A
Organize mangrove planting event	1	N/A	N/A	N/A	N/A
Demarcation of community's boundary	1	N/A	N/A	N/A	N/A

Strengthening sea's bank protection	1	N/A	N/A	N/A	N/A
-------------------------------------	---	-----	-----	-----	-----

Source: Author's Consolidate from 5-Year Investment Plan (2023-2027)

### 3.1.5 Promotion of Resilience to Vulnerable Group: Implementation Plans to Coastal Communities in targeted Communes

The Royal Government of Cambodia has also prepared for mainstreaming climate change resilience into the development plan in commune level. Since climate change is a global issue; Cambodia has received much support from development partners in order to reduce its negative impacts. From the Rectangular strategy for growth, employment, equity and efficiency phase III announced in September 2013, the National Strategic Development Plan (NSDP) (2014-2018) was formulated to highlight activities to be done for social economic development in Cambodia. International donors such as World Bank, Asian Development Bank and the United States Agency for International Development (USAID) have sponsored the Royal Government of Cambodia to implement the NSDP ((2014-2018) to meet the national priorities. For national response to the negative impacts of climate change and natural disaster; the National Committee for Sub-national Democratic Development Secretariat (NCDDS) is a coordinating and transfer funds to line Ministries, Provincial Administration and Technical Line Departments, and District/Municipal Administration and Technical Line Offices. At Commune/Sangkat Level, NGOs and the Provincial Administration and Technical Line Departments worked with CoCs member and local people to raise awareness and build capacity in relation to climate change and disaster risk management. With this regards, community-based disaster risk reduction has been established and granted for funding support of the implementation of this project. From above figure - the budget transfer will be flowed from the Sub-grant (district level) to communes throughout the climate change risk reduction projects in the commune level. Moreover, in this program - Hip Pocket on CCA mainstreaming into Commune/Sangkat plan is also established (Figure 5).

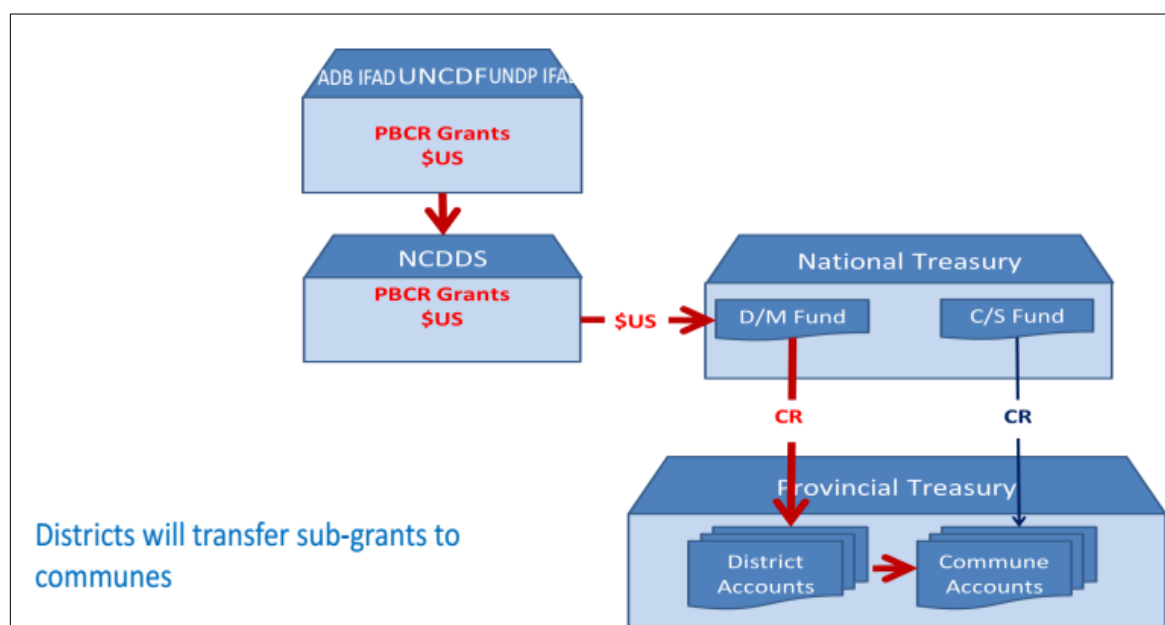


Figure 5: Sub-grants Transferred from District to Commune  
Source: NCDD (2016)

*Proposed Climate Change Adaptation and Mitigation and Disaster Risk Management*



Public and private actors in both developed and developing countries carry out adaptation measures through policies, investments in infrastructure and technology, and behavioural change (Schneider *et al.* 2007). Adaptation measures are classified as reactive, i.e., in response to current climate variability and observed impacts, or anticipatory, i.e., undertaken before impacts are observed to reduce exposure to future risks (Koh & Buller 2010). Given the uncertainty surrounding climate change, the implementation of anticipatory measures is especially challenging, as they require in-depth information and knowledge about climate change. Resilience to climate change can be advanced by developing new technologies and adaptation methods, and by disseminating knowledge through education and public information campaigns to bring about behavioural change (OECD 2009). Having received low priority in the past, these activities are now gaining importance as the need to involve more communities, sectors and regions in practical adaptation actions is realised.

Table 8: Climate Change Response Measures

Climate Change Issue	Proposed Response Measures at National Level	Proposed Response Measures at Sub-National Level
Drought	<ul style="list-style-type: none"> <li>- Early warning systems, crop calendar, reliable weather/climate variability forecasting and agricultural information and agricultural extension services should be handed over to farmers on time so that they are able to prepare and respond more quickly to the changing climate</li> <li>- <b>Improvement of genetic or development of new high-yielding varieties.</b></li> <li>- <b>Promote conservation agriculture (CA) for small holder farmers.</b></li> <li>- <b>Promoting rural cottage industries</b></li> </ul>	<ul style="list-style-type: none"> <li>- Renewing efforts to rehabilitate existing and construct new irrigation infrastructure including pumping stations, canals (main, secondary and tertiary), flood protection barriers, and water gates.</li> <li>- <b>Capacity-building and awareness-raising at the community level</b></li> <li>- Promote of water conservation practices such as rooftop rainwater-harvesting systems that will help in improving access to daily water consumption.</li> <li>- Provide training rural people in different livelihood options</li> <li>- Promoting sustainable agricultural practices such as reduced tillage</li> <li>- Improvement of crop management and cultural practices.</li> <li>- Promote sustainable water harvesting</li> </ul>
Flooding	<ul style="list-style-type: none"> <li>- Rehabilitate existing canals</li> <li>- Preparing higher-hill for cash-crops and vegetable farming.</li> </ul>	<ul style="list-style-type: none"> <li>- Rehabilitate existing canals</li> <li>- Preparing higher-hill for cash-crops and vegetable farming.</li> </ul>
Windstorm	<ul style="list-style-type: none"> <li>- Early warning systems, reliable weather/climate variability forecasting should be handed over to farmers and fishermen on time so that they are able to prepare and respond more quickly to the changing climate</li> <li>- Plan financial resources carefully to support the operational and maintenance costs of the system</li> </ul>	<ul style="list-style-type: none"> <li>- Plan financial resources carefully to support the operational and maintenance costs of the system</li> <li>- In the medium-term, enhance the technological capacities of the system (e.g. optimize the</li> </ul>

Climate Change Issue	Proposed Response Measures at National Level	Proposed Response Measures at Sub-National Level
	<ul style="list-style-type: none"> <li>- In the medium-term, enhance the technological capacities of the system (e.g. optimize the broadcasting system allowing the software to notify and confirm back the operator when a warning system is successfully disseminated)</li> </ul>	<p>broadcasting system allowing the software to notify and confirm back the operator when a warning system is successfully disseminated)</p>
Sea Level Rise	<ul style="list-style-type: none"> <li>- Increasing public awareness on the effect of sea level rise on Cambodia’s coast</li> <li>- Formulating a comprehensive adjustment and mitigation policy for sea-level rise in the context of integrated coastal zone management</li> <li>- Improvement of genetic or development of new high-yielding varieties that adapting to the changing of water quality due to sea level rise.</li> </ul>	<ul style="list-style-type: none"> <li>- Increasing public awareness on the effect of sea level rise on Cambodia’s coast</li> </ul>

Source: Focus Group Discussion (May 2024)

As has been indicated, responding to climate change and its related impacts requires action at the local level and any such action will require the involvement of multiple stakeholders. Efforts were made to identify solutions to the problems identified in a participatory manner. Participants were asked to grade the usefulness of solutions such as income diversification, improving livelihoods, better education, access to markets, and even direct financial support. Respondents were of the opinion that renewing efforts to rehabilitate existing and construct new irrigation infrastructure including pumping stations, canals (main, secondary and tertiary), flood protection barriers, and water gates is the most important and useful solution for reducing climate-related vulnerabilities due to drought followed by income diversification and improvement of existing livelihoods (see details proposed response measures on annex 4).

## 4 Conclusion and Recommendation

### 4.1 Conclusion

Cambodia is a country vulnerable to climate variability and climate change. Flood and drought are two major climate hazards commonly experienced in Cambodia. Their impacts include the yearly destruction of infrastructures, properties, crops, livestock, and losses of lives. The adaptive capacity to flood and drought is poorly developed in Cambodia. However, in selected communes, majority of local people are faced with drought followed by flash flood from heavy rainfall, and windstorm. Activities for adaptation and resilience were mainstreamed into CIP; but it remained very little due to lack of funds and local initiatives. The CoCs did not create its own revenues and the implementations of CIP were derived from the funds from central government and NGOs. Yet, central government and NGOs also have their own agenda and plan which are not really responded to the local needs. Separated plans formulated by the provincial government, NGOs and CoCs were also the main reason that CIP did not have sufficient funds for their activities. More likely, CIP could probably have more funds when the provincial department of environment, NGOs and CoCs were working together to develop a single plan. During the development of CDP/CIP, provincial office and NGOs could be

facilitators or observers on the priority setting; they could also select some of those activities based on their expertise into their plans. By doing so, local need will be filled, either through the implementation by provincial offices and NGOs. when the CoCs committee members were elected among the local people. They were only not able to mobilize financial resources for CIP implementation but they could not implement climate change related activities well without the support of the provincial Department of Environment and NGO. In order to improve their competency and capacity, a long-term capacity building and the inclusion of local profession into the CoCs committee members are very necessary action for improvement of CoCs functions and effectiveness.

## **4.2 Recommendation**

*The capacity building of CoCs committees* could prove a long-term, on-the-job process. Young university graduates could be recruited as technical assistants to support their daily operations by providing them with a good working environment and capacity building. The roles of the IOs, NGOs and governments at the provincial and district levels would be to provide technical guidance and training to CoCs, and technical assistance in the spheres of climate change and disaster risk reduction, fund raising, and management planning of the agricultural and non-agricultural sectors for livelihood improvement of local communities. On-the-job capacity building and the availability of technical assistants could definitely enhance the daily operations and competence of the CoCs in the above suggested fields. The types of public and social services with which CoCs should become familiar include Income Generation Activities (IGAs) from agricultural and non-agricultural sectors, health care, basic education, infrastructure development, migration, and social security.

*Planned adaptation* to future climate change should be based on current individual, community, and institutional behavior that, in part, have been developed as a response to current climate. However, common practices local people use to adapt to existing climate hazards have not received enough attention from government and international agencies. These practices have been implemented sporadically due to the lack of financial support. Delays in developing and enhancing local communities' capacity in responding to climate hazards may increase their vulnerability, and lead to increased costs at a later stage.

*Mainstreaming CCA/DRR through implementing CDP and CIP.* Every year, activities related to CCA/DRR intervention have been already included in CDP and CIP; but CoCs could not implement any project so far because lack of funds for them. The C/S fund transferred from MoI were mainly allocated for physical infrastructure while integration of funds from NGOs remained every limited. In this stage, mainstreaming of CCA/DRR at commune level could probably happen when annual funds for CoCs are specifically allocated for CCA/DRR related development projects from S/C funds or NGOs. At the movement, S/S funds were very limited so only NGOs could make this happen. During the development of CIP, NGOs may work with CoCs to facilitate the priority setting and provide funds of the prioritized activities proposed by local people in order to reduce the impact from climate change and natural disaster.

*Promote resilience and conservation agriculture:* Conventional farming in Cambodia is highly dependent on synthetic pesticide which is of industrial origin. Conservation agriculture has been shown to stabilize yields in the long term and increase the soil's ability to sequester carbon, thereby delivering on both adaptation and mitigation goals. The study suggests that the implementation of CA is a good preference as climate adaptation strategy for yield positive benefits and are economically profitable.



*In addition, the capacity of communities* in terms of what they can do during the difficult times of drought determines their vulnerability to climate change. Our research has identified a very limited availability of alternative livelihoods and skills among the communities we surveyed that could be used during the stress time. It is essential that the capacity-building programmes of the government focus on imparting training in alternative skills that could be used during the stress period. Our study also revealed that the local agricultural extension department does not have sufficient capacity to develop solutions to tackle the impacts related to climate change and variability. Strengthening this extension system in terms of capacity-building programmes is essential so that local agricultural practices can be modified for better drought risk mitigation. One important initiative that can help these local level functionaries is again through strengthening the weather forecasting and early warning systems, supported by better crop planning and input management advisory services. While irrigation facilities can avert low-intensity, short-duration droughts, the role of irrigation systems in averting a severe drought is still meagre. Since there are no dependable climate projections regarding what could be the exact duration and intensity of droughts in future, strengthening the irrigation systems is nevertheless a no-regret adaptation option which should be done on a priority basis.

## REFERENCE

- Chanrith, N., Naret, H., Try, T., & Nong, K. Report on Identification of Case Study Site: Khemarak Phoumin Town, Koh Kong Province, Cambodia.
- Liu, J., Chen, X., Yin, P., Cao, K., Gao, F., Meng, Y., . . . Li, M. J. J. o. O. U. o. C. (2021). Sediment characteristics, sources, and transport patterns in Kampong Som Bay, Cambodia: indications from grain size and heavy minerals. *20*, 329-339.
- Snidvongs, A., & Sojisuporn, P. (1999). *Numerical simulations of the net current in the Gulf of Thailand under different monsoon regimes*. Paper presented at the Proceedings of the First Technical Seminar on Marine Fishery Resources Survey in the South China Sea, Area I: Gulf of Thailand and Peninsular Malaysia, 24-26 November 1997, Bangkok, Thailand.
- MoE. (2013). Cambodia climate change strategic plan 2014–2023. In: Ministry of Environment Phnom Penh.
- Houghton, J. T., Ding, Y. D. J. G., Griggs, D. J., Noguera, M., van der Linden, P. J., Dai, X., ... & Johnson, C. A. (2001). *Climate change 2001: the scientific basis*. The Press Syndicate of the University of Cambridge.
- MoE. (2013). Cambodia Climate Change Strategic Plan 2014-2023. Ministry of Environmental, Phnom Penh, Cambodia.
- WB. (2021). Climate Risk Country Profile: Cambodia.
- Ministry of Environment, Cambodia. (2013). Cambodia Climate Change Strategic Plan 2014-2023. <https://www.moe.gov.kh/wp-content/uploads/2023/10/20231005-COP-HANDBOOK-Final-signed.pdf>
- United Nations Framework Convention on Climate Change (UNFCCC). (2020). Cambodia's Nationally Determined Contributions (NDCs). [https://unfccc.int/sites/default/files/NDC/2022-06/20201231\\_NDC\\_Update\\_Cambodia.pdf](https://unfccc.int/sites/default/files/NDC/2022-06/20201231_NDC_Update_Cambodia.pdf)
- National Committee for Disaster Management (NCDM), Cambodia. (2019). National Action Plan for Disaster Risk Reduction 2019-2023. <https://nmchc.moh.gov.kh/wp-content/uploads/2021/07/National-Strategic-Plan-on-Disaster-Risk-Management-for-Health-2020-2024-EN.pdf>

**Annex1: List of Photo Activities**



Consultation with Commune Officers and Concerned Stakeholders at Chi Kha Kraom Commune



Consultation with Commune Officers and Concerned Stakeholders at Chrouy Svay Commune





Consultation with Commune Officers and Concerned Stakeholders at Andoung Tuek Commune



Consultation with Commune Officers and Concerned Stakeholders at Tomnub Rolok Commune.

Annex 2: Level of Climate Change Impacts on People's Livelihoods in Selected Sites

<i>Disaster/Commune</i>	<i>Cash Crop Damaged due to Flood</i>	<i>Heavily Rainfall Effected on Fishing</i>	<i>Increasing of Flood Level</i>	<i>Flood Duration Delayed</i>	<i>Changing Climate and Seasonality between Rainy and Dry Season</i>	<i>Drought</i>	<i>Cash Crop Damaged due to Drought</i>	<i>Delay of Drought Period</i>	<i>Lightening</i>	<i>Windstorm</i>	<i>Strong Wave (in between June-August)</i>
<b><i>Chrouy Svay Commune</i></b>											
2010-2014	2	2	1	1	1	1	1	3*	2	2	3*
2015-2020	3*	3*	2	2	2	2	2	3*	3*	3*	4**
2021-Present	4**	4**	4**	4**	4**	5***	5***	3*	3*	4**	5***
<b><i>Tumnob Rolok Commune</i></b>											
2010-2014	3*	3*	2	1	2	1	2	3*	2	2	3*
2015-2020	4**	3*	2	2	2	2	2	3*	3*	4**	4**
2021-Present	2	2	1	1	4**	4**	3*	3*	4**	2	3*
<b><i>Chi Kha Kraom Commune</i></b>											
2010-2014	3*	3*	2	1	2	1	2	3*	2	2	3*
2015-2020	4**	3*	2	2	2	2	2	3*	3*	4**	4**
2021-Present	2	2	1	1	4**	4**	3*	5***	4**	2	3*
<b><i>Andaung Teuk</i></b>											
2010-2014	3*	3*	2	1	2	1	2	3*	2	2	3*
2015-2020	4**	3*	2	2	2	2	2	3*	3*	4**	4**
2021-Present	2	2	1	1	4**	4**	3*	5***	4**	2	3*
<b><i>Thma Sa Commune</i></b>											
2010-2014	3*	3*	2	1	2	1	2	3*	2	2	3*
2015-2020	4**	3*	2	2	2	2	2	3*	3*	4**	4**
2021-Present	2	2	1	1	4**	4**	3*	5***	4**	2	3*

Source: Author Combined Results from FGD with Authority, Local NGOs, and related Effected Communities/People (May 2024)

Note: 1 Very Low Impact  
 2 Low Impact  
 3\* Medium Impact  
 4\*\* High Impact  
 5\*\*\* Very High Impact

In Chrouy Svay Commune, at this present time, drought is considered as most and server (was rated in level 5\*\*\*) climate-related disaster and caused damage on cash-crops and farmland of local people followed by windstorm and storm-wave (was rated in level 4\*\*). Similarly, in Tumnob Rolok, Chi Kha Kraom, Andoung Tuek and Thma Sa Communes, local people rated drought as high-risk disaster due to climate change since 2021 until present.

## Annex2.1: Vulnerability and Resilience by Education, Vulnerability and Occupation Indicators

Names of Sangkat (Commune)	Chrouy Svay	Tumnob Rolok	Chi Kha Kraom	Thma Sa	Andaung Teuk
<b>Education</b>					
Percentage of illiteracy	10	3.3	4.4	0.4	4.3
<b>Poverty</b>					
Poverty rate (%)	39.80***	N/A	13.6***	8.69	7.11
<b>Vulnerability status</b>					
Disable people (person and %)	0.9%	50***	30	30	46***
Effectuated HH by Windstorm (HH)	05	02	01	19	00
Effectuated HH by drought (HH)	00	00	00	00	00
Effectuated HH by flooding (HH)	00	00	00	01	00
HH with Well (HH and %)	23%	15%	324HH	19.9%	75%
<b>Occupation</b>					
Agriculture (%)	15	22	57.4	70.4***	71***
Non-Agriculture (%)	35	29	0.9	18.3	0.4
Services/ thousand persons (%)	55***	76***	41.7***	11.3	28.6

Source: 5-Years Commune Investment Plan (2023-2027)

Note: \*\*\* significant in term of vulnerability

Among selected commune, Chrouy Svay Commune is identified and rated higher of poverty rate (39.80%) followed by Chi Kha Kraom (up to 13.6%), Thma Sa (8.69%) and Andaung Teuk (7.11%). As commonly perceived, people who are engaged with agriculture related and daily services are more vulnerable to climate change impacts than those with business and government services. Reference to table 1 presents the key occupations of people in selected commune. Andoung Teuk Commune possess highest number of people engaged in agriculture activities at 71 percent, followed by Thma Sa Commune at 70.4 percent. These communes are more vulnerable to climate change impacts, especially those are caused droughts. Geographically, the communes are located in high slop area, where people have engaged in farming activities for generations. With regard to services, Chi Kha Kraom Commune composes highest number of peoples engaged, while Thma Sa has engaged in the lowest (at 11.3%). This can be interpreted that the people in these commune have high capacity to cope with climate change impacts, meaning that they are more resilient to impacts of climate change that have occurred within other communes.

### Annex 3: Details National Strategics, Plans, and Program on Climate Change Risk Reduction of Cambodia

- National Action Plan for Disaster Risk Reduction (NAP-DRR) 2014-2018 is established on the current Strategic National Action Plan (SNAP), and its main purpose is to pursue proactive and integrated way to reduce risk to hazards through sustainable, innovative and realistic strategies with stronger partnership of all stakeholders. The National Strategic Plan is aligned with the planning cycle of National Strategic Development Plan (NSDP) and it describes a roadmap to DRR for 2014-2018. The effort of the Government is to continue the effective actions and interventions currently in place, proposes actions to challenge new risks and suggests foundational investment in next five years for dealing with long term risks in relation to climate change, urbanization and industrialization. Considering the long term nature of disaster risks, it has carefully balanced between what must be done and what can be done given the institutional capacity and resource availability (The Royal Government of Cambodia, 2013).
- Law on Disaster Management is developed to formalize the National Committee for Disaster Management (NCDM) as the main authority of the Royal Government of Cambodia (RGC) on disaster management. The NCDM has its mandate to lead the administration and coordination of all disaster-related management activities. In addition, the law also formalizes the expenditure mechanism to maintain a sufficient reserve to resource disaster management for the functioning of NCDM which is allocated by the national budget in the budget plan of the Office of the Council of Ministers. The NCDM has worked with line government ministries and Sub-National Committees for Disaster Management as focal points. This law also provides, for the first time, a strong legal basis for the NCDM to coordinate international assistance during major disasters, including provisions to clarify the country's needs in the case of an appeal for assistance, and then facilitate tax exemption entry of humanitarian relief supplies, and coordination of assisting international institutions (NCDM, 2015).
- National Climate Change Strategic Plan (NSCSP) (2014-2023) was prepared under a coordination of MoE with active participation of the Climate Change Technical Team (CCTT) and a guidance from the National Climate Change Committee (NCCC). The mission of this strategic plan is to establish a national framework for engaging the public, private sector, civil society organizations and development partners in a participatory process for responding to climate change to support sustainable development. The participation of all the relevant agencies made the strategic plan more coherent and aligned to other existing sectoral plans of the line ministries and agencies CCCSP (MoE, 2013).
- The National Programme for Sub-National Democratic Development (NP-SNDD) 2010-2019 is the government's framework for providing technical and financial guidance to implement the Decentralization and Deconcentration (D&D). The NP-SNDD provides strategic directions for mainstreaming climate change as well as disaster risk management at sub-national levels. The NP-SNDD has been formulated while the RGC is strengthening the roles and responsibilities of institutions at all levels towards achieving good governance, development and poverty reduction. In this respect, the RGC's goals for sub-national democratic development are to create a culture of local participatory democracy, accountable to the citizens, to improve public services and infrastructures, to bring about social and economic development; and to contribute to poverty reduction (NCDD, 2010).
- The Strategic National Action Plan for Disaster Risk Reduction (SNAP) (2008-2013) aims to address disaster risk reduction at the national and local levels under the Hyogo Framework for Action. The objectives of the Action Plan contribute to a common understanding, knowledge and awareness of disaster risk reduction, provide a comprehensive framework to guide and monitor the implementation of disaster risk

reduction initiatives in Cambodia, to create a conducive environment for the mainstreaming of disaster risk reduction into development plans, policies and projects of the government, to enhance coordination and cooperation between disaster management and development stakeholders, to improve the efficiency of resource allocation and utilisation in disaster reduction, and orient donor support in disaster risk reduction to government-identified priorities. The SNAP has provided directions for mainstreaming climate change as well as disaster risk management at sub-national levels, a comprehensive guideline is required to guide SNAs to deal with technical aspect of the mainstreaming (NCDD and MoP, 2008).

- The National Program is divided into three phases, coordinated by the National Committee for Sub-National Democratic Development (NCDD). The IP3 was firmly embedded in national development priorities according to the NSDP. The strategy to strengthen SNAs described in the National Program aims to enhance and sustain democratic development based on key principles: public representation, local autonomy, consultation and participation, responsiveness and accountability, promotion of quality of life of local residents, promotion of equity; transparency and integrity, and measures to fight corruption and abuse of power. The first phase, the 3-Year Implementation Plan (IP3, 2010-14) focused on developing SNA operational systems and procedures and ends in December 2014. In the second IP3, it strengthened ownership across government while facilitating program coordination which will present a considerable challenge to the NCDD. Third, a three-year plan for Implementation of the Social Accountability Framework (ISAF) 2015-2017 was designed as field tested and ready to be rolled out under the IP3-II (NCDD, 2011).
- The Ministry of Environment (MOE), the National Climate Change Committee (NCCC), and National Council for Green Growth (NCGG) have developed the NCCSP (2014-2028), and the National Policy on Green Growth Development and National Strategic Plan on Green Growth Development (2013-2030), Cambodia's National Strategic Development Plan (2014-2018) explicitly acknowledge climate change and disaster management issues. However mainstreaming CCA/DRR into CIP/CDP has been well recognized; many constraints were challenging to support the efforts in reducing the negative impacts from CCA/DRR (Lassa and Sembiring, 2017).
- Circular Strategy on Environment (2023-2028), developed in accordance with the Pentagon Strategy (Phase 1) 2023-2028 of the Royal Government of Cambodia, the 7th Legislature of the National Assembly, which outline the mission and commitment of the RGC in the field of environment. To meet the aspirations of the economy towards sustainable development goals. As the management of the environment and natural resources continues to improve, especially in the areas of land, water, minerals, and forestry, efforts to implement priority programmes are necessary in the context of change in climate. It is also important to address the emerging challenges of climate change.



Annex 4: Response Strategies to Climate Related Disaster in Selected Communes

CLIMATE-RELATED IMPACTS/DISASTER	RESPONSE STRATEGIES				
	Chrouy Svay	Tumnob Rolok	Chi Kha Kraom	Andoung Teuk	Thma Sa
<b>DROUGHT</b>	<ul style="list-style-type: none"> <li>- <u>Dig more open-well to get groundwater to support their crops and farmland (5)</u></li> <li>- Rehabilitate existing irrigation system (4)</li> <li>- Looking support from sub-national level (2)</li> <li>- Buy drinking water for dairy uses (3)</li> </ul>	<ul style="list-style-type: none"> <li>- <u>Dig more open-well to get groundwater to support their crops and farmland (5)</u></li> <li>- Rehabilitate existing irrigation system (4)</li> <li>- Looking support from sub-national level (2)</li> <li>- Buy drinking water for dairy uses (3)</li> </ul>	<ul style="list-style-type: none"> <li>- <u>Dig more open-well to get groundwater to support their crops and farmland (5)</u></li> <li>- Rehabilitate existing irrigation system (4)</li> <li>- Looking support from sub-national level (2)</li> <li>- Buy drinking water for dairy uses (3)</li> </ul>	<ul style="list-style-type: none"> <li>- <u>Dig more open-well to get groundwater to support their crops and farmland (5)</u></li> <li>- Rehabilitate existing irrigation system (4)</li> <li>- Looking support from sub-national level (2)</li> <li>- Buy drinking water for dairy uses (3)</li> </ul>	<ul style="list-style-type: none"> <li>- <u>Dig more open-well to get groundwater to support their crops and farmland (5)</u></li> <li>- Rehabilitate existing irrigation system (4)</li> <li>- Looking support from sub-national level (2)</li> <li>- Buy drinking water for dairy uses (3)</li> </ul>
<b>WINDSTORM</b>	<ul style="list-style-type: none"> <li>- Observing climatic information from television and social media (4)</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>- Observing climatic information and weather broadcasting on television and social media (5)</li> </ul>	<ul style="list-style-type: none"> <li>- Observing climatic information and weather broadcasting on television and social media (5)</li> </ul>	<ul style="list-style-type: none"> <li>- Observing climatic information and weather broadcasting on television and social media (5)</li> </ul>	<ul style="list-style-type: none"> <li>- Observing climatic information and weather broadcasting on television and social media (5)</li> </ul>
<b>STORM-WAVE</b>	<ul style="list-style-type: none"> <li>- Observing climatic information and weather broadcasting on television and social media (5)</li> <li>- Mangrove planting to protected from storm-wave (4)</li> </ul>	<ul style="list-style-type: none"> <li>- Observing climatic information and weather broadcasting on television and social media (5)</li> </ul>	<ul style="list-style-type: none"> <li>- Observing climatic information and weather broadcasting on television and social media (5)</li> </ul>	<ul style="list-style-type: none"> <li>- Observing climatic information and weather broadcasting on television and social media (5)</li> </ul>	<ul style="list-style-type: none"> <li>- Observing climatic information and weather broadcasting on television and social media (5)</li> </ul>
<b>LIGHTENING FLASH-FLOOD</b>	<ul style="list-style-type: none"> <li>- N/A</li> <li>- Rehabilitate existing canals (5)</li> </ul>	<ul style="list-style-type: none"> <li>- N/A</li> <li>- Rehabilitate existing canals (5)</li> </ul>	<ul style="list-style-type: none"> <li>- N/A</li> <li>- Rehabilitate existing canals (5)</li> </ul>	<ul style="list-style-type: none"> <li>- N/A</li> <li>- Rehabilitate existing canals (5)</li> </ul>	<ul style="list-style-type: none"> <li>- N/A</li> <li>- Rehabilitate existing canals (5)</li> </ul>

	- Preparing higher-hill for cash-crops and vegetable farming (3)	-	-	-	-
<b>FOREST FIRE</b>	-	-	-	-	- Protection of these forests by surrounding them with fire lines (5)

Source: Author Combined Results from FGD with Authority, Local NGOs, and related Effected Communities/People (May 2024)

- Note: 1 Very Low Potential  
2 Low Potential  
3 Medium Potential  
4 High Potential  
5 Very High Potential

During the discussion with commune council and related stakeholders, there are six (06) climate related disasters and specific response strategies has been identified. Among those climate-related disaster, drought is considered as most critical and server hazard and caused critical damages and concerns by local people. Result from the analysis indicates that the absence of clear intervention and support strategic options from local government are the main concerns for effective management and addressing climate change related hazards. Table 5 shows that people are facing with severe drought, however, the intervention and support mechanism from local government remains limited. Understanding that drought is a long-term issue, it is imperative that a strategy to minimise its negative impacts is put in place now from local perception such as 1) dig more open-well to get groundwater to support their crops and farmland, 2) rehabilitate existing irrigation system, 3) looking support from sub-national level, and 4) buy drinking water for dairy uses.