



FULLY DEVELOPED PROPOSAL FOR SINGLE COUNTRY

PART I PROJECT/PROGRAMME INFORMATION

Title of Project/Programme: Increasing climate resilience through small-scale infrastructure investments and enhancing adaptive capacity of vulnerable communities in Kampot and Koh Kong Provinces in Cambodia

Country: Cambodia

Thematic Focal Area:

Type of Implementing Entity: Multilateral Implementing Entity

Implementing Entity: United Nations Human Settlements Programme (UN-Habitat)

Executing Entities: National level
Ministry of Environment
National Council for Sustainable Development

Local level Provincial Department of Environment,
Kampot and Koh Kong
Provincial Administrations

Community level NGO(s) to be identified
Community Based Organisations and citizen/women groups in target communities

Amount of Financing Requested: 10,000,000 (in U.S Dollars Equivalent)

Letter of Endorsement (LOE) signed: Yes No

NOTE: The LOE should be signed by the Designated Authority (DA). The signatory DA must be on file with the Adaptation Fund. To find the DA currently on file check this page: <https://www.adaptation-fund.org/apply-funding/designated-authorities>

Stage of Submission:

This proposal has been submitted before including at a different stage (concept, fully-developed proposal)

This is the first submission ever of the proposal at any stage

In case of a resubmission, please indicate the last submission date:

Please note that fully-developed proposal documents should not exceed 100 pages for the main document, and 100 pages for the annexes.

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addition, the report highlights that increases in annual maximum and minimum temperatures are expected to be larger than the rise in average temperature, directly increasing pressures on human health, livelihoods, and ecosystems. Increased incidences of extreme heat represent a significant threat to human health in Cambodia, especially for outdoor laborers and urban populations for whom the urban heat island effect compounds the effect of heat rises.¹⁶

The April 2018 report, *Modelling of Climate Change Impacts on Growth* by the Ministry of Economy and Finance and the National Council for Sustainable Development, estimated that climate change could reduce the GDP of Cambodia by 2.5 percent by 2030 and by almost 10 percent by 2050.¹⁷ According to the report, the fall is primarily the result of extreme events impacting on infrastructure and loss of crops, and reduced worker productivity following temperature increases. Cambodia is especially vulnerable to floods, droughts, windstorms, and seawater intrusion.¹⁸ Climate change may reduce the country's annual average GDP growth by 6.6 percent.¹⁹

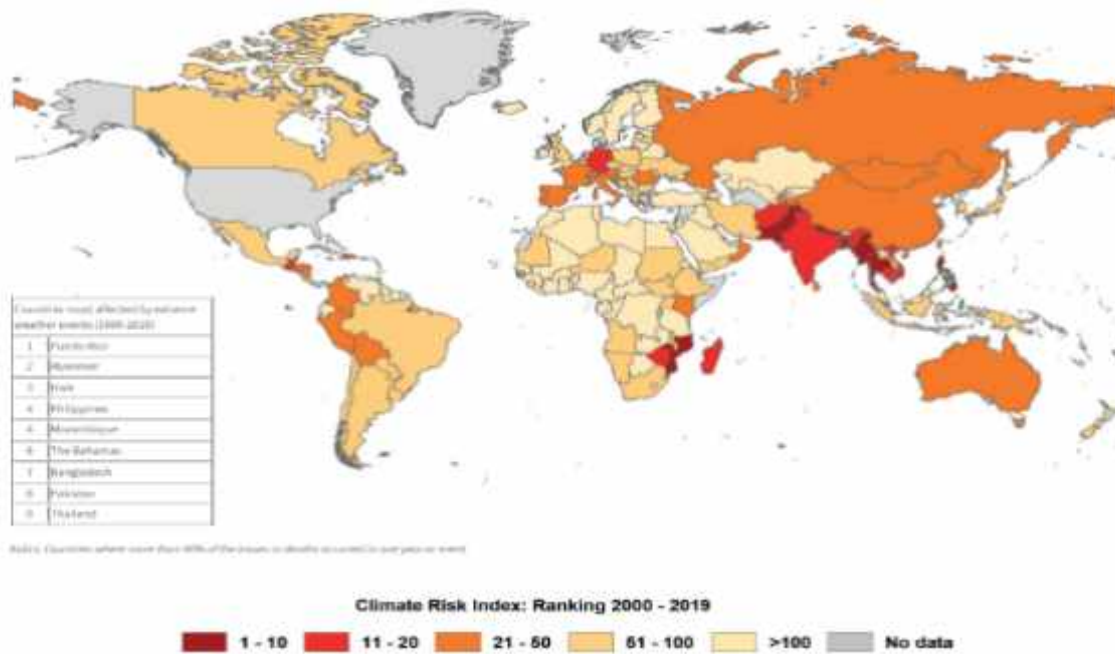


Figure 2 World Map of the Global Climate Risk Index 2000 – 2019

The coastal zones are among the most affected in the country.²⁰ In addition to the agriculture sector, this also affects the rapidly growing tourism sector, especially in the coastal areas on which the economy heavily relies. Rising sea levels can potentially impact coastal systems in multiple ways, including flood and storm damage, inundation, loss of wetlands, erosion, saltwater intrusion, and rising water tables.²¹

The 2014 Forest Cover Report, released by the Organisation for the Development of Data, highlights emerging trends in the loss of forest cover, especially the loss of dense forests throughout Cambodia since 1973. The percentage of non-forest cover, i.e., 48.4 percent, is more significant than forest cover.²²

Cambodia's vulnerability is characterized by recurrent floods and irregular rainfall, an agrarian-based economy, inadequate human and financial resources, insufficient physical infrastructure, and limited access to technologies. Socio-economic status, location, access to resources, and technologies influence Cambodia's ability to manage climate impacts or lack thereof.^{23 24 25} The vulnerability of Cambodia to climate change is exacerbated as the economy relies heavily on climate-related sectors. The economy of Cambodia is narrowly based and driven by four primary

¹⁶ The World Bank Group and Asia Development Bank (2019). *Climate Risk Country Profile: Cambodia*. Washington DC, USA and Metro Manila, Philippines.

¹⁷ Department of Climate Change (2018). *Modeling of Climate Change Impacts on Growth*. Ministry of Environment, Kingdom of Cambodia. <http://www.camclimate.org.kh/en/policies/ncsd-news/445-445.html>

¹⁸ Ibid

¹⁹ Ministry of Environment (2020). *Cambodia's Updated Nationally Determined Contribution*. Ministry of Environment, Kingdom of Cambodia.

²⁰ Ministry of Environment (2020). *Cambodia's Updated Nationally Determined Contribution*. Ministry of Environment, Kingdom of Cambodia.

²¹ Ministry of Environment (2022). *Third National Communication to the United Nations Framework Convention on Climate Change*. Kingdom of Cambodia.

²² Development Data Organisation (2015). *Forest Cover*. <http://www.opendatacambodia.net/briefing/forest-cover/>

²³ Ministry of Environment (2020). *Cambodia's Updated Nationally Determined Contribution*. Ministry of Environment, Kingdom of Cambodia.

²⁴ The World Bank Group and Asia Development Bank (2019). *Climate Risk Country Profile: Cambodia*. Washington DC, USA and Metro Manila, Philippines.

²⁵ INFORM (2017). *Country Risk Profile for Cambodia 2017*. <http://www.inform-index.org/Countries/Country-profiles/iso3/KHM>

sectors, garment, tourism, construction, and agriculture. Agriculture remains the dominant employment sector for the rural population, accounting for 39 percent of the country's 8.8 million labor force and contributing to about 22.85 percent of GDP in 2021.^{26 27} Tourism's share of GDP came to 3.6 percent in 2022 compared to 1.8 percent in 2021.²⁸ The *Asian Development Outlook* April 2023 says the tourism sector is expected to grow 7.3% in 2023 before easing to 6.8% in 2024.²⁹

Being a developing nation with limited infrastructure, recovery from climate-related disasters is still challenging. Between 1991 and 2014, Cambodia experienced extreme hazards, mainly floods and storms that led to the deaths of over 1,500 people^{30 31 32}, and the vulnerability to extreme weather events such as floods and cyclones caused most losses in terms of both mortality and economic losses. Between 1991 and 2014, the financial losses amounted to more than US\$235 million.³³ Two-thirds of the loss could have been avoided with improved policies, investment to adapt to climate change, and measures to climate-proof infrastructure where possible.

In addition, there is a growing risk that severe weather events will continue to impact Cambodia, which will affect the achievement of its national development priority, i.e., to build institutional capacity, improve socio-economic infrastructure, and create a favorable environment to attract both domestic and foreign investments, to ensure a high rate of economic growth and poverty reduction, as outlined in its National Strategic Development Plan (NSDP) 2019 – 2023.³⁴ The uncertainty and intricacy of ever-increasing climate change risks and threats significantly will hamper economic growth and development potential in the future.³⁵ Retaining growth and development performance under a changing climate will be a real challenge to Cambodia in years to come. Cambodia portrays a severe lack of coping capacity.

1. Temperature

The climate in Cambodia is tropical, with high temperatures and two distinct seasons, namely, a monsoon-driven rainy season and a dry season. The rainy season between May to October is with south-westerly winds ushering in clouds and moisture accounting for 80 to 90 percent of the country's annual precipitation. The dry season from November to April is cooler, mainly between November and January, with an average minimum temperature of 17°C in January. Average temperatures across the country are relatively uniform. Nonetheless, temperatures are the highest in the early summer months before the rainy season begins, with maximum temperatures often exceeding 32°C (with an average maximum temperature of 38°C in April).^{36 37}

As mentioned elsewhere, over the last decades, the mean temperature in Cambodia has increased significantly, a trend that is predicted to continue with projected increases in monthly averages between 0.013°C and 0.036°C per year by 2099 with higher predictions for locations at low latitudes.³⁸ The number

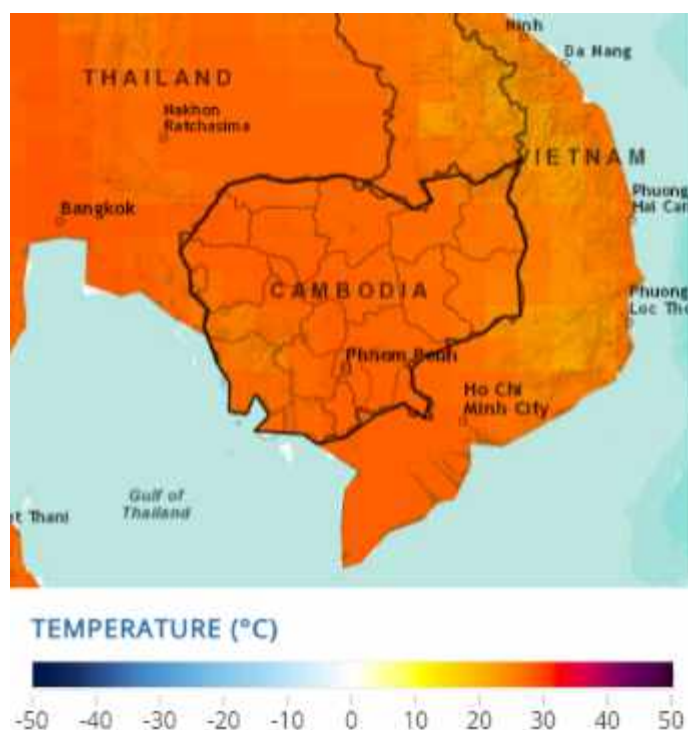


Figure 3 Observed climatology of mean-temperature 1991 – 2020 Cambodia

²⁶ <https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?locations=KH>

²⁷ <https://www.statista.com/statistics/438728/share-of-economic-sectors-in-the-gdp-in-cambodia/#:~:text=This%20statistic%20shows%20the%20share,sector%20contributed%20about%2034.18%20percent.>

²⁸ [https://www.phnompenhpost.com/business/international-tourism-receipts-rocket-nearly-eightfold-over-14b#:~:text=Tourism's%20share%20of%20GDP%20\(gross,in%202018%2C%20the%20report%20indicated.](https://www.phnompenhpost.com/business/international-tourism-receipts-rocket-nearly-eightfold-over-14b#:~:text=Tourism's%20share%20of%20GDP%20(gross,in%202018%2C%20the%20report%20indicated.)

²⁹ <https://www.adb.org/outlook>

³⁰ Global Climate Risk Index (2016). <https://germanwatch.org/fr/download/13503.pdf>

³¹ UNISDR (2017). Global Risk Assessment 2017. <http://www.preventionweb.net/countries/khm/data/>

³² International Disaster Database (2017). EM-DAT http://www.emdat.be/country_profile/index.html

³³ Index for Risk Management (INFORM) Country Risk profile for Cambodia, 2017. <http://www.inform-index.org/Countries/Country-profiles/iso3/KHM>

³⁴ Ministry of Planning (2019). *National Strategic Development Plan 2019 – 2023*. Ministry of Planning, Kingdom of Cambodia.

³⁵ Ministry of Environment (2013). *Cambodia Climate Change Strategic Plan 2014 – 2023*. National Climate Change Committee. Royal Government of Cambodia.

³⁶ Ibid

³⁷ The World Bank Group (2022). Climate Change Knowledge Portal for Development Practitioners and Policy Makers.

<https://climateknowledgeportal.worldbank.org/country/cambodia/climate-data-historical>

³⁸ Ministry of Environment (2013). *Cambodia Climate Change Strategic Plan 2014 – 2023*. National Climate Change Committee. Royal Government of Cambodia.

of 'hot days' in the country has increased over the last century, by as much as 46 days per year.³⁹ The temperature is expected to increase by 0.6 °C by 2030, by 1.4 °C by 2050 in Kampot Province⁴⁰ and by 0.7°C (RCP4.5) and 1.0°C (RCP8.5) by 2025 in Koh Kong Province.⁴¹

Heat stress has a negative impact on many sectors, including construction, garment, agriculture, education, etc.⁴² Moreover, a predicted increase in temperatures coupled with an increase in inter-annual and seasonal temperature variability will result in increased evaporation rates and, consequently, likely desiccation and hard setting of soils (depending on soil type) and the drying up of freshwater bodies.⁴³

2. Rainfall

The rainfall in Cambodia varies within the country and is strongly influenced by topography, declining in the central plains and increasing in the upland areas. However, precipitation is heaviest along the 435km coastline stretching from Koh Kong Province bordering Thailand in the West, Sihanoukville city, which contains Cambodia's largest deep-water seaport, Kampot Province bordering Vietnam to the East, and Kep city. While lowlands may receive an average annual rainfall of 1,400mm, data shows that rainfall within coastal areas can be as high as 4,000mm per year or higher.⁴⁴ The average annual rainfall in Kampot is 2,215 mm⁴⁵ and in Koh Kong Province, it is 4,498 mm.⁴⁶

The projected change in precipitation from climate models is much more variable than it is for temperature. The average projection for annual rainfall from the Global Climate Models is for an increase by 2030. A report on *Climate Risk and Vulnerability Assessment* states that typhoons and tropical storms can bring widespread, intense rainfall and subsequent flooding, and it is also projected that rainfall events from tropical depressions crossing across Cambodia from typhoons landing in Vietnam will decrease in frequency, but each event will bring heavy rains (Figure 4). Additionally, the coastal location of Kampot Province could experience increased rainy monsoons resulting in more considerable rainfall from extreme events. Modeling studies project that excessive rain in one-day events will increase by 3 - 10 mm.⁴⁷ The annual mean projected rainfall changes by -1% (RCP 4.5) and -2.5% (RCP 8.5) for Koh Kong Province, and the rainfall is projected to decrease during the rainy season and increase in other parts of the year.

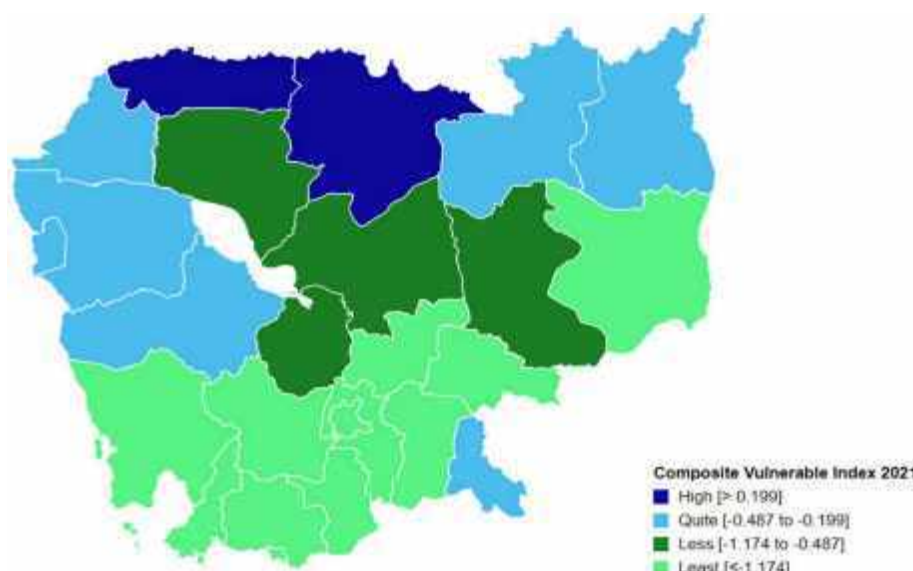


Figure 4 National Vulnerability Indexes

Moreover, it is projected that there is a higher tendency for short-term and medium-term droughts to decrease, but long-term droughts to increase in the future with increases in the projected number of days of extreme temperatures (days above 35°C) and also an increase in the Heat Wave Duration Index (HWDI) in Koh Kong Province.⁴⁸

³⁹The World Bank Group (2022). Climate Change Knowledge Portal for Development Practitioners and Policy Makers. <https://climateknowledgeportal.worldbank.org/country/cambodia/climate-data-historical>

⁴⁰Asian Development Bank (2021). *Climate Risk and Vulnerability Assessment: Cambodia: Livable Cities Investment Project Kampot*. <https://www.adb.org/sites/default/files/linked-documents/53199-001-ld-05.pdf>

⁴¹The World Bank Group (2011). *Vulnerability, Risk Reduction and Adaptation to Climate Change, Cambodia*. https://climateknowledgeportal.worldbank.org/sites/default/files/2018-10/wb_gfdr_climate_change_country_profile_for_KHM.pdf

⁴²National Council for Sustainable Development (2022). 'Study on Impact of Heat Stress to Human Productivity and Economic in Cambodia'. <https://ncsd.moe.gov.kh/dcc/project/study-impact-heat-stress-human-productivity-and>

⁴³Ministry of Environment (2002). *Initial National Communication under the United Nations Framework Convention on Climate Change*. Kingdom of Cambodia.

⁴⁴Thoeun, C. (2015). Observed and projected changes in temperature and rainfall in Cambodia. *Weather and Climate Extremes*, 7, 61 – 71. <https://www.sciencedirect.com/science/article/pii/S2212094715000043?via%3Dihub>

⁴⁵Weather & Climate. <https://weather-and-climate.com/average-monthly-precipitation-Rainfall-inches,kampot,Cambodia>

⁴⁶Climate conditions in Koh Kong Province. <http://hikersbay.com/climate-conditions/cambodia/kohkong/climate-conditions-in-koh-kong-province.html?lang=en#weather-rain-months>

⁴⁷Asian Development Bank (2021). *Climate Risk and Vulnerability Assessment: Cambodia: Livable Cities Investment Project Kampot*. <https://www.adb.org/sites/default/files/linked-documents/53199-001-ld-05.pdf>

⁴⁸Climate Investment Funds (2014). *Climate Change Impact Modeling and Vulnerability Assessments for Koh Kong and Mondulkiri Provinces in Cambodia*. Supplementary Appendix M - CAM GMS BCC-PPCR. https://www.cif.org/sites/cif_enc/files/meeting-documents/m_climate_change_modelling_and_vulnerability_assessment_0.pdf

The increase in the frequency and intensity of flooding events due to more frequent episodes of heavy rainfall will lead to decreased productivity in rain-fed crops and a greater frequency of droughts and floods. In addition, increased rates of runoff of water from the soil surface because of greater rainfall intensity will increase rates of soil erosion and reduce river flow in dry periods.⁴⁹

Episodes of droughts and floods are identified as the two main climate hazards experienced in both Kampot and Koh Kong Provinces.^{50 51} A significant factor in exacerbating the damage is that drought periods have been increasing followed by destructive flooding in the same province in the same year. The agricultural sector is most heavily affected by droughts and floods in the two provinces.

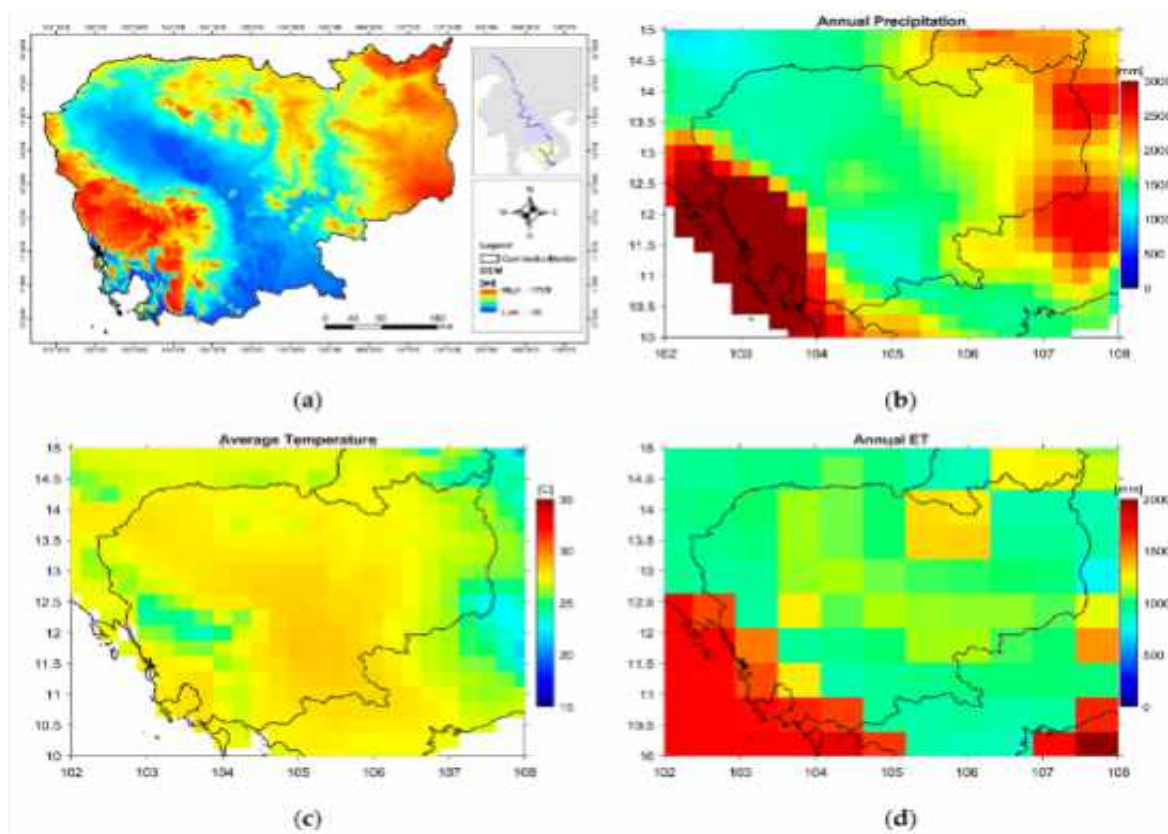


Figure 5 Map of Cambodia showing: (a) Digital Elevation Model; (b) Average annual precipitation over Cambodia from APHRODITE dataset; (c) Average annual temperature over Cambodia from APHRODITE dataset; (d) Average annual evapotranspiration over Cambodia from JRA-55 dataset.
[<https://www.mdpi.com/2225-1154/10/11/162/htm>]

3. Sea Level Rise

By 2025, the local sea level at Koh Kong Province is projected to increase by approximately 10 cm above the 1986 - 2005 baseline.⁵² Rising sea levels could pose a significant threat to marine coastal areas of Kampot and Koh Kong Provinces, which already suffer from storm surges, high tides, and beach erosion. Low-lying areas, including settlements, beach resorts, seaports, coastal fisheries, and mangrove forests, could all be directly affected.⁵³

According to the Met Office of the UK, in Cambodia, under a high emissions scenario and without significant investments in adaptation, an annual average of 30,700 people are projected to be affected by flooding due to sea level rise between 2070 and 2100. If emissions decrease rapidly and there is a significant scale-up in protection (i.e., continued construction/raising of dikes), less than 100 people annually could be affected.⁵⁴

⁴⁹ Ministry of Environment (2002). *Initial National Communication under the United Nations Framework Convention on Climate Change*. Kingdom of Cambodia.

⁵⁰ Save the Children, People in Need & CARE Cambodia (2016). *Final Report of Rapid Assessment of the Drought in Koh Kong Province*. https://resourcecentre.savethechildren.net/pdf/csp_report_on_rapid_assessment_on_drought_in_koh_kong_ab_revised_version_3.pdf/

⁵¹ Cambodianess (2021). 'Drought Hits Farmers in Kampot and Pailin'. <https://cambodianess.com/article/drought-hits-farmers-kampot-and-pailin>

⁵² Climate Investment Funds (2014). *Climate Change Impact Modeling and Vulnerability Assessments for Koh Kong and Mondulkiri Provinces in Cambodia*. Supplementary Appendix M - CAM GMS BCC-PPCR. https://www.cif.org/sites/cif_enc/files/meeting-documents/m_climate_change_modelling_and_vulnerability_assessment_0.pdf

⁵³ The World Bank Group (2011). *Vulnerability, Risk Reduction and Adaptation to Climate Change, Cambodia*.

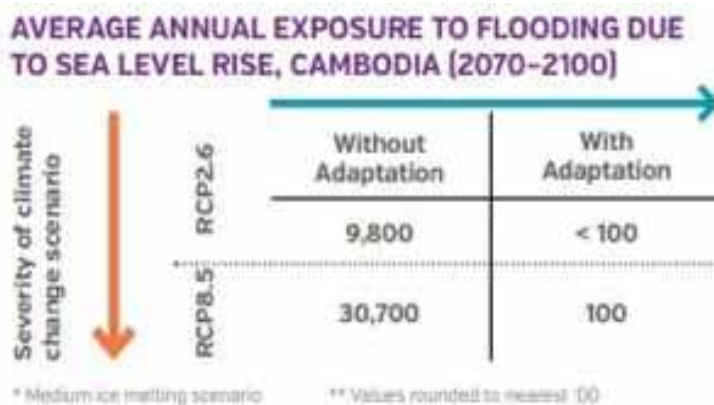
https://climateknowledgeportal.worldbank.org/sites/default/files/2018-10/wb_gfdr_climate_change_country_profile_for_KHM.pdf

⁵⁴ Met Office (2014). *Human dynamics of climate change*. Technical Report. Met Office, HM Government, United Kingdom.

Increased sea levels are especially alarming for Kampot and Koh Kong Provinces, already experiencing severe seawater intrusion, beach erosion, high tides, and frequent storm surges. Other impacts, such as regional land subsidence, may intensify its effects further. Especially coastal settlements, seaports, fisheries, forests, and tourism facilities in low-lying areas would be equally affected. For example, research by the Danish International Development Assistance found that around 56 percent of the low-lying city of Koh Kong would be submerged by a one-meter rise in the sea levels.⁵⁵ As sea level rises, the base-level of the Teuk Chhou River will also rise, increasing the likelihood of flooding during high tide events in the Kampot Province.

When there are heavy rains along the coastline, runoff floods coastal areas along the base of the mountain ranges. Kampot Province becomes flooded due to the river overtopping the riverbanks.⁵⁶ In 2015, persistent heavy rain and opened gates at the Kamchay Hydropower Dam caused flooding in Kampot Province, resulting in extensive damage to homes and businesses and thousands of affected families.⁵⁷

Figure 6.



Source: Met Office, HM Government, UK (2014)

C. Proposed Project Area

The project will focus its activities on two provinces (Kampot and Koh Kong) in the southern coastal area of Cambodia.

1. Kampot Province

Kampot Province covering a land area of 4,837 km² has a coastline of around 73km on the Gulf of Thailand stretches from the borders of the Hatieng District of Vietnam to Preah Sihanouk Province. Kampot Province consists of seven districts (Angkor Chey, Banteay Meas, Chhuk, Chum Kiri, Dang Tong, Kampong Trach, Tuek Chhou districts) and Kampot city (Krong Kampot) and is divided into 92 communes with a total of 477 villages.⁵⁸ Kampot Province had a population of 593,829 in 2019.⁵⁹ Its capital city of Kampot comprises five Sangkats and 15 villages.^{60 61} The poverty rate in Kampot province was 16.21 percent in 2019. 71.9 percent of the people are employed in the agriculture sector, 0.5 percent in handicrafts, and 27.7 percent in the service sector.⁶²

Paddy is cultivated in both rainy and dry seasons. In 2021, 119,528 hectares (89.96 percent) of land were cultivated during the rainy season, and around 8,430 hectares (2.83 percent) were cultivated during the dry season. Cambodia has promoted the agro-industry through its Agricultural Sector Strategic Plan 2014 - 2018, of which Kampot pepper is one of the leading industrial crops for Kampot Province. The pepper production exported overseas was 102 tons in 2018.⁶³ Kampot pepper is a specialized product, protected by GI law. Durian, another specialized product.

Marine fishery resources contribute to the local livelihood, where fishery resources are mainly distributed to domestic markets throughout Cambodia. Kampot sea salt is extracted from the seawater through salt evaporation ponds in the coastal areas of Kampot and Kep Provinces. Hydro-electric power plants function in Kampot, Koh Kong, Pursat, and Battambang provinces, with the highest capacity being 190 MW in Kampot province.⁶⁴

⁵⁵ Danish International Development Assistance (2008). <https://www.weadapt.org/sites/weadapt.org/files/legacy-new/placemarks/files/Cambodia.pdf>

⁵⁶ Asian Development Bank (2021). *Climate Risk and Vulnerability Assessment: Cambodia: Livable Cities Investment Project Kampot*. <https://www.adb.org/sites/default/files/linked-documents/53199-001-ld-05.pdf>

⁵⁷ National (2015). *Thousands Affected by Kampot Floods*. <https://www.khmertimeskh.com/59506/thousands-affected-by-kampot-floods/>

⁵⁸ National Institute of Statistics (2019). *Cambodia Population: Census: Kampot 1998 – 2019*. NIS, Kingdom of Cambodia. <https://www.ceicdata.com/en/cambodia/population-census/population-census-kampot>

⁵⁹ National Institute of Statistics (2000). *General Population Census of Cambodia, 1998: Village Gazetteer*. NIS, Kingdom of Cambodia.

⁶⁰ Ministry of Planning (2019). *General Population Census of the Kingdom of Cambodia 2019 (Final Results)*. National Institute of Statistics, Ministry of Planning, the Kingdom of Cambodia.

⁶¹ National Committee for Sub-National Democratic Development (2009). *Kampot Data Book 2009*. NCDD, Kingdom of Cambodia.

⁶² *Provincial Socioeconomic Report 2019*, Kampot Province.

⁶³ Nagoya University (2019). *Kampot Province, Cambodia: Overseas Fieldwork Report*. Graduate School of International Development. Nagoya University, Nagoya, Japan. https://www2.gsid.nagoya-u.ac.jp/blog/fieldwork/files/2020/03/20200330_OFW2019-Report.pdf

⁶⁴ East Asia Summit/Energy Cooperation Task Force. *Biofuel Database in East Asia*. <http://www.asiabiomass.jp/biofuelDB/cambodia/contents003.htm>

The Kampot Preah Monivong Bokor National Park, designated as an ASEAN Heritage Park, was established in 1993 and covers 1,423.17 km². There are 35 protected forest areas being managed by communities covering an area of 136.17 km². Ten fisheries communities manage fisheries conservation zones covering an area of 58.35 km². Three environment and natural protection areas cover 21.62 km².⁶⁵

Kampot is among other coastal provinces with great potential for eco-tourism, provided its natural resources, coastline ideal for ports, and unique landscape. Recently, the economy of Kampot has been fuelled by tourism and special economic zone development along the coastline and the number of hotels and restaurants/other businesses. The entire economic base of Kampot (agriculture, fishery, sea salt extraction, hydro-electricity, national park, tourism, etc. are all very vulnerable to climate change.

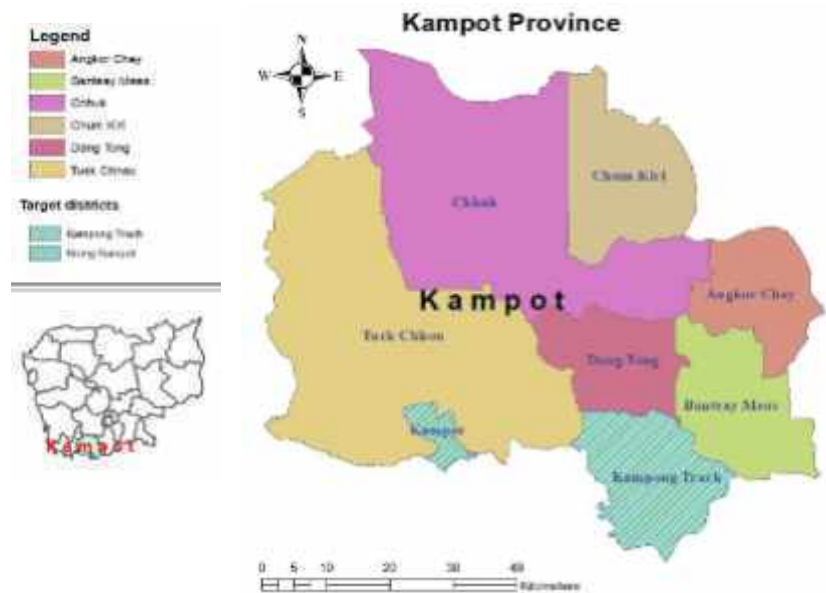


Figure 7 Map of Kampot Province

2. Koh Kong Province

Koh Kong Province is the most southwestern province of Cambodia, and the capital is Khemarak Phoumin.⁶⁶ It covers an area of 10,090 km². Koh Kong has a 230 km² undeveloped coastline and a mountainous, forested, and largely inaccessible interior which includes part of the Cardamom Mountains, Cambodia's largest national park (Botum Sakor National Park), and a section of Kirirom National Park.^{67 68} The province is divided into six districts (Botum Sakor, Kiri Sakor, Kaoh Kong, Mondol Seima, Srae Ambel, and Thma Bang) and Khemarak Phoumin city.⁶⁹

According to the 2019 census, the population of Koh Kong was 123,618.⁷⁰ The poverty rate in Koh Kong Province was 9.62 percent in 2021. 57.5 percent of the people are employed in the agriculture sector, 0.2 percent in handicrafts, and 42.3 percent in the service sector.⁷¹ The poverty rate of Khemarak Phoumin city is 0.92 percent. 25.8 percent of the people are employed in the agriculture sector, 0.3 percent in handicrafts, and 73.9 percent in the service sector.⁷²

Koh Kong has 637 km² mangrove forest and 39.93 km² seagrass and coral reef areas are found around Koh Sdech and Phnom Koh Kong Krao.

D. Socio-economic Context (Cambodia and of Kampot and Koh Kong Provinces)

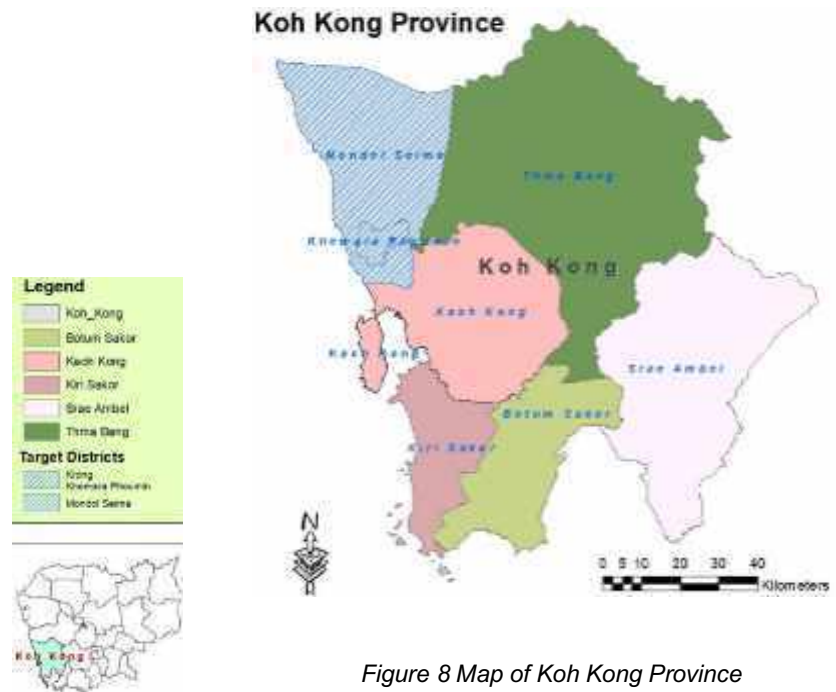


Figure 8 Map of Koh Kong Province

⁶⁵ <https://seaknowledgebank.net/content/kampot-province>

⁶⁶ Mekloy, P. (2019). "Not What It Seems". Bangkok Post. <https://www.bangkokpost.com/travel/1722527/not-what-it-seems>

⁶⁷ Koh Kong, Cambodia. <https://www.koh-kong-cambodia.com/>

⁶⁸ Koh Kong Province. https://en.wikipedia.org/wiki/Koh_Kong_province

⁶⁹ National Institute of Statistics (2013). *Economic Census of Cambodia 2011, Provincial Report: Koh Kong Province*. Ministry of Planning, Kingdom of Cambodia.

⁷⁰ <https://www.populationu.com/cambodia-population>

⁷¹ *Provincial Socioeconomic Report 2019*, Koh Kong Province.

⁷² Ibid

The GDP of Cambodia in 2021 was 29.8 billion US dollars. Although growing rapidly, the per capita income is low compared to most neighboring countries (US\$1,730). The two leading sectors of the Cambodian economy are textiles and tourism. In addition, agriculture remains the primary source of income for many Cambodians. The service sector is highly concentrated on trading and catering services.⁷³

Despite the considerable decline in poverty incidence (poverty rates fell from 60 percent in 2000 to 13.5 percent in 2015) and depth (reduction in poverty gap from 21.8 percent in 2004 to 2.2 percent in 2014), a large share of the population still lives just above the national poverty line and are at a high risk of falling back into poverty.⁷⁴ The unemployment rate in Cambodia is projected to trend around 2 percent and 0.90 percent in 2024, according to the projections of the econometric models.⁷⁵

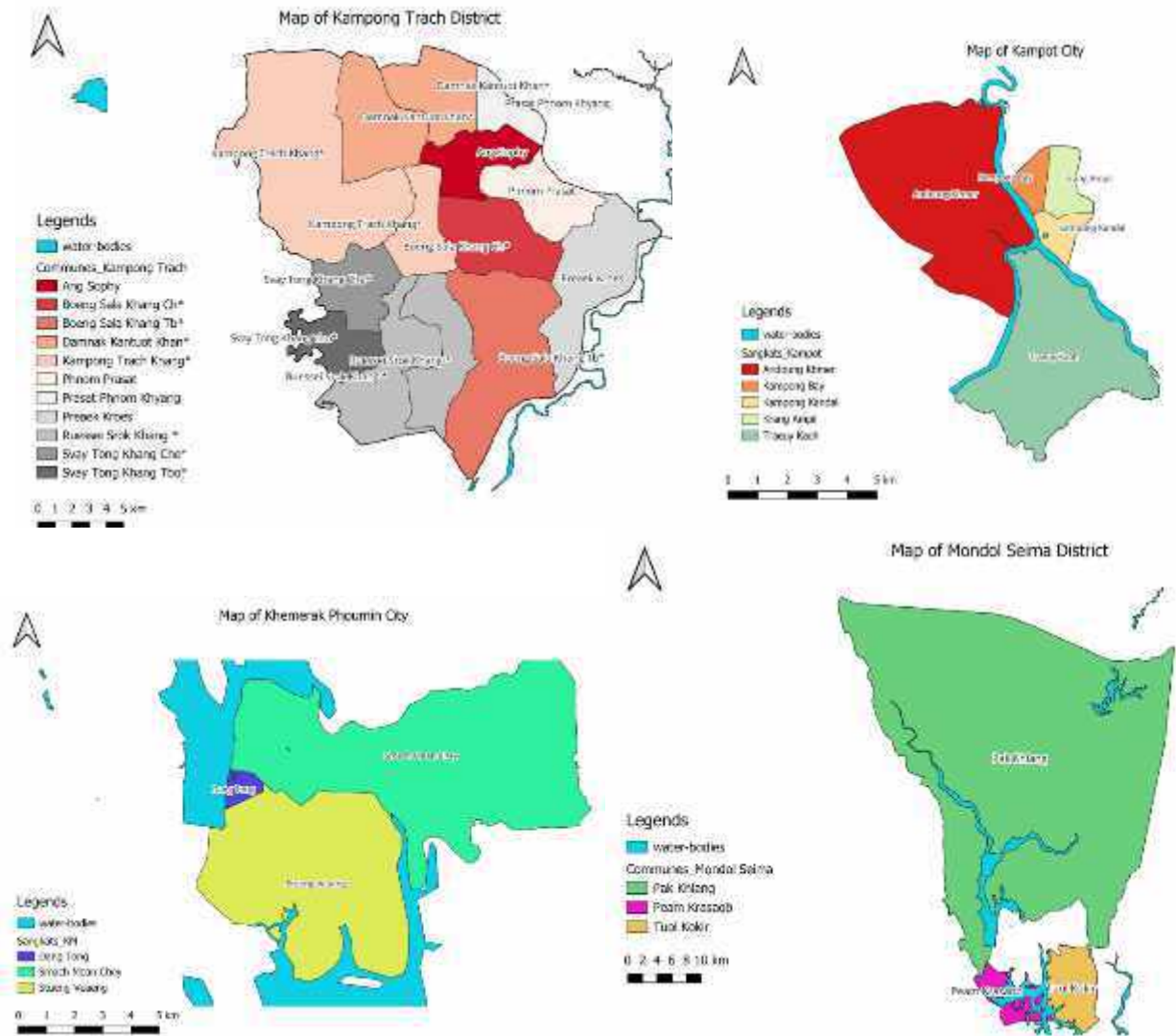


Figure 9
Maps of the Project Area

Utilizing the most recent Cambodia Socio-Economic Survey for 2019/20, Cambodia has recently redefined the poverty line. The national poverty line is now 10,951 riels per person per day, equivalent to US\$2.70 at October 2022 exchange rates. Under the new poverty line, about 18 percent of the population is identified as poor, with poverty rates varying considerably by area. The poverty rate is the lowest in Phnom Penh (4.2 percent) and other urban areas (12.6 percent) and the highest in rural areas (22.8 percent),⁷⁶ which includes a majority of the areas in the Kampot and Koh Kong

⁷³ Embassy of the Republic of Belarus in the Socialist Republic of Vietnam (2022). Cambodian economy.

<https://vietnam.mfa.gov.by/en/exportby/camobz/comeco/>

⁷⁴ Asian Development Bank (2021). Employment and Poverty Impact Assessment. <https://www.adb.org/sites/default/files/linked-documents/54195-001-sd-03.pdf>

⁷⁵ Business (2022). Joblessness in Cambodia is to stay around 2% in 2023. <https://www.khmertimeskh.com/501169894/joblessness-in-cambodia-to-stay-around-2-in-2023/>

⁷⁶ The World Bank Group (2022). *The World Bank in Cambodia*.

<https://www.worldbank.org/en/country/cambodia/overview#:~:text=Cambodia%20has%20recently%20redefined%20the,at%20October%202022%20exchange%20rates.>

Provinces. The Human Development Index for Koh Kong at 0.620 and Kampot at 0.597 were higher than the national average of 0.593.⁷⁷

The Kampot and Koh Kong Provinces' economy reflects the national economy and primarily depends on the tourism, agriculture, and construction sectors due to their location. Rice is the primary agricultural output within the provinces, with other products being vegetables and fruits. Fishing and seaweed cultivation is also crucial to the economy of the provinces. Kampot and Koh Kong Provinces recognize tourism as an important sector and have a great potential for ecotourism, with nature, livelihood promotion, and community-based tourism activities.

Cambodia remains highly vulnerable to economic shocks, intensified due to climate variability and change. Climate change threatens to reduce the productivity of, especially the agriculture and fisheries sector, posing a significant threat to the livelihoods and nourishment of many poor, rural communities in Cambodia.⁷⁸ Climate variability and change are already severely impacting the key sectors, especially agriculture, and tourism, in the two provinces. These impacts are reversing economic growth, exacerbating poverty, and undermining future prosperity. According to the International Labour Organisation, as climate change affects temperature and rain patterns, it may render entire regions unproductive and make workplaces too hot for work, thereby leading to climate-induced migration, the proliferation of precarious and informal work, and an increase in unemployment⁷⁹ which is pertinent to the two provinces as well. As mentioned elsewhere, it is estimated that climate change could reduce the GDP of Cambodia by 2.5 percent by 2030 and by almost 10 percent by 2050.⁸⁰

E. Gender Context (Cambodia and of Kampot and Koh Kong Provinces)

In the 2022 World Economic Forum Global Gender Gap Index, Cambodia is ranked 11th in the region (out of 19 East Asia and Pacific countries) and 98th globally (156 countries) with a score of 0.690.⁸¹

Life expectancy at birth (SDG3) for females at 72.3 is better than for males at 66.8. Neonatal and under-five mortality rates have rapidly declined over the past two decades, from 37 to 8 and 124 to 16 per 1000 live births, respectively. This included an over 50 percent decrease between 2014 and 2021-2022 alone, far faster than global averages, and meeting the Cambodian Sustainable Development Goals (SDGs) eight years ahead of schedule.⁸² The mortality rate dropped dramatically from 437 among 100,000 lives in 2000 to 170 among 100,000 lives in 2014.⁸³ It further dropped to 160 in 2017.^{84,85} Access to maternal health care has improved steadily over the years. Nearly all (99 percent) women now give birth with a skilled health provider, an increase from just over one in three women in 2000.⁸⁶ In Cambodia, the rate of adolescent fertility has remained roughly the same since 2010. The rate in 2020 was 46 of every 1,000 girls ages 15-19 gave birth.⁸⁷

Cambodia has made significant progress in educating its children. Gender disparity in education has reduced at all levels, with more scholarships for poor students, especially girls, more schools at the sub-national level, and more girls' dormitories. Since 2007, the number of children enrolled in preschool programs has doubled. The number of children enrolled in primary education has increased from 82 percent in 1997 to over 97 percent in the school year 2017/18.⁸⁸ 63 percent of girls and 52.5 percent of boys complete lower secondary school in Cambodia as of 2021 data.⁸⁹ According to the Human Development Report (SDG 4.4), only 18.3 percent of females complete secondary education compared to 31.7 percent of males. Mean years of school is 5.9 for males and 4.4 for females.⁹⁰ Adult literacy in Cambodia is lower among women (79.8 percent) than among men (88.4 percent) (2021).⁹¹

Cambodia has made significant progress in expanding opportunities and participation of women in economic activities and is making good progress in women's economic empowerment. The World Economic Forum recorded in 2022 that Cambodia ranked 61st in economic participation and opportunity (out of 146 countries), which is an improvement compared to the 2014 ranking of 77th (total of 142 countries). In the Global Gender Gap Index, Cambodia ranked 98th

⁷⁷ https://en.wikipedia.org/wiki/List_of_Cambodian_provinces_by_Human_Development_Index

⁷⁸ The World Bank Group and Asia Development Bank (2019). *Climate Risk Country Profile: Cambodia*. Washington DC, USA, and Metro Manila, Philippines.

⁷⁹ International Labour Organisation (2018). *The employment impact of climate change adaptation*. Input Document for the G20 Climate, Sustainability Working Group. ILO, Geneva.

⁸⁰ Department of Climate Change (2018). *Modeling of Climate Change Impacts on Growth*. Ministry of Environment, Kingdom of Cambodia. <http://www.camclimate.org.kh/en/policies/ncsd-news/445-445.html>

⁸¹ World Economic Forum (2022) Global Gender Gap Report 2022

⁸² <https://www.who.int/cambodia/news/detail/07-04-2023-cambodia-celebrates-significant-health-achievements-on-the-75th-anniversary-of-who>

⁸³ Ministry of Women's Affairs (2020) Neary Rattanak V Five-year Strategic Plan for Gender Equality and Women's Empowerment 2019-2023

⁸⁴ <https://genderdata.worldbank.org/countries/cambodia/#:~:text=In%20Cambodia%2C%20the%20labor%20force,labor%20force%20participation%20has%20decreased.>

⁸⁵ UNDP (2022) Human Development Report 2021-22, p 293

⁸⁶ <https://www.who.int/cambodia/news/detail/07-04-2023-cambodia-celebrates-significant-health-achievements-on-the-75th-anniversary-of-who>

⁸⁷ <https://genderdata.worldbank.org/countries/cambodia/>

⁸⁸ <https://www.unicef.org/cambodia/education>

⁸⁹ <https://genderdata.worldbank.org/countries/cambodia/>

⁹⁰ UNDP 2022 Human Development Report 2021-2022

⁹¹ *ibid*

(0.690 score), which is an improvement from the previous year when the rank was 103rd (0.684 score).⁹² In Cambodia, the labor force participation rate among females is 69.6 percent, and among males is 82.1 percent for 2022.⁹³

Despite the above-mentioned progress, studies have shown that women (including children and older persons) disproportionately suffer the impacts of severe weather events, disasters, climate change, and variability because of cultural norms and the inequitable distribution of roles, resources, and power, especially in developing countries like Cambodia⁹⁴. Therefore, women have greater sensitivity and less adaptive capacity. Women tend to have lower incomes and are more likely to be economically dependent than men.⁹⁵

The female population in Kampot Province is 51 percent, with 16.24 percent being Female-Headed Households (FHH).⁹⁶ In Koh Kong Province, the female population is 50 percent, with FHH being 16.08 percent.⁹⁷ As in other parts of the country, in Kampot and Koh Kong Provinces, women's livelihoods, access to resources and capacity to adapt are different from men. In many cases, women face challenges due to social reasons and roles in the household. Women often contribute to the household income and have domestic responsibilities, for instance, caregiving for the sick and older persons and raising and educating children. Women in Kampot and Koh Kong Provinces are usually responsible for domestic chores, including water collection, small-scale gardening, cropping rice, trade, and rearing livestock—a greater range of responsibilities than men. Therefore, supporting women to adapt is crucial.

The coastal area of Cambodia, including coastal regions of Kampot and Koh Kong Provinces, are especially at risk from flooding from inland waterways, heavy rain, and coastal flooding from storm surges and sea level rise. Increases in extreme weather conditions such as droughts, storms, and floods are altering economies, economic development, and patterns of human migration and are likely among the most significant global health threats this century. Everyone will be affected by these changes, but not equally. Vulnerability to climate change will be determined by a community or the ability of the individual to adapt.⁹⁸

When drought or heavy rain threatens agricultural production, men can adapt by using their savings and economic independence to invest in alternative income sources, and in times of food scarcity and drought, women will often give priority to their husbands and family members nutritional needs before hers.⁹⁹ According to reports from the Cambodia Humanitarian Response Forum (CHF), in September/October 2022, flooding in Cambodia affected an estimated 85,482 households across 74 districts in the 14 provinces. As many as 33,165 homes have been damaged, along with 29 health centres, 280 schools, 1,600 km of rural road and 152,386 hectares of agricultural land.¹⁰⁰ Evidence suggests that women were more severely affected during such floods. Women were more likely to be in the home when floods hit or unable to leave because of domestic care responsibilities. The resulting disruption to health care infrastructure



Photo 1 Families encroaching water bodies with no waste water treatment and exposed to health hazards and diseases

⁹² World Economic Forum (2022) Global Gender Gap Report 2022

⁹³ <https://genderdata.worldbank.org/countries/cambodia/>

⁹⁴ PRB (2012). *Women more vulnerable than men to climate change*. <https://www.prb.org/resources/women-more-vulnerable-than-men-to-climate-change/>

⁹⁵ Oxfam International (2022). *Why the majority of the world's poor are women*. <https://www.oxfam.org/en/why-majority-worlds-poor-are-women>

⁹⁶ *Provincial Socioeconomic Report 2019*, Kampot Province.

⁹⁷ *Provincial Socioeconomic Report 2019*, Koh Kong Province.

⁹⁸ Care International (2010). *Adaptation, Gender and Women's Empowerment*. Care International Climate Change Brief.

www.careclimatechange.org/files/adaptation/CARE_Gender_Brief_Oct2010.pdf

⁹⁹ PRB (2012). *Women more vulnerable than men to climate change*. <https://www.prb.org/resources/women-more-vulnerable-than-men-to-climate-change/>

¹⁰⁰ <https://floodlist.com/asia/cambodia-floods-september-october-2022>

and service left pregnant women to deliver in very critical conditions such as flooded delivery rooms or worse and at home where immediate medical care was not available.¹⁰¹

According to CARE in Cambodia, poor women and girls of Koh Kong Province are tempted to migrate to Thailand in search of work – and many fall victim to human trafficking.¹⁰² In Koh Kong Province, the two critical underlying causes of poverty affecting young women, i.e., gender inequality and limited income generation opportunities – result in low household incomes, little knowledge of and access to markets, lack of capital, and few opportunities to improve individual capacities and skills.¹⁰³

F. Environment Context (Cambodia and of Kampot and Koh Kong Provinces)

Cambodia Environment Outlook by the Ministry of Environment has identified four key environmental issues, (1) land degradation, (2) depletion of biodiversity, (3) degradation of inland aquatic resources, and (4) management of coastal and marine resources and waste. These issues have been prioritized and analyzed by various experts to determine their policy-making implications.¹⁰⁴

1. Land Degradation

In Cambodia, policies on land have focused more on land administration than on converting more land to agriculture or urban land expansion. Attention has been given to improved tenure security, hoping that secure titles would lead to improved natural resource management, land farming, and poverty alleviation. However, improvement is required in the overall coordination of land use planning and land allocation, which includes land use planning (for forests, agricultural development areas, key urban areas, and road corridors),¹⁰⁵ land allocation and establishment of land inventory system.¹⁰⁶

Approximately 13 percent of rural households in Cambodia are still landless. As family landholdings are being divided into smaller parcels, the average size of agricultural holdings is relatively small, only one ha per household. Rural change in Cambodia manifests itself in rapidly declining land availability for the smallholder sector, posing the question of how farmers may be able to deal with limited access to land. Therefore, land has become a significant issue nationally,¹⁰⁷ not merely in Kampot and Koh Kong Provinces.

Forests are at risk due to increasing demand for agricultural lands in Kampot¹⁰⁸ and Koh Kong Provinces. The direct causes of degradation and deforestation in Kampot and Koh Kong Provinces (similar to other areas in Cambodia) are agricultural expansion, land encroachment, etc., driven by economic and social forces. Both urban and rural population growth has increased rapidly, resulting in pressure on land resources.¹⁰⁹ Land expose sandy soils to erosional forces.



Photo 2 Kampong Trach Reservoir overgrown with plants

¹⁰¹ International Bank for Reconstruction and Development (2019). *STRIKING A BALANCE MANAGING EL NIÑO AND LA NIÑA IN CAMBODIA'S AGRICULTURE*. <https://documents1.worldbank.org/curated/en/433961554200320844/text/Striking-a-Balance-Managing-El-Ni%C3%B1o-and-La-Ni%C3%B1a-in-Cambodia-s-Agriculture.txt>

¹⁰² ReliefWeb (2013). Cambodia: Floods - Sep 2013. <https://reliefweb.int/disaster/fl-2013-000131-khm>

¹⁰³ CARE Cambodia (2022). Young Women in Business (YWIB). <https://www.care-cambodia.org/ywib>

¹⁰⁴ Ministry of Environment (2009). *Cambodia Environment Outlook*. Ministry of Environment, Kingdom of Cambodia.

¹⁰⁵ The World Bank Group (2003). *Cambodia Environment Monitor*. The World Bank Group, Washington DC.

¹⁰⁶ Ministry of Environment (2009). *Cambodia Environment Outlook*. Ministry of Environment, Kingdom of Cambodia.

¹⁰⁷ Ministry of Land Management Urban Planning and Construction & World Bank (2002). *Cambodia Land Management and Administration Project*. Ministry of Land Management Urban Planning and Construction & World Bank, Kingdom of Cambodia.

¹⁰⁸ Scheidel, A., Farrell, K., Ramos-Martin, J., Giampietro, M. & Mayumi, K. (2009). Land poverty and emerging realities in Cambodia: insights from Kampot province. *Environ Dev Sustain*, 16: 823 – 840.

¹⁰⁹ Ministry of Environment (2009). *Cambodia Environment Outlook*. Ministry of Environment, Kingdom of Cambodia.

Due to severe soil quality problems, there appears to be low potential for yield increases across approximately 50 percent of Cambodia's cultivated areas.¹¹⁰

2. Loss of Biodiversity

Both Kampot and Koh Kong Provinces are endowed with rich biodiversity. Conversion of forest lands for agriculture, excessive and uncontrolled logging, exploitation of forest resources, and illegal hunting of wildlife for trade and local consumption have contributed to the increasing rate of wildlife habitat loss and biodiversity destruction.¹¹¹ As mentioned elsewhere, the increase in population and the demand for land for agriculture and industrial development have contributed to the reduction and loss of natural ecosystems.

3. Degradation of Inland Aquatic Resources

Fish is consumed daily in rural Cambodia and heavily relies on other aquatic resources. Although there are a considerably smaller number of significant conflicts between communities and fishing lot owners, the disputes related to encroachment, illegal fishing, and destructive fishing practices are increasing. In the meantime, there are direct and indirect factors causing the depletion of fisheries in Cambodia, including the loss of fisheries due to overfishing, destructive and illegal fishing practices, and clearance of inundated forests. In addition, pollution from agricultural runoff is becoming more common due to the increasing use of chemicals, such as fertilizers, herbicides, and pesticides. Fish stocks are also threatened by other toxic elements from industrial waste and organic pollutants from domestic sewage, which damage the aquatic ecology.^{112 113}

4. Coastal and Marine Resources Management

Approximately 70 percent of the households in the four coastal provinces, including Kampot and Koh Kong Provinces and municipalities, rely on the primary sectors: agriculture, fishing, and forestry, as the source of their employment and income. Coastal and marine biodiversity have provided and continue to provide substantial benefits to local communities.

Mangrove forests provide food, shelter, and a nursery for culture and capture fisheries along the coastal zone. The main threats to Cambodia's mangrove forest were intensive shrimp farming and charcoal production in Koh Kong Province, and fuel-wood extraction and conversion to salt farming in Kampot Province. Shrimp farming has created an environmental disaster of large areas of mangrove swamps and tidal areas which were cleared for the farms in Koh Kong. According to Mangrove Action Project (MAP) newsletters, excessive quantities of fresh and sea water are needed to operate intensive shrimp ponds. Salt water intrusion destroyed neighboring rice paddies, other crops, and drinking water. Massive amounts of organic waste produced by ponds are simply pumped into surrounding waterways, killing local flora and fauna. Chemicals and antibiotics used to prevent disease outbreaks contaminate natural ecosystems and hasten the development of disease-resistant viruses.¹¹⁴



Photo 3 Lampu Reservoir overgrown with plants

¹¹⁰ McKenny, B. & Tola, P. (2002). Natural resources and rural livelihoods in Cambodia: A baseline assessment. Working paper 23, CDRI, Phnom Penh, July 2002.

¹¹¹ Ibid

¹¹² Ibid

¹¹³ Asian Development Bank (2003). Asian Development Bank Draft Poverty Analysis. ADB, Philippines.

¹¹⁴ <https://www.phnompenhpost.com/national/shrimp-farming-dead-koh-kong>

G. Impact of Climate Change (Cambodia and of Kampot and Koh Kong Provinces)

1. Flooding, Heat Stress, and Health

As mentioned elsewhere, climate change is expected to increase the mean annual temperature and the intensity and frequency of heat waves resulting in a more significant number of people at risk of heat-related medical conditions in Cambodia. The chronically ill, older persons, children, the socially isolated, and at-risk occupational groups are particularly vulnerable to heat-related conditions.¹¹⁵

According to the World Health Organisation and World Meteorological Organisation, some of the world's most virulent infections are highly sensitive to changes and variations in climate, namely, temperature, precipitation, and humidity. These have a strong influence on the lifecycles of the vectors and the infectious agents that carry and influence the transmission of water and foodborne diseases.¹¹⁶ Moreover, according to the World Health Organisation, there are growing health risks from climate change in Cambodia, including vector-borne diseases, malnutrition, and diarrhoeal diseases, along with other conditions, for instance, rodent-borne diseases, respiratory tract infections, non-communicable diseases, heat-related illness, and mental health impacts.¹¹⁷

In Cambodia, under a high emissions scenario, heat-related deaths in older persons (65+ years) are projected to increase to about 56 deaths per 100,000 by 2080 compared to the estimated baseline of about four deaths per 100,000 annually between 1961 and 1990. A rapid reduction in emissions could limit heat-related deaths in older persons to about 11 deaths per 100,000 in 2080.¹¹⁸

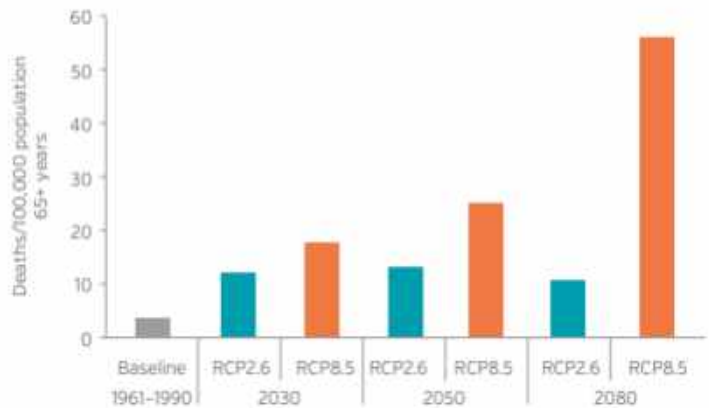
In Cambodia, by 2070, 22 million people are projected to be at risk of malaria under both a high and low emissions scenario. Population growth can also cause increases in the population at-risk in areas where malaria presence is static in the future.¹¹⁹ In Cambodia, the mean relative vectorial capacity for dengue fever transmission is projected to increase from about 0.82 to about 0.91 towards 2070 under both a high and low emissions scenario.¹²⁰

Like other parts of the country, Kampot and Koh Kong Provinces experience flooding due to heavy rainfall. It is projected that by 2030, an additional 69,800 people may be at risk of river floods annually because of climate change

Figure 10

HEAT-RELATED MORTALITY

Heat-related mortality in population 65 years or over, Cambodia (deaths / 100,000 population 65+ yrs)

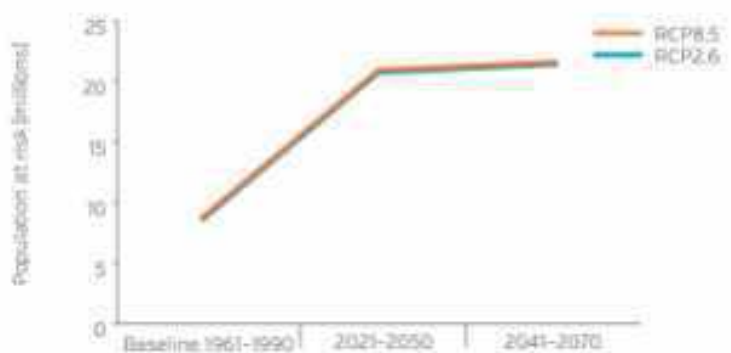


Source: Liu-Helmersson, J., Quam, M., Wilder-Smith, A., Stenlund, H., Ebi, K., Massad, E., & Rocklöv, J. (2015).

Figure 11

INFECTIOUS AND VECTOR-BORNE DISEASES

Population at risk of malaria in Cambodia (in millions)



Source: Liu-Helmersson, J., Quam, M., Wilder-Smith, A., Stenlund, H., Ebi, K., Massad, E., & Rocklöv, J. (2015)

¹¹⁵ World Health Organisation and United Nations Framework Convention on Climate Change (2015). Climate Change Health Country Profile – 2015, Cambodia. World Health Organisation <https://apps.who.int/iris/rest/bitstreams/1064308/retrieve>

¹¹⁶ World Health Organisation and World Meteorological Organisation (2012). Atlas of Health and Climate. World Health Organisation.

¹¹⁷ World Health Organisation and World Meteorological Organisation (2021). Building climate-resilient health systems in Cambodia: Case Study on Climate Change and Health. World Health Organisation <https://www.who.int/news-room/feature-stories/detail/building-climate-resilient-health-systems-in-cambodia#:~:text=Growing%20health%20risks%20from%20climate,illness%20and%20mental%20health%20impacts.>

¹¹⁸ World Health Organisation and United Nations Framework Convention on Climate Change (2015). Climate Change Health Country Profile – 2015, Cambodia. World Health Organisation <https://apps.who.int/iris/rest/bitstreams/1064308/retrieve>

¹¹⁹ World Health Organisation (2015). Country-level analysis, completed in 2015, was based on health models outlined in the quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. Geneva: World Health Organisation. The mean of health impact estimates for three global climate models are presented. Models assume continued socioeconomic trends (SSP2 or comparable). Liu-Helmersson, J., Quam, M., Wilder-Smith, A., Stenlund, H., Ebi, K., Massad, E., & Rocklöv, J. (2015). Climate Change and Aedes Vectors: 21st Century Projections for Dengue Transmission in Europe. *eBioMedicine*, 7(2016): 267 – 277.

¹²⁰ Ibid.

and 41,200 due to socioeconomic change, above the estimated 89,700 annually affected in 2010.¹²¹ In addition to deaths from drowning, flooding causes widespread indirect health effects, together with impacts on food production, water provision, ecosystem disruption, infectious disease outbreak, and vector distribution. Longer-term effects of flooding may include population displacement and post-traumatic stress.^{122 123}

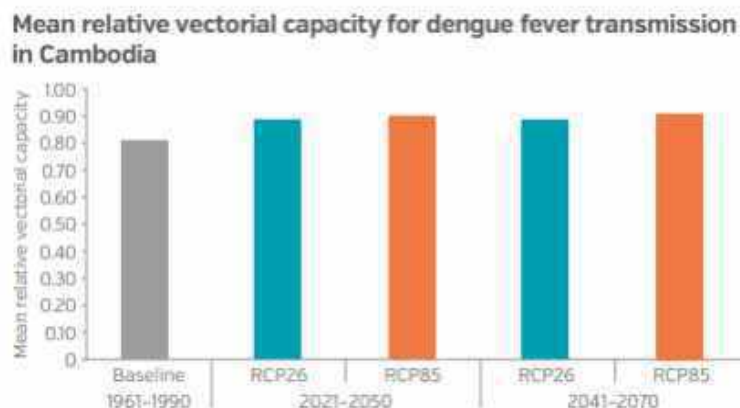
2. Food Security (Agriculture and Fisheries)

Communities have adapted to natural climate variability and change over the centuries. However, the rapid changes in climate and extreme events are beyond their coping capacity. As temperatures rise and extreme weather events become more frequent and severe, vulnerable communities in Kampot and Koh Kong Provinces struggle to survive. As mentioned elsewhere, the population of Cambodia and the economy are highly vulnerable to climate change and variability. Food security is already a significant concern in Cambodia, where 25 percent of the population suffered from undernourishment in 2004 – 2005. This was a higher proportion than in neighboring Southeast Asian countries.¹²⁴ Approximately 75 percent of the people in Cambodia are rural, and agriculture accounts for 35 percent of GDP.¹²⁵ Agriculture remains the dominant employment sector for the rural population, accounting for 38.85 percent of the country's 8.9 million labor force and contributing to about 22.85 percent of GDP in 2021.^{126 127} According to the Food and Agriculture Organisation, two-thirds of the population of Cambodia is economically dependent on agriculture.¹²⁸ In addition, majority of farmers are poorly equipped to adapt to climate change.¹²⁹

The agriculture sector, comprising fisheries and aquaculture, is most vulnerable to climate change. A comprehensive understanding of its impact is critical in formulating informed and effective adaptation strategies. Empirical studies have demonstrated that the intensification of extreme weather conditions have found to increase prolonged droughts and flash floods, and these changes have directly and indirectly affected the agriculture sector in Cambodia, thus imposing barriers to economic growth and national food security.¹³⁰

A study by Cambodia Development Resource Institute (CDRI) found that prolonged droughts from 2013 to 2020 have caused the most severe impacts as opposed to all other hazards. As per the study, across all four agro-ecological zones in Cambodia, the rural communities dependent on agriculture have high levels of vulnerability, and those dependent on water resources have medium levels of vulnerability.¹³¹ The study further states that drought frequency is highest in Kampot Province, and drought is the most frequently occurring natural disaster and floods are the second most common extreme event.¹³²

Figure 12



Source: Liu-Helmersson, J., Quam, M., Wilder-Smith, A., Stenlund, H., Ebi, K., Massad, E., & Rocklöv, J. (2015).

¹²¹ World Resources Institute, <http://www.wri.org/Aqueduct> Global Flood Analyzer. Assumes continued current socioeconomic trends (SSP2) and a 25-year flood protection.

¹²² World Health Organisation and United Nations Framework Convention on Climate Change (2015). Climate Change Health Country Profile – 2015, Cambodia. World Health Organisation <https://apps.who.int/iris/rest/bitstreams/1064308/retrieve>

¹²³ World Health Organisation and United Nations Framework Convention on Climate Change (2015). Climate Change Health Country Profile – 2015, Cambodia. World Health Organisation <https://apps.who.int/iris/rest/bitstreams/1064308/retrieve>

¹²⁴ Shicavone, A. (2010). "Trade and climate change implications for food security in mainland Southeast Asia." International Institute for Sustainable Development.

¹²⁵ World Bank (2009). World Development Indicators.

¹²⁶ <https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?locations=KH>

¹²⁷ <https://www.statista.com/statistics/438728/share-of-economic-sectors-in-the-gdp-in-cambodia/#:~:text=This%20statistic%20shows%20the%20share,sector%20contributed%20about%202034.18%20percent.>

¹²⁸ Shicavone, A. (2010). "Trade and climate change implications for food security in mainland Southeast Asia." International Institute for Sustainable Development.

¹²⁹ Royal Government of Cambodia. 2006. *National Adaptation Programme of Action to Climate Change*. Phnom Penh: Ministry of the Environment.

¹³⁰ Nelson, G.C., M.W. Rosegrant, A. Palazzo, I. Gray, C. Ingersoll, R. Robertson, T. Zhu, T. Sulser, C. Ringler, and S. Msangi. Forthcoming. "Food Security and Climate Change Challenges to 2050: Key Messages from the Future of Food and Farming Quantitative Scenarios." Washington D.C., International Food Policy Research Institute.

¹³¹ Ibid

¹³² Nelson, G.C., M.W. Rosegrant, A. Palazzo, I. Gray, C. Ingersoll, R. Robertson, T. Zhu, T. Sulser, C. Ringler, and S. Msangi. Forthcoming. "Food Security and Climate Change Challenges to 2050: Key Messages from the Future of Food and Farming Quantitative Scenarios." Washington D.C., International Food Policy Research Institute.

Climate change may directly affect fishery production along many pathways.¹³³ Fish reproduction, growth, and migration patterns are all affected by temperature, rainfall, and hydrology.¹³⁴ Building fisher communities' capacity to adapt to immediate environmental change through Ecosystem-based Adaptation (EbA), improving access to natural resources and diversifying livelihoods goes together with enhancing their long-term capacity to adapt to climate change.

As fisheries and aquaculture can compensate for other adaptation problems, such as the loss of low-lying farmland, conserving wild fisheries and enhancing aquaculture (cultivating freshwater, brackish water, and saltwater populations under controlled or semi-natural conditions) should be considered twin strategies of adapting to climate change.¹³⁵ Fisheries are critical to human well-being in Cambodia, where fish provide up to 80 percent of all animal protein in the diet.¹³⁶ As a result of higher temperatures, drought and displacement, flooding land, and water scarcity adversely impacts agricultural production and trigger breakdown in food systems. As mentioned earlier, these disproportionately affect those most vulnerable people at risk of hunger and can lead to food insecurity. If exposed to extreme climate events, vulnerable groups risk further deterioration into food and nutrition crises.

Without substantial efforts made to enhance climate resilience, it has been estimated that the global risk of hunger and malnutrition could rise by up to 20 percent by 2050.¹³⁷ In Cambodia, in 2014, the incidences of stunting in children under age 5 was 32.4 percent in 2014, the prevalence of underweight children and wasting in children under 5 was 23.9 percent and 9.6 percent, respectively.¹³⁸

3. Water Resources and Waste

The economy of Cambodia is highly dependent on water. The significance of water for food production, rural livelihoods, and economic development is recognized in the “Rectangular Strategy on Growth, Employment, Equity, and Efficiency of the Kingdom of Cambodia”. It has been acknowledged that climate change will increase water management challenges in Cambodia, with less rainfall anticipated during the dry season and more during the rainy season, in addition to frequent extreme weather events and potentially worse seasonal water shortages and floods. Challenges are more threatening where meteorological systems still need to forecast severe weather, like flash floods and unpredicted drought, which have often happened in Cambodia with no exception to Kampot and Koh Kong Provinces.

Most Cambodians in rural areas face freshwater shortages during the dry season and minor dry spells in the rainy season. Then there is too much water and flooding in the rainy season. The water reservoirs are overgrown with grass limiting their water storage capacity. The irrigation infrastructure is old and run down, severely impacting water distribution and supply. Moreover, the waters of the Gulf of Thailand are enclosed by land, and there is a growing risk that contaminants and sediment from coastal towns, agricultural areas, and forest logging may pollute the sea. The marine waters of Cambodia require careful management, especially along the coastline and in estuaries, to ensure they continue to support healthy ecosystems and fisheries and provide the basis for sustainable economic activities, particularly fishing and tourism.¹³⁹

Cambodia has 440km of coastline from the northwest to the southwest, covering Koh Kong, Sihanouk, Kampot, and Kep Provinces. With these provinces becoming increasingly populated due to economic and tourism development, there is growing concern about wastewater and solid waste systems.¹⁴⁰ Therefore, water management must be improved, especially regarding wastewater and solid waste systems. With the increased scarcity of water resources, wastewater reuse will become essential as climate change accelerates. Simultaneously, an increase in severe flooding further enhances poorly managed solid waste pollution.

Although access to on-site sanitation improved access to 73 percent in 2016, a large share of the residents in Cambodia relies heavily on non-sewered sanitation. In Kampot Province, families using improved water is 65.6 percent, and families having latrines is 81.2 percent,¹⁴¹ and the same in Koh Kong Province is 69.6 percent and 63.2 percent.¹⁴²

¹³³ World Fish Centre (2021). Climate change and fisheries: vulnerability and adaptation in Cambodia.

¹³⁴ Ficke A.D., Myrick, C.A., Hansen, L.J. (2007). Potential impacts of global climate change on freshwater fisheries. *Reviews in Fish Biology and Fisheries*, 17(4): 581 – 613.

¹³⁵ World Fish Centre (2021). Climate change and fisheries: vulnerability and adaptation in Cambodia.

¹³⁶ Hurtle, K.G. 2007. Consumption and the yield of fish and other aquatic animals from the lower Mekong basin. MRC Technical Paper no. 16, Mekong River Commission, Vientiane, Lao PDR.

¹³⁷ World Food Programme (2015). *World Food Project 2015*. <https://www.wfp.org/content/two-minutes-climate-change-and-hunger>

¹³⁸ World Health Organisation (2015). *Global Database on Child Growth and Malnutrition [2015 edition]*. Please see the source for definitions of child malnutrition measures. Note that the estimates for underweight children are pending reanalysis.

¹³⁹ Ibid

¹⁴⁰ Rizvi, A. R., and Singer, U. (2011). Cambodia Coastal Situational Analysis. The International Union for Conservation of Nature, Building Resilience to Climate Change Impacts, Coastal Southeast Asia No.6. <https://portals.iucn.org/library/sites/library/files/documents/2011-114.pdf>

¹⁴¹ *Provincial Socioeconomic Report 2019*, Kampot Province.

¹⁴² *Provincial Socioeconomic Report 2019*, Koh Kong Province.



Photo 4 Abandoned compost recycling unit

The discharge of untreated effluent to water bodies has a negative impact not only on human health and water systems but also on the environment. The combined effects of sea-level rise, coastal flooding, and onshore development issues, mainly solid waste and wastewater disposal, are causing coastal erosion and widespread pollution of livelihood-providing ecosystems¹⁴³ in Kampot and Koh Kong Provinces. Therefore, with solid waste management, wastewater needs urgent attention to improve hygienic living conditions and reduce environmental degradation.

H. Summary of Climate Change Hazards

- According to Cambodia's Climate Risk Country Profile, the country is projected to experience warming of 3.1°C by the 2090s, against the baseline conditions over 1986 – 2005 under the highest emissions pathway, RCP8.5.
- The temperature is expected to increase by 0.6 °C by 2030, by 1.4 °C by 2050 in Kampot Province and by 0.7°C (RCP4.5) and 1.0°C (RCP8.5) by 2025 in Koh Kong Province. The annual mean projected rainfall changes by -1 percent (RCP 4.5) and -2.5 percent (RCP 8.5) for Koh Kong Province, and the rainfall is projected to decrease during the rainy season and increase in other parts of the year. By 2025, the local sea level in Koh Kong Province is projected to increase by approximately 10 cm above the 1986 - 2005 baseline.
- It is estimated that climate change could reduce the GDP of Cambodia by 2.5 percent by 2030 and by almost 10 percent by 2050. The vulnerability of Cambodia to climate change is exacerbated as the economy relies heavily on climate-related sectors like agriculture and tourism.
- The mean temperature in Cambodia has increased significantly, a trend that is predicted to continue with projected increases in monthly averages between 0.013°C and 0.036°C per year by 2099, with higher predictions for locations at low latitudes.
- The number of 'hot days' in the country has increased by 46 days per year over the last century.
- Cambodia is especially vulnerable to floods, droughts, windstorms, and seawater intrusion. Coastal zones are among the most affected in the country.
- Increases in sea levels are especially alarming for the coastal provinces of **Kampot and Koh Kong**, which are already experiencing severe seawater intrusion, beach erosion, high tides, and frequent storm surges. Especially coastal settlements, seaports, fisheries, forests, and tourism facilities in low-lying areas would be equally affected.
- The agricultural sector is most heavily affected by droughts and floods and the loss of yields of staple crops due to extreme heat in the two provinces. The incidences of extreme heat represent a significant threat to human health, especially for outdoor laborers.

I. Recommended Adaptation Interventions

1. Financial, institutional, and technological barriers and lack of information on climate change characteristics generally constrain climate change adaptation measures. Therefore, support is required through funding, technical inputs, assistance in planning and coordination, community empowerment, extension initiatives to enhance **community social networks, Early Warning System, awareness creation, etc., to overcome the barriers.**

2. Due to heavy precipitation events, i.e., increased frequency and intensity of rainfall, Kampot and Koh Kong Provinces are seriously impacted. **Drainage networks** designed based on historical climate regimes are now defunct. This could lead to widespread pluvial inundation/flooding and saltwater intrusion, exacerbated by inappropriate land-

¹⁴³ Green Climate Fund (2021). Enhanced actions to respond to climate change through sustainable waste management in Coastal Cities in Cambodia. Readiness & Preparatory Support. UN-Habitat, Cambodia. <https://www.greenclimate.fund/sites/default/files/document/cambodia-un-habitat-khm-rs-006.pdf>

use planning, increased paving, and loss of water storage space, and has also led to an increase in vector-borne and water-borne diseases.

3. Under the backdrop of climate change, **comprehensive attention should be given to irrigation (both groundwater and canal irrigation)**, considering the varying levels of rainfall forecast in the Kampot and Koh Kong Provinces. Renovation of small/micro tank for water harvesting and irrigation offer various benefits, such as providing drinking water for rural communities and livestock, replenishing groundwater levels, conserving topsoil, and promoting livelihood activities such as inland fishing. Tanks should be renovated in a climate-resilient manner, i.e., to tackle future floods, droughts and prevent saltwater intrusion in coastal areas.

4. The current trends in climate change and disaster risks call for enhanced and coherent adaptive action in Kampot and Koh Kong provinces by **generating more efficient and effective preparedness, response, and recovery processes** while using financial and human resources more efficiently.

5. Poor and marginalized households tend to be less resilient and face more significant difficulties in absorbing and recovering from the impacts of natural disasters. Recurrent disasters observed in Kampot and Koh Kong provinces compound the losses for many households, forcing them to organize their livelihood such that overall risks can be reduced in the face of uncertainty, even if it means a reduction in their income and increased poverty. Therefore, **supporting vulnerable communities with their livelihoods** would increase their resilience against disasters.

6. Local housing, especially for low-income households, is typically associated with construction defects, poor workmanship, unsuitability of construction, and inadequate local building techniques, consequently, are prone to disasters. Therefore, **disaster-resilient shelter construction and adopting** leading practices based on the local context are paramount.

7. Climate change and water pollution crises drive a greater need for water filtration systems in Kampot and Koh Kong Provinces. Over 80 percent of the wastewater flows back into the environment without being treated or reused. Droughts can aggravate the effluent concentration runoff, pH, and chemical quality, contaminating water. **Small/medium-scale purification plants** would improve the quality of water released to waterways and, ultimately, the sea.

8. Climate change can impact waste facilities both directly and indirectly. At the same time, improper waste management observed in Kampot and Koh Kong provinces, i.e., waste blocking drainage exacerbating flooding during rainfall events, have reduced the ability to cope with extreme climate events. Therefore, **solid waste management** should consider being resilient to climate change. The prevention of waste blocking the drainage systems is paramount in both Kampot and Koh Kong provinces, and also adopt a post-flood action plan, as floods will carry large quantities of waste that will end up in the open once the water level lowers. Kampot and Koh Kong Provinces should have the plan to collect it quickly, divert as much as possible, and safely dispose of the residual waste.

9. As a coastal ecosystem, mangroves play a significant role in climate change adaptation. Mangroves are regularly referred to as a “nature-based solution” in tackling the climate crisis. Under sustainable management, mangroves provide many livelihood opportunities (shellfish gathering, fishing, and beekeeping are some of these opportunities that communities living alongside mangroves can benefit from a thriving mangrove forest) for local communities in Kampot and Koh Kong provinces that can help to keep these valuable coastal ecosystems intact. It has been vital for the protection of the coast and the people who live around them. **Mangroves form a green barrier that can hold off coastal erosion**, storm surges, saltwater intrusion, and even tsunamis, and create a unique environment for fish, birds, reptiles, amphibians, and crustaceans and are sources of wood, fiber, charcoal, and ingredients for cosmetics, perfumes, pharmaceuticals, and tanneries. Despite their unique ecological contributions, mangroves are being destroyed and degraded in Kampot and Koh Kong provinces mainly due to unplanned development.



Photo 5 Mangrove plantation and sea water intrusion

J. Project/Programme Objectives

Project Main Objective

The overall objective of the proposed project is to support climate resilient and adaptive development and increase capacity for climate variability/change adaptation of target communities living in Kampot and Koh Kong Provinces. This objective will be achieved through the following objectives:

- To implement concrete adaptation actions that support climate resilient infrastructure in Kampot and Koh Kong Provinces to adapt to current impacts of climate change, in particular, extreme hydro-meteorological events.
- To reduce the impacts of coastal climate hazards by recovering coastal ecosystems (Ecosystem-Based Adaptation) and minimizing related socioeconomic impacts on communities.
- To enhance institutional capacity, at the provincial and local level, relevant Government entities, and communities, for decision-making and management of the implementation of adaptation measures/actions to address climate change and variability in Kampot and Koh Kong Provinces.

Nearly two thirds of the budget (73.5 percent) of the total project budget will be invested in the physical infrastructure component (Component 1) (57.7 percent) and in mangrove restoration and livelihood diversification (Component 2) (15.9 percent). This reflects the preferences of the communities and city administrations and national government. The effectiveness and sustainability of the infrastructure will be supported through Components 3 focusing on capacity building.

K. Project / Programme Components and Financing

This project is organized under three strategic components:

1. Increasing coping capacity by promoting climate-resilient small-scale infrastructure.
2. Adapting to current impacts of climate change through the recovery of coastal ecosystems and livelihood improvement and diversification.
3. Building capacity and knowledge sharing to reduce vulnerability to climate change.

Project/ Program Components	Expected Concrete Outputs	Expected Outcomes	Amount (US\$)
Component 1. Increasing coping capacity by promoting climate resilient small-scale infrastructure	Output 1.1. Rehabilitate and improve embankment in Ou Chreang Reservoir (Kampong Trach Khang Lech commune, Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/flooding/saltwater intrusion and controlling vector-borne and water-borne diseases.	Outcome 1 Increased adaptive capacity of built infrastructure and communities to withstand extreme weather and climate variability and change.	821,600
	Output 1.2. Establish/renovate five medium/small-scale wastewater treatment plants (with two in Kampot and three in Koh Kong Provinces).		920,000
	Output 1.3. Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste from discharging to the sea in Khemerak Phoumin City.		765,659
	Output 1.4. Renovate waterbodies (irrigation tanks and embankments) in Lompu Reservoir and rehabilitate Kampong Trach canal in Kampong Trach District.		1,245,100
	Output 1.5. Resilient housing and toilet designs developed, and demonstration housing units constructed in three vulnerable communities in Koh Kong Province.		1,230,000
	Output 1.6. Build five sluice gates and embankments to prevent saltwater intrusion in Krong Khemara Phoumin.		643,500
	Output 1.7. Establish Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Mondol Seima District.		132,000
Component 2. Adapting to current impacts of climate change through recovery of	Output 2.1. Restoration of destroyed mangrove ecosystems to improve mangrove ecosystem resilience in Mondol Seima District.	Outcome 2 Improved conditions of coastal ecosystems and income diversification of	799,613
	Output 2.2. Develop Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems, including prevention of waste/pollution in Mondol Seima District.		255,000

coastal ecosystems, and livelihood improvement and diversification	Output 2.3. Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to Increase the income of the vulnerable households (including women and youth) with initiation of these livelihoods.	vulnerable communities have enhanced the resilient capacity of these communities.	530,000
Component 3. Building capacity and knowledge sharing to reduce vulnerability to climate change	Output 3.1. Conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, including community-based in community/sub-national/ district development plans and promote climate change/disaster resilience in local development plans.	Outcome 3 Improved effectiveness of climate adaptation planning/implementation to increase coping capacity to address climate variability/risk reduction, and to sustain/scale-up actions for transformative adaptation interventions at the local level.	167,340
	Output 3.2. Capacity building of provincial and sub-national level Government entities and communities on mainstreaming climate change adaptation.		118,880
	Output 3.3. Capacity building of sub-national level Government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems. [Linked to Outputs 1.2 and 1.3]		183,629
	Output 3.4. Training communities in target locations on resilient housing/latrines construction technique. [Linked to Output 1.5]		118,880
	Output 3.5. Organizing communities and local authority to manage, monitor and maintain infrastructure investments to ensure sustainability and establish an adaptive pathway plan for flood response [Linked to Outputs 1.1, 1.3, 1.4, and 1.6].		124,000
	Output 3.6. Share knowledge and lessons through documentation of climate-resilient actions for increased adaptive capacities. <i>(Special note: Material produced will be disability inclusive)</i>		295,814
3. Project/Program Execution cost (9.5%)			875,575
4. Total Project/Program Cost			9,216,590
5. Project/Program Cycle Management Fee charged by the Implementing Entity (if applicable), i.e., Overhead cost (8.5 percent)			783,410
Amount of Financing Requested			10,000,000

L Projected Calendar

Milestones	Expected Dates
Start of Project/Programme Implementation	January 2024
Mid-term Review	December 2025
Project/Programme Closing	December 2027
Terminal Evaluation	December 2027

M. Target Area and Beneficiaries

As mentioned above, the Project will focus on four districts: Kampong Trach and Krong Kampot in Kampot Province and Khemera Phonumin and Mondul Seima in Koh Kong Province. The two provinces have 102,759 females, 98,796 males, and the total population is 201,555. The proposed Project will benefit 63,181 females, 60,210 males and the total population being 123,392 which is 74 percent of the total population of the selected districts. See Table 1 for details.

Table 1 Population of selected districts in Kampot and Koh Kong provinces (2021)^{144 145}

Province	District		R: rural; U: Urban C: commune; S: Sangkat	AREA	HHS	TOTAL	MALE	FEMALE	HHS SIZE	
Kampot	Kampong Trach	R C	Boeng Sala Khang Cheung	24.81	1,649	7,181	3,471	3,710	4.4	
		R C	Damnak Kantuot Khang Tboung	26.49	1,862	8,051	3,915	4,135	4.3	
		R C	Prasat Phnom Khyang	9.49	632	2,587	1,244	1,343	4.1	
		R C	Angk Sophy	16.29	1,090	4,319	2,093	2,226	4.0	
		R C	Damnak Kantuot Khang Tboung	26.49	1,862	8,051	3,915	4,135	4.3	
		R C	Kampong Trach Khang Lech	78.22	1,563	6,999	3,393	3,606	4.5	
		R C	Svay Tong Khang Cheung	17.63	920	3,664	1,782	1,882	4.0	
		R C	Kampong Trach Khang Kaeut	15.86	1,954	8,550	4,173	4,377	4.4	
				Sub-total	209.63	11,203	47,462	23,023	24,438	4.2
	Krong Kampot	U S	Kampong Kandal	2.001	1,196	5,292	2,538	2,754	4.4	
		U S	Krang Ampil	2.48	1,091	4,778	2,330	2,448	4.4	
		U S	Kampong Bay	1.81	1,229	5,679	2,657	3,022	4.6	
		U S	Andoung Khmer	26.19	2,448	10,514	5,092	5,422	4.3	
		U S	Traeuy Kaoh	22.33	1,252	5,790	2,834	2,956	4.6	
			Sub-total	54.81	7,216	32,053	15,451	16,602	4.4	
Koh Kong	Krong Khemara Phoumin	U S	Smach Mean Chey	57.26	2,696	11,547	5,628	5,919	4.3	
		U S	Dang Tong	2.01	2,703	13,163	6,527	6,636	4.9	
		U S	Stueng Veang	41.06	920	4,126	2,060	2,066	4.4	
				Sub-total	100.33	6,319	28,836	14,215	14,621	4.6
	Mondol Seima	R C	Bak Khlang	1,345	2,750	12,485	6,236	6,249	4.5	
		RC	Peam Krasaob	46.01	331	1,463	720	743	4.4	
		R C	Tuol Kokir	71.05	276	1,093	565	528	4.0	
			Sub-total	1,462.10	3,357	15,041	7,521	7,520	4.5	
			TOTAL	1,826.83	28,095	123,392	60,210	63,181	4.4	

The below estimates (in Table 2) give the total number of beneficiaries across all the project's activities. Of these, at least 50 percent of the direct and indirect beneficiaries are expected to be women. To ensure equitable distribution of the project benefits between men and women, an initial gender assessment was done, and a Gender Action Plan that describes the measures to promote gender equality and mainstream gender in the project's outcomes was prepared and has been incorporated into the project's monitoring and evaluation framework. Addressing gender concerns will entail close collaboration with women throughout the project's inception, implementation monitoring, and evaluation stages.

The project has been designed to actively encourage the involvement of women in the implementation, management, and decision-making roles of the project. Focus group discussions among women will take place every six months, and reports prepared by the project will contain a gender analysis and recommendations to mainstream gender considerations where appropriate. At the inception stage, the project will review the data in the Gender Action Plan to set up a definitive baseline from which to monitor progress.

¹⁴⁴ Provincial Socioeconomic Report 2021, Kampot Province.

¹⁴⁵ Provincial Socioeconomic Report 2021, Koh Kong Province.

Table 2 Project Outputs, Geographical Location and Beneficiaries

Outputs	Related Output	KAMPOT PROVINCE		KOH KONG PROVINCE		BENEFICIARIES
		Kampong Trach District	Khemara Phoumin	Khemara Phoumin	Mondul Seima	
Output 1.1. Rehabilitate and improve embankment in Ou Chreaneang Reservoir (Kampong Trach Khang Lech commune, Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/flooding/saltwater intrusion and controlling vector-borne and water-borne diseases	3.6	Kampong Trach Khang Lech				Direct: 27,264 (Women: 14,000)
Output 1.2. Establish/renovate five medium/small-scale wastewater treatment plants (with two in Kampot and three in Koh Kong Provinces)	3.3		Traeuy Kaoh and Andoung Khmer	Sangkat Smach Mean Chey	Peam Krasaob and Bak Khlang	Direct: 75,930 (Women: 37,420)
Output 1.3. Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste from discharging to the sea in Khemerak Phoumin City.	3.3 3.6			Smach Mean Chey, Dang Tong and Stueng Veang		Direct: 28,836 (Women: 13,298)
Output 1.4. Renovate waterbodies (irrigation tanks and embankments) in Lompu Reservoir and rehabilitate Kampong Trach canal in Kampong Trach District	3.6	Boeng Sala Khang Cheung, Damnak Kantuot Khang Cheung, Damnak Kantuot Khang Tboung, Prasat Phnom Khyang, Angk Sophy				Direct: 86,444 (Women: 44,419)
Output 1.5. Resilient housing and toilet designs developed, and demonstration housing units constructed in three vulnerable communities in Koh Kong Province.	3.4 3.6			Smach Mean Chey	Peam Krasaob and Bak Khlang	Direct: 300 (Women 150) Indirect: 12,000 (Women: 6,000)
Output 1.6. Build five sluice gates and embankments to prevent saltwater intrusion in Krong Khemara Phoumin.	3.6			Smach Mean Chey, Dang Tong and Stueng Veang		Direct: 28,836 (Women: 13,298)
Output 1.7. Establish Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Mondol Seima District.					Beng Kachhang Community (on island) in Bak Khlang	Direct: 15,041 (Women: 7,520)
Output 2.1. Restoration of destroyed mangrove ecosystems to improve mangrove ecosystem resilience in Mondol Seima District.	2.2				Peam Krasaob	Direct: 15,041 (Women: 7,520)
Output 2.2. Develop Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems, including prevention of waste/pollution in Mondol Seima District.	2.1				Bak Khlang, Tuol Kokir and Peam Krasaob	Direct: 15,041 (Women: 7,520)

Output 2.3 Explore livelihood diversification options		✓	✓	✓	✓	Direct: 400 (Women 300)
Output 3.1 Conduct participatory vulnerability/risk assessments		✓	✓	✓	✓	Indirect: 162,374 (Women: 81,839)
Output 3.2 Capacity building on mainstreaming climate change adaptation.		✓	✓	✓	✓	Direct: 400 (Women 200)
Output 3.3 Capacity building in managing solid waste and wastewater to strengthening of waste collection	1.2	Kampong Trach Khang Lech, Svay Tong Khang Cheung, Damnak Kantuot Khang Tboung, Damnak Kantuot Khang Cheung, Kampong Trach Khang Kaeut, Boeng Sala Khang Cheung, Prasat Phnom Khyang, Angk Sophy	Traeuy Kaoht and Andoung Khmer	Smach Mean Chey, Dang Tong and Stueng Veang	Peam Krasaob and Bak Khlang	Direct: 400 (Women 200)
Output 3.4 Training communities in target locations on resilient housing/latrines construction technique.	1.5			Smach Mean Chey	Peam Krasaob and Bak Khlang	150 (Women: 45)
Output 3.5. Organizing communities and local authority to manage, monitor and maintain infrastructure investments to ensure sustainability and establish an adaptative pathway plan for flood response	1.1, 1.4	Kampong Trach Khang Lech, Svay Tong Khang Cheung, Damnak Kantuot Khang Tboung, Damnak Kantuot Khang Cheung, Kampong Trach Khang Kaeut, Boeng Sala Khang Cheung, Prasat Phnom Khyang, Angk Sophy	Traeuy Kaoh and Andoung Khmer	Smach Mean Chey, Stueng Veang and Dang Tong	Peam Krasaob and Bak Khlang	Direct: 400 (Women 200)
Output 3.6 Share knowledge and lessons through documentation of climate-resilient actions		✓	✓	✓	✓	Indirect: 162,374 (Women: 81,839)

The project's grievance mechanism, outlined in the Environmental and Social Safeguards Annex, will also provide a platform for women to give feedback and to raise any concerns about inequality – anonymously if the user chooses to remain so. Equal involvement of women and men in the project activities will be ensured through community planning and consultations throughout the project period, and the project will make sure women participate in decision-making around appropriate infrastructure design, operation, and maintenance features. The project will thus take a transformative approach to their empowerment and resilience-building activities.

Compliance with the environmental and social risks will be monitored annually, for which a template will be prepared in advance and discussed during the Inception Workshop so that all stakeholders are aware of the importance of compliance with the safeguard principles.

Gender disaggregated information focused on climate change-related issues, needs and perceptions of vulnerable groups, activity prioritization, and identifying and verifying potential risks and impacts will be collected through community surveys and public consultations. The data will be used to monitor progress toward and achievement of the above gender targets. Gender focus group discussion will be conducted every six months, and an analysis will be included in project reports to establish a qualitative baseline of gender perceptions and monitor changes in behaviors and attitudes as the project progresses.

A. Kampot Province [Kampong Trach, Krong Kampot]

Of the fourteen communes in Kampong Trach District, eight communes in Kampong Trach district (Boeng Sala Khang Cheung, Damnak Kantuot Khang Cheung, Damanak Kantuot Khang Tboung, Prasat Phnom Khyang, Anky Sophy, Kampong Trach Khang Lech, Kampong Trach Khang Kaeut, and Svay Tong Khang Cheung). Kampong Kandal, Krang Ampil, Kampong Bay, Andoung Khmer, and Traeuy Kaoh communes have been selected in Krong Kampot. The total project area is 264.4 km². The total population of two program districts in Kampot Province is 118,497 of whom 61,021 are female and 57,475 are male. As only eight of the 14 communes in Kampong Trach District are included in the project activities, the population to be covered by the Project in Kampot Province will be 79,515 of whom 41,040 are

female and 38,474 are male. There are 18,419 households and the average household size is 4.3. Kampong Kandal, Krang Ampil and Kampong Bay in Krong Kampot (city) are relatively more densely populated than other sangats.¹⁴⁶

Water scarcity for agricultural production even during rainy season is a major problem for example is Dang Tong. Prek Thnout village in Praek Tnoat commune, Chhuk District has been facing coastal erosion. Due to forest clearance and land and soil excavation, landslide occur along the Kampong Bay stream. Saltwater intrusion into paddy fields and plantations, have affected crop production in Kampong Trach Khang Lech and Praek Tnoat communes. Due to increasing number of fisherfolks and the use of modern fishing equipment there are been overfishing and destructive fishing. Liquid waste discharge from households and markets is a major problem. Crowded areas along the steam banks do not have treatment facilities for discharging wastewater and this is causing pollution to streams and sea, as well as affecting local public health and tourism.¹⁴⁷ To address these issues in the province, the project will implement the following activities that will benefit the number as shown in the table 2.

B. Koh Kong Province [Khemara Phoumin, Mondol Seima]

Similarly, Smach Mean Chey, Dang Tong, and Stueng Veaeng communes have been selected in Khemera Phonumin and Pak Khlang, Peam Krasaob, and Tuol Kokir communes in Mondul Seima. So, project activities will be implemented in total 15 communes in an area of 1,562.39 km². The total population of two program districts in Koh Kong Province is 43,877 of whom 22,141 are female and 21,736 are male within 9,676 households. The average household size is 4.5 persons. Dang Tong sangkat is densely populated with 13,163 people living within 2.01 km². The project activities will cover all the communes in both districts.¹⁴⁸

Irregular rainfall is leading to lower production in agriculture. Coastal erosion during heavy rains which causes heavy sedimentation and siltation on coastal areas. Saltwater intrusion has particularly affected Toukoki commune, Modulseima District and Sangkat Steung Veaeg, Khemarak Phoumin city. Sewage from households discharge directly to the natural stream waterways, without treatment. Currently no dumpsite and wastewater facility are installed in Koh Kong. Mangroves are being cleared for settlement area, charcoal production, and shrimp ponds. Due to limited area for agricultural cultivation, the households are prompted to use chemical fertilizers to enhance productivity.¹⁴⁹ To address these issues in the province, the project will implement the following activities that will benefit the number as shown in the table 2.

¹⁴⁶ The population data is from 2019 census.

¹⁴⁷ *Provincial Socioeconomic Report 2021*, Koh Kong Province.

¹⁴⁸ The population data is from 2019 census.

¹⁴⁹ <https://seaknowledgebank.net/content/koh-kong-province>



Photo 6 Kampong Trach



Photo 7 Kampot City



Photo 8 Koh Kong City



Photo 9 Mondol Seima District

PART II PROJECT/PROGRAMME JUSTIFICATION

A. Project components, concrete adaptation activities

Describe the project/programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

To achieve the overall objective of the proposed project -- *Increasing climate resilience through small-scale infrastructures and enhancing adaptive capacity of vulnerable communities in Kampot and Koh Kong Provinces in Cambodia*, the actions proposed by the project have been designed to target the poorest and most vulnerable people in Kampot and Koh Kong Provinces. A set of *soft* and *hard* measures has been proposed to ensure that resilience at the household and community level are strengthened sustainably.

The *hard* investments made by the project will all be in small-scale protective infrastructure and ecosystems. The proposed activities will focus on the above recommendations, which include establishing/renovating medium/small-scale wastewater treatment plants, establishing of filter nets on the outlet of drainage pipes, renovating waterbodies (minor irrigation tanks and embankments), designing and building climate resilient housing and toilets, building sluiceways and embankments to prevent saltwater intrusion, establishing Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities. Moreover, the proposed Project intends to restore mangrove ecosystems and develop Ecosystem-based Adaptation (EbA) management plans. Community participation is the key to success in ecosystem restoration and EbA under the proposed Project.

In addition, the Project will explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat making and livestock raising, etc.) and support the most vulnerable households to support agriculture and inland fishing to increase the income of vulnerable households (including women and youth) with the initiation of these livelihoods. The options include “defend to co-exist and retreat as impacts become less manageable, and capacity to protect local properties and infrastructure, natural systems, food production, availability of fresh and drinking water and well-being of the local population”¹⁵⁰. The *soft* measures focus on addressing capacity needs and gaps in adaptation measures that can reduce vulnerability to climate change and increase coping capacity. All *soft* measures are designed to support, enhance, and sustain the *hard* investments that the project will make.

The proposed Project intends to conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, promote climate change/disaster resilience in local development plans, build capacity of provincial and sub-national level Government entities and communities on mainstreaming climate change adaptation, and sub-national level Government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems, training communities in target locations on resilient housing/latrines construction technique, organizing communities to manage, monitor and maintain infrastructure investments to ensure sustainability, and sharing knowledge and lessons through documentation of climate resilient actions for increased adaptive capacities.

Through previous development interventions of UN-Habitat, it has been recognized that increasing the resilience of the most vulnerable communities is best achieved through a participatory, community-led process based on local priorities, needs, knowledge, and capacities, which can then empower people to cope with and plan for the impacts of climate change. Emphasis will be given to local knowledge, including information about trends and changes experienced by communities and strategies these communities have used to cope with similar shocks or gradual climatic change. Approaches and methods developed in disaster risk reduction and community adaptation initiatives have demonstrated that empowering communities is imperative for any climate change adaptation interventions to be effective and sustainable. Indigenous knowledge of climate change adaptation will be utilized where possible. Other *soft* options include awareness raising and professional skills enhancement. Key audiences for this work are communities and Government stakeholders. In addition, the proposed Project will work with the underprivileged, i.e., women, older persons, people with disability, who are much more vulnerable.

Through the gender assessment during the full proposal development stage, it was identified that women have greater sensitivity and less adaptive capacity in Cambodia due to their lower incomes, gender inequality, and daily household responsibilities. The female population in Kampot Province is 51 percent, with 16.24 percent being Female-Headed Households (FHH). In Koh Kong Province, the female population is 50 percent, with FHH being 16.08 percent. Women's livelihoods, access to resources, and capacity to adapt differ from men's. The data indicate that, on average, 16.16 percent of households in the target area are single-headed. In comparison, 9.75 percent of people in the target area live below the poverty line regarding income level. (Annex D page 183-191). Therefore, the Project designed activities and approaches to be more gender-responsive. It considers not only equal benefits to men and women but

¹⁵⁰ USAID Adapting to Coastal Climate Change - A Guidebook for Development Planners, May 2009

also ensures that women and men have equal opportunities to build resilience, address their differentiated vulnerabilities and increase their capacity to adapt to climate change impacts through the project implementation.

Based on the gender assessment, the project will ensure 50 percent women representation during the meetings, consultations, community votes, participatory planning, and monitoring initiatives under the People's Process approach. A comprehensive list of indicators is included in the Gender Action Plan. The main gender-focused indicators the project will aim to achieve (Table 17, Table 20, Table 34):

- 50 percent of the members of the communities established to implement the project will be female
- 30 - 50 percent of trainees at all training/workshops and learning events will be female
- 50 percent of direct beneficiaries of improved housing and toilets will be female

Output 2.3 has been designed to promote livelihood diversification options and support the most vulnerable households to increase the income of the vulnerable households (including women and youth). 75 percent of beneficiaries in livelihood promotion activities will be women.

Output 1.1. Rehabilitate and improve embankment in Ou Chreaneang Reservoir (Kampong Trach Khang Lech commune, Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/ flooding/ saltwater intrusion and controlling vector-borne and water-borne diseases.

Kampong Trach, North of the provincial road n. 33, was constructed during the Khmer Rouge regime (1975-1979). It currently faces limitations in providing water as the reservoir dries out at the onset of the dry season. The local community aims to extend water availability throughout the year for agriculture, livestock, amenities, and biodiversity conservation, which could contribute to eco-tourism development. Additionally, minor flooding has occurred in some properties located north of the reservoir. Therefore, the project should focus on preventing an increase in flood risks. Furthermore, considering the anticipated impact of climate change, it is crucial to explore options that can prolong the water availability in the reservoir. The preferred alternative identified in consultations with the local community is to increase the volume that can be stored by excavating the ground level of the reservoir and using the soil to build and enlarge the embankments to increase the capacity of the reservoir three. The local government will contribute by replanting the embankment with local species, constructing viewing platforms with illustration boards containing topics such as biodiversity and climate change adaptation, and landscaping to promote eco-tourism. In view of the lack of data for this location and uncertain future climatic conditions, an adaptive action plan with short-term actions and longer-term options (pathways) with defined tipping points will be developed in consultation with the existing Community Disaster Management Committees, Commune Emergency Coordination Mechanism, and District Committee for Disaster Management. (See Output 3.5)

Output 1.2. Establish/renovate five medium/small-scale wastewater treatment plants (with two in Kampot and three in Koh Kong Provinces).

Solid and wastewater in Kampot City and Koh Kong dumped into waterways. Accumulation of waste and blockages in the drainage lead to more untreated sewer overflows particularly during flooding. In addition to the general impact on the environment, the livelihood, health, and safety conditions of the local communities are of great concern. This output focuses on wastewater management in five different locations in Kampot City and Koh Kong Province. In Kampot City the objectives are (i) to install floating wetlands for wastewater disposal in floating villages and (ii) to convert the canal into a subsurface flow-constructed wetland, where wastewater is treated as it percolates through a bed of porous media. In Koh Kong the objectives are (i) to install a single household treatment system for which several options are being considered and (ii) to improve natural catchment by intercepting discharges into the waterbodies showed, starting from the upper catchments. These interventions will provide local benefits and can be a pilot to identify options for small/medium scale interventions. The output has been developed in conjunction with outputs 1.3, 1.5, and 3.3. The activities will be implemented in (a) fishery community in Sangkat Traeuy Kaoh, Krong Kampot, (b) the area nearby a canal crossing the national road number 3 in Sangkat Andoung Khmer, Krong Kampot, (c) a community in village 1, Sangkat Smach Mean Chey, Krong Khemara Phoumin, (d) community in Peam Krasaob commune, Mondol Seima District, and (e) community on island in Bak Khleng commune, Mondol Seima District.



Figure 13 Area of the reservoir

Output 1.3. Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste from discharging to the sea in Khmerak Phoumin City.

The pollution level of the canals and drainage due to wastewater and solid waste is extremely high in Koh Kong. The watercourses are filled with trash, particularly plastic. During recurrent flooding, the issue gets intensified due to the accumulation of waste. In addition to the general impact on the environment, the livelihood, health, and safety condition of the local communities are of great concern. The problem can only be further worsened by climate change, so Koh Kong urgently needs a pan-wide approach to tackle solid waste and wastewater. The issues should be tackled at the source and addressed city-wide, i.e., the three major watercourses and their feeder canals. This output focuses on (i) removing solid waste from the watercourses as much as reasonably possible in three locations and (ii) to install some barriers to capture solid waste (especially plastic) in nine locations and facilitate regular maintenance. These activities will be implemented in the three districts, namely, Smach Mean Chey, Dang Tong, and Stueng Veang Sangkats in Krong Khemara Phoumin District in Koh Kong. It will be crucial that organizations at all levels and the local communities are involved and work together to address the situation.



Figure 14 Initial Recommendation for Location of Trashbooms

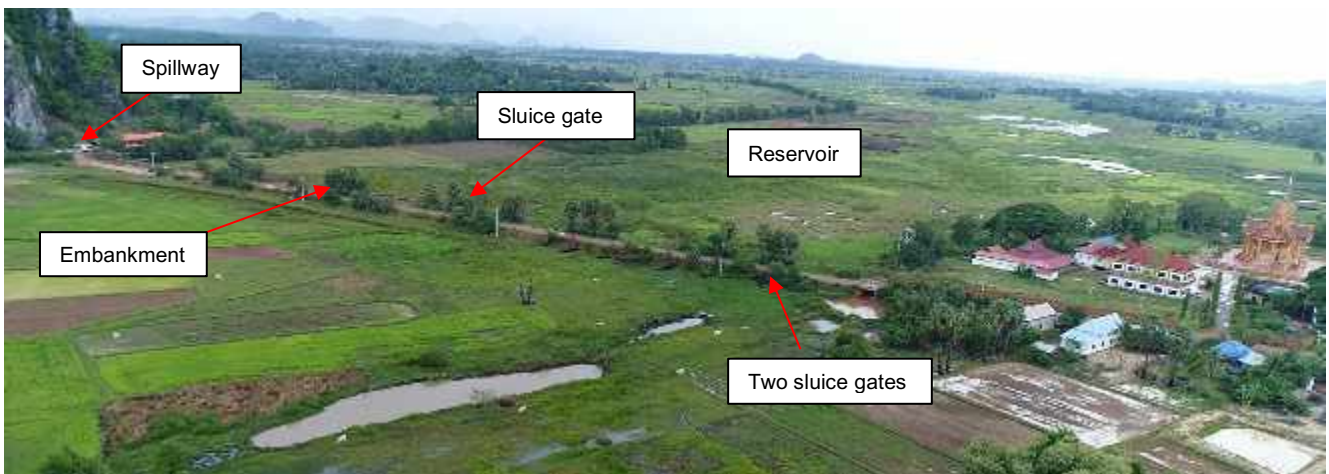


Photo 10 Lompu Reservoir Area

Output 1.4. Renovate waterbodies (irrigation tanks and embankments) in Lompu Reservoir and rehabilitate Kampong Trach canal in Kampong Trach District.

The Lompu Reservoir is located at Kampong Trach, close to the provincial road no. 33. The local community believes that in the last decades, siltation and overgrown vegetation have significantly compromised the system's capability to store water. As such, the Project aims to restore this capability to enhance agriculture, livestock, amenities, and biodiversity conservation, which could contribute to eco-tourism development throughout the year. To increase the reservoir's capacity, the preferred option identified in agreement with the local community is managing the vegetation and partly dredging some areas, and using the soil to enlarge the embankments. The vegetation will be selectively removed while dredging will be carried out within the predetermined range to restore and build a deeper canal and ponds to maximize the ability of the system to store and convey water. Landscaping will incorporate techniques aimed at optimizing the benefits of the reservoir. By reintroducing native vegetation, we can enhance the ecological value of the reservoir and support the recovery of indigenous flora and fauna and promote the restoration of the ecosystem. People in four communes (Damnak Kantuot Khang Cheung, Damnak Kantuot Khang Tboung, Prasat Phnom Khyang, and Angk Sophy in Kampong Trach District) will benefit from this Project. In view of the lack of data for this location and uncertain future climatic conditions, an adaptative action plan with short-term actions and longer-term options (pathways) with defined tipping points will be developed in consultation with the existing Community Disaster Management Committees, Commune Emergency Coordination Mechanism, and District Committee for Disaster Management. (See Output 3.5)

Output 1.5. Resilient housing and toilet designs developed, and demonstration housing units constructed in three vulnerable communities in Koh Kong Province.

Climate change brings challenges, but it also brings the opportunity to design the resilience necessary to improve housing and sanitation for the most vulnerable. Strong winds and frequent flooding damage houses, especially those most vulnerable. Climate-resilient housing and toilets will enable people to adapt autonomously to climate change. UN-Habitat will draw lessons from the ‘Climate Change Adaptation through Protective Small-Scale Infrastructure Interventions in Coastal Settlements of Cambodia’, particularly on adopting housing designs piloted under the Project above. The Project will be implemented in village 1, Sangkat Smach Mean Chey, Krong Khemara Phoumin; in a community in Peam Krasaob commune, Mondol Seima District; and another community on an island in Bak Khlang

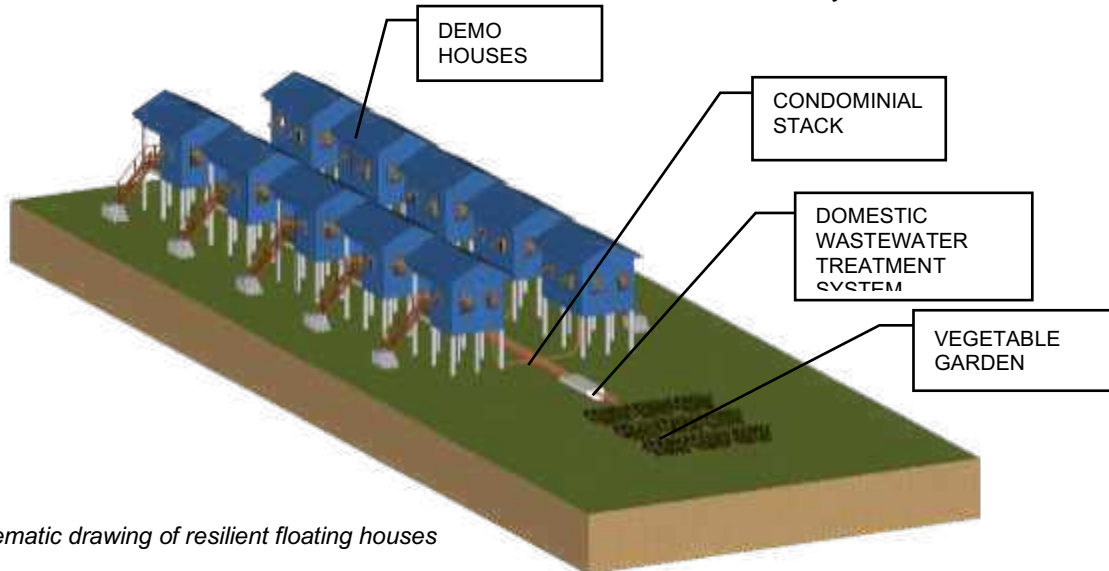


Figure 15 Schematic drawing of resilient floating houses

commune, Mondol Seima District. This activity will be implemented through community contracting with the beneficiaries where they will be responsible to construct their home and related small infrastructure. Young graduate architect students will be recruited to support the housing design, material survey, community empowerment, and monitor the house construction.

Output 1.6. Build five sluice gates and embankments to prevent saltwater intrusion in Krong Khemara Phoumin.

The vulnerability of coastal groundwater resources/coastal aquifers to saltwater intrusion has become a challenge in Koh Kong Province. Overexploitation and mismanagement have increased the potential of saltwater intrusion, which has now negatively affected the agricultural yield of coastal crops/plantations through the accumulation of salts. Soil salinity reduces water infiltration rates, plant growth, and yield and decreases the quality of crops/plants, which reduces economic attractiveness. Therefore, embankments/earth bunds with sluice gates to prevent saltwater intrusion will positively affect the agricultural activities in the area. Therefore, the activities under this output will focus on clearing the site and improve the embankment and to install five water gates to prevent flooding and saltwater intrusion to the agricultural land and nearby settlement and business areas, As the problem of saltwater is critical in Sangkat Smach Mean Chey, Sangkat Dang Tong and Sangkat, and Sangkat Stueng Veang districts in Krong Khemara Phoumin, this activity will be implemented in these locations.



Figure 16 Proposed Target Area for Mangrove Restoration

Output 1.7. Establish Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Mondol Seima District.

EWS is an adaptive measure for climate change, using integrated communication systems to help communities prepare for hazardous climate-related events. Sub-national level government and affected communities in Koh Kong Province need more access to weather

information and EWS. A successful EWS saves lives, jobs, land, and infrastructures and supports long-term sustainability. EWS will also assist public officials and administrators in planning, saving money in the long run, and protecting economies; local people are equipped with greater information and can protect their houses and property from severe climate conditions. Therefore, an EWS (type 'FSI Remote Coastal Reporter) and an Automated Weather Station will be established in Beng Kachhang Community (on the island) in Bak Khlang commune, Mondol Seima District.

Output 2.1. Restoration of destroyed mangrove ecosystems including elimination and/or control of invasive alien species in coastal wetlands to improve mangrove ecosystem resilience in Mondol Seima District.

The Peam Krasoub Community currently encompasses 1,326 ha of mangrove forest, of which 333 ha have successfully rehabilitated. The sanctuary's magnificent mangroves are anchored in the bays and channels that weave among the many islands, protecting the coastline from erosion, providing vital habitat for marine species, and sheltering migratory bird species. However, 15 percent of the mangrove forest (150 hectares) still requires restoration. This investment aims to plant mangroves in the damaged area of the Peam Krasoub Community in Mondol Seima District, Koh Kong Province, particularly targeting areas affected by extreme weather events. A mangrove planting management plan in consultation with local communities will be prepared which will include an outline design, detailed design, design for construction, support during construction, geological investigation, geotechnical report, hydrology and hydraulic studies, and environmental assessment. A mangrove nursery will be established to prepare the seedlings.

Output 2.2. Develop Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems, including prevention of waste/pollution in Mondol Seima District.

EbA involves people using biodiversity and ecosystem services to adapt to the adverse effects of climate change and promote sustainable development. Similar to Community-based Adaptation (CbA), it has people at its center, and it uses participatory, culturally appropriate ways to address challenges. Still there is a stronger emphasis on ecological and natural solutions. Therefore, EbA has great potential to increase people's resilience in Koh Kong Province and their ability to adapt. This Project aims to undertake mangrove restoration initiatives in the Peam Krasoub Community (Output 2.1). As part of this endeavor, developing and implementing a comprehensive management plan that addresses various aspects of the restoration efforts is essential.

Output 2.3. Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to increase the income of the vulnerable households (including women and youth) with initiation of these livelihoods.

The coastal fishing villages of Kampot and Koh Kong Provinces face significant challenges, including limited income opportunities and vulnerability among households, with a particular focus on women and youth. The heavy reliance on traditional fishing practices has resulted in income instability and a lack of economic resilience. Livelihood diversification is essential for reducing vulnerability to climate change. Livelihood diversification of vulnerable communities consists of maintaining and adopting a diverse portfolio of activities to survive and improve living standards by assisting in increasing income, improving assets, and, most importantly, building economic resilience against climate disasters. The Project activities will focus on providing training programs and workshops to local communities and individuals to enhance their skills and knowledge in aquaculture, product processing/value addition, handicraft making, and ecotourism. This could involve hiring trainers, organizing training sessions, and developing educational materials. The project will also support in establishing necessary infrastructure and facilities to support the identified livelihood diversification options. Examples are constructing aquaculture ponds, setting up handicraft-making workshops, etc. Developing marketing strategies, creating promotional materials, and organizing events to raise awareness will help in attracting visitors to the newly developed livelihood options. In addition, the training programs will include modules to raise awareness about the adverse effects on the environment of overfishing, destructive fishing, forest clearance, land and soil excavation, mangrove clearance, and how they contribute to climate change, habitat loss, and altered ecosystems.

Output 3.1. Conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, including community-based in community/sub-national/ district development plans and promote climate change/disaster resilience in local development plans.

Conducting participatory vulnerability/risk assessments will help communities raise awareness, assess their climate change and disaster risks, and develop adaptation strategies, particularly in areas the proposed Project is not supporting. These could be incorporated into community/sub-national/district development plans and can be utilized to promote climate change/disaster resilience in sub-national level development plans. Once the assessment reports are completed, training and guidance on mainstreaming climate change in the local plans will be conducted. This activity will be conducted in 23 communities. Training will also be provided to Community Disaster Management Committees, Commune Emergency Coordination Mechanism, and District Committee for Disaster Management in planning and implementing early warning systems. (See Output 3.5)

Output 3.2. Capacity building of provincial and sub-national level Government entities and communities on mainstreaming climate change adaptation.

Mainstreaming climate change adaptation can make development and societies more resilient to climate change's impacts and climate variability and extremes, which are of immediate concern and relevance to both the Kampot and Koh Kong provinces. Training programs will include modules to raise awareness about the adverse effects on the environment from destructive practices and how they contribute to climate change, habitat loss, and altered ecosystems; discuss concrete actions to reduce their environmental impacts; and advocate for positive change. In addition, mainstreaming climate change adaptation can also bring synergies between development and adaptation and significant developmental benefits. Therefore, capacity building of provincial and sub-national level Government entities and communities on mainstreaming climate change adaptation is crucial to ensure the sustainability of the interventions proposed. Training will also be provided to Community Disaster Management Committees, Commune Emergency Coordination Mechanism, and District Committee for Disaster Management in planning and implementing early warning systems. (See Output 3.5)

Output 3.3. Capacity building of sub-national level Government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems. [Linked to Outputs 1.2 and 1.3]

Training and capacity building in the abovementioned areas will facilitate behavioral changes and stakeholder support in managing solid waste and wastewater to strengthen waste collection and related interventions. Not all stakeholders are aware and fully informed about the negative impacts of solid waste and wastewater and how climate change will exacerbate the issue, increasing the vulnerability. Training and capacity building are an important component of managing solid waste and wastewater to minimize the impacts of climate change, enhance adaptive capacity, and reduce overall vulnerability.

Output 3.4. Training communities in target locations on resilient housing/latrines construction technique. [Linked to Output 1.5]

Training of communities, including artisans within the community, on hazard-resilient housing/latrines will enhance the knowledge of hazard-resilient construction techniques. This will also address the best construction practices. Disseminating information about the People's Process will be another focus of this output to support the implementation of Output 1.5. As mentioned under Output 1.5, lessons learned and methodologies utilized under 'Climate Change Adaptation through Protective Small-Scale Infrastructure Interventions in Coastal Settlements of Cambodia' will be adopted in the current Project.

Output 3.5. Organizing communities and local authority to manage, monitor and maintain infrastructure investments to ensure sustainability and establish an adaptive pathway plan for flood response [Linked to Outputs 1.1, 1.3, 1.4, and 1.6]

Organizing and empowering communities create strong and supportive social entities that facilitate the sustainability of *hard* investments. With the significant amount of funds being invested in hard investment, post-construction maintenance will be a priority. The infrastructure under the sub-national level's purview will be formally handed over to the provincial or district government. Moreover, in the long run, it will create benefits for local people and places. Capacity building and training of communities will be undertaken to improve their awareness and understanding of the benefits of the activities, including infrastructure maintenance. Training programs with specific modules will be carried out to raise awareness about the adverse effects on the environment from destructive practices and how the communities contribute and participate in responding to climate change related events such as floods, habitat loss, and altered ecosystems; discuss concrete actions to reduce their environmental impacts and advocate for positive change. Related to Output 1.1 and 1.4, in view of the lack of data for this location and uncertain future climatic conditions, an adaptive action plan with short-term actions and longer-term options (pathways) when defined tipping points are reached will be developed in consultation with the existing Community Disaster Management Committees, Commune Emergency Coordination Mechanism, and District Committee for Disaster Management. The plan will include enabling actions and identifying adaptation pathways, showing the multiple sequences of additional actions over time when defined tipping points (thresholds) are reached. To assist in the monitoring of climatic events, an easy-to-use tide gauge (e.g. CT-TIDE), which can be remotely programmable and accessible, as well as having an on-screen display, will be installed. This will provide flood warnings to vulnerable communities based on the real-time water level rise above the defined warning and danger threshold. The existing caretaker mechanism at the site of Output 1.1 will be strengthened and replicated in the location of Output 1.4.

Output 3.6. Share knowledge and lessons through documentation of climate-resilient actions for increased adaptive capacities.

This output has been included to build knowledge to support the institutionalization and sustainability of the benefits achieved through the activities implemented under the other components. It will also generate knowledge products that will be disseminated. Knowledge sharing for evidence-based climate change adaptation is key to reducing vulnerabilities, as knowledge-sharing activities enhance understanding of best practices in climate change adaptation. Output 3.6 aligns with AF Strategic Results Framework Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at the local level.

Table 3 Concrete interventions and supporting activities
(corresponding to prioritized resilience building interventions in the above)

Province	Concrete interventions / activities Detailed activities (for more details see environmental and social risks screening sheets in Annex B)	Target District Community	Estimated number of beneficiaries Direct & Indirect	Estimated cost (US\$) and cost- effectiveness of direct beneficiaries	Dimensions	Description (incl. relevant info for risks screening)
Kampot	Output 1.1. Rehabilitate and improve embankment in Ou Chreaneang Reservoir (Kampong Trach Khang Lech commune, Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/flooding/saltwater intrusion and controlling vector-borne and water-borne diseases.	Kampong Trach Khang Lech, Svay Tong Khang Cheung, Damnak Kantuot Khang Tboung, Kampong Trach Khang Kaeut in Kampong Trach	Direct: 27,264 (Women: 14,000)	Cost: 811,600 Cost effectiveness: 29.8	23 ha	Land status: public Land use: reservoir
Kampot Koh Kong	Output 1.2. Establish/renovate five medium/small-scale wastewater treatment plants (with two in Kampot and three in Koh Kong Provinces).	In Traeuy Kaoh and Andoung Khmer in Kampot; Smach Mean Chey in Khemerak Phoumin; Peam Krasaob and Bak Khlang in Mondul Seima	Direct: 75,930 (Women: 37,420)	Cost: 920,000 Cost effectiveness: 12.11	Kampot: 2 Sangkats Kor Kong: 3 target communities of Output 1.5	Land status: public
Koh Kong	Output 1.3. Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste from discharging to the sea in Khemerak Phoumin City.	In Smach Mean Chey, Dang Tong and Stueng Veaeng in Khemerak Phoumin, In Stueng Veaeng and Dang Tong in Khemerak Phoumin	Direct: 28,836 (Women: 13,298)	Cost: 765,659 Cost effectiveness: 26.55	Drainage system/ canals/ waterways in the town centre, along the 3 watercourses.	Land status: public
Kampot	Output 1.4. Renovate waterbodies (irrigation tanks and embankments) in Lompu Reservoir and rehabilitate Kampong Trach canal in Kampong Trach District.	In Boeng Sala Khang Cheung, Damnak Kantuot Khang Cheung, Damnak Kantuot Khang Tboung, Prasat Phnom Khyang, Angk Sophy in Kampong Trach	Direct: 86,444 (Women: 44,419)	Cost: 1,245,100 Cost effectiveness: 14.4	275 ha (Kampong Trach canal) 75 ha (Lompu reservoir)	Land status: public Land use: canal/ reservoir
Kampot Koh Kong	Output 1.5. Resilient housing and toilet designs developed, and demonstration housing units constructed in three vulnerable communities in Koh Kong Province.	In Smach Mean Chey in Khemerak Phoumin Peam Krasaob and Bak Khlang in Mondul Seima	Direct: 450 (Women 225) Indirect: 12,000	Cost: 1,230,000 Cost effectiveness:	3 communities (450 households)	Land status: public <i>The target beneficiaries were authorized by local</i>

			(Women: 6,000)	98.79		<i>authorities to live in the current land.</i>
Koh Kong	Output 1.6. Build five sluice gates and embankments to prevent saltwater intrusion in Krong Khemara Phoumin.	In Smach Mean Chey, Dang Tong and Stueng Veaeng in Khemerak Phoumin	Direct: 28,836 (Women: 13,298)	Cost: 643,500 Cost effectiveness: 22.31	5 sluice gates and embankments	Land status: public
Koh Kong Province	Output 1.7. Establish Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Mondol Seima District.	In Beng Kachhang Community (on island) in Bak Khlang in Mondul Seima	Direct: 15,041 (Women: 7,520)	Cost: 132,000 Cost effectiveness: 8.77	2 machines (wave and tide gauge, and automated weather station)	Land status: public
Koh Kong	Output 2.1. Restoration of destroyed mangrove ecosystems to improve mangrove ecosystem resilience in Mondol Seima District.	Peam Krasaub in Mondul Seima District	Direct: 15,041 (Women: 7,520)	Cost: 799,613 Cost effectiveness: 53.16	150 ha	Land status: public (protected area)
Kampot Koh Kong	Output 2.3 Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to Increase the income of the vulnerable households (including women and youth) with initiation of these livelihoods.	All target communes	Direct: 400 (Women 300)	Cost: 530,000 Cost effectiveness: 3.26	Kampot City, Kampong Trach District, Khemerak Phoumin City, and Mondol Seima District (Koh Kong)	Common occupation: fisheries, farmers

B. Economic, social and environmental benefits

Describe how the project/programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project/programme will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy and Gender Policy of the Adaptation Fund.

The proposed Project focuses on upgrading drainage systems, canals and waterways, and waterbodies to adapt to the current impacts of climate change; reducing the effects of coastal flooding through the recovery of coastal ecosystems; and mainstreaming adaptation and capacity building of provincial and local level Government entities and communities to reduce vulnerability to climate change and increase coping capacity, and the maintenance and restoration of essential ecosystem functions in the coastal zone, to reduce climate change-induced flooding, erosion, and saltwater intrusion through ecosystem-based adaptation measures.

If projections for sea level rise and increased intensity of rainfall become a reality, more and more of the coastal zone and peripheral rural villages in Kampot and Koh Kong Provinces will require some combination of coastal protection structures and EbA approaches in the coming decades. Therefore, the strategies developed in the Project will benefit the country by providing models for designing and constructing future coastal protection infrastructure.

By increasing the capacity of rural and coastal communities of Kampot and Koh Kong Provinces to adapt to climate change, the Project will reduce the need for investment in immensely costly structural solutions (seawalls and dikes) and/or relocation away from the most vulnerable coastal areas. As a result, government funds can be directed towards social welfare and human development priorities, thereby generating significant national benefits.

The population's vulnerability to climate change impact and hazards in Kampot and Koh Kong Provinces is exceptionally high. The provinces have experienced flooding/inundation and droughts for a long history. However, the intensification of hazards due to climate change entails a higher magnitude of impact, especially in the most vulnerable rural and coastal communities. The traditional social settings, the adherence to culture, and, most importantly, the livelihood activities encourage people to remain with the communities and not give up on their lands. Therefore, this also makes the communities more exposed to climate change impacts and disasters, increasing their vulnerability as assets are constantly exposed to disasters that have now become frequent.

Beneficiaries: The Project will deliver economic, social, and environmental benefits to vulnerable groups, particularly women and marginalized groups in the targeted project locations. As mentioned elsewhere, the proposed Project will benefit 63,181 females, 60,210 males, and the total population being 123,392, which is 73 percent of the total population of the selected districts. Emphasis will be given to female headed households and families with persons with disability. Women, persons with disabilities, and youth will be a particular focus in training.

Economic: The income from agriculture and fisheries has primary importance in the provinces, as all communities are engaged in agriculture in the rural areas. Destructive impacts of climate change, like droughts and floods, are the primary reasons behind decreased farming output in Kampot and Koh Kong Provinces, affecting food security and nutrition. In addition, flooding and rising sea levels have resulted in saltwater intrusion threatening coastal farmland, freshwater supply, and inland fisheries. Climate change directly affects the earning capacity of the poorest through its impacts on agriculture, exacerbating uncertainty of the farmers and fisher communities in the Kampot and Koh Kong Provinces, making it more difficult for them to escape and remain out of poverty. These vulnerable communities face compounded crises, with climate change compromising the harvest, disruption of market value chains due to the COVID-19 pandemic, etc.

Previous work carried out by UN-Habitat, especially on climate change adaptation, has revealed that creating a more climate-resilient system through improved adaptation actions, as proposed in the Project, will facilitate substantial ancillary effects. Flood defenses will contribute to reducing and eliminating loss and damage occurring because of climate change hazards.

Moreover, this area has significant potential for tourism development. Protecting the mangroves, reservoirs, etc. will provide greater scope for eco-development and increase employment and income opportunities. Investing in affordable, resilient housing and toilets will reduce households having to use their savings to repair houses. The target locations will have access to year-round water for daily consumption and agriculture. The flood defenses proposed by the Project will contribute to reducing and eliminating loss and damage due to climate hazards. Improved protective infrastructure will have the co-benefit of protecting agricultural areas and other service infrastructure, which will also benefit community livelihood activities in the Kampot and Koh Kong Provinces. Using the People's Process to implement Project investments will directly contribute to an increase in income (during the Project period) and have the co-benefit of improving vocational skill levels, enabling people to earn higher wages (after the Project).

Social: Empirical evidence has shown that climate change is deeply intertwined with patterns of inequality in Cambodia, where the most vulnerable farmers/fisher communities bear the brunt of climate change impacts. Yet, they contribute the least to the crisis.

Communities must be brought along in the decision-making process, which requires transparency and access to information. Moreover, stakeholders, including communities, bring unique perspectives, skills, and knowledge to the challenge of strengthening resilience and addressing climate change. The People's Process, which involves the communities in project activities, will enhance their participation in project design, implementation, monitoring, and ownership.

In addition, by implementing the proposed activities, which include structural and institutional solutions, the Government stakeholders can assist in addressing the impacts of climate change on the small farmers of the agricultural and fisheries sectors and help to reverse losses of production from climate hazards, improve food security and livelihood opportunities. This denotes a high possibility of scaling the project's adaptation practices, tools, and technologies. Improved protective infrastructure will have the co-benefit of protecting agricultural areas and other service infrastructure, which will also benefit livelihoods.

The alignment with the commune/district investment plans and increased capacity of decision-makers will enable better management of climate-resilient investments. It will ensure that infrastructure and settlements are more resilient in the long term. In addition, vulnerable communities will have increased capacities and opportunities to gain income from eco-tourism. As mentioned under the "Economic" section, which is also applicable to "Social", improved protective infrastructure will have the co-benefit of protecting agricultural areas and other service infrastructure, which will also benefit community livelihood activities. Alignment with the commune/sub-national/district investment plans and increased capacity of officials at those levels to plan for and manage climate-resilient investments will ensure that infrastructure and settlements are maintained and made more resilient in the long term.

Environmental: As mentioned elsewhere, severe ecological degradation has occurred throughout Cambodia's coastal area, particularly in areas with investments in infrastructure and tourism. Therefore, interventions on mangroves prioritize the protection of the environment, while other investments made under the Project aim to strengthen the ability of people to live symbiotically with the environment. The *soft* interventions of improving solid waste and wastewater management are designed to rectify a local environmental problem and prevent further environmental damage from a lack of solid waste management and wastewater issues. The combined effects of sea-level rise, coastal flooding, and onshore development issues (especially wastewater disposal) are causing coastal erosion. Thus, better onshore water management proposed by the Project will contribute to reducing the effects of coastal erosion in the Kampot and Koh Kong Provinces.

Women empowerment, youth, and persons with disabilities: Women in the selected Kampot and Koh Kong Provinces areas are primarily responsible for securing food, water, and energy for daily use. With frequent droughts/flooding being experienced, women must travel great distances to access clean water sources (potable water), an added burden to their busy schedule, giving them limited time to earn an income and get an education or for leisure. Women from rural and coastal villages in Kampot and Koh Kong Provinces find it challenging to recover from a natural disaster as they do not own land or other liquid assets that can be sold to secure income in an emergency.

The Project's participatory methodology of People's Process will encourage an inclusive Leaving No One Behind (LNOB) approach. It will safeguard the involvement of women, youth, and disadvantaged groups in project activities.

The gender analysis will be conducted based on the available data/information, consultations with the community, experience from development activities carried out by UN-Habitat, and data/information shared by Kampot and Koh Kong provincial/local officials. These will further highlight (and not limited to) ensuring that risk assessments are informed by the gender analysis, gender equality, and women's empowerment are mainstreamed in activities, assessing different implications of planned activities on women and men, ensuring that women participate equally and actively alongside men and are enabled to take up leadership positions throughout the project cycle, etc.

Non-climatic barriers: Barriers in decision-making by stakeholders and beneficiaries at different levels involved in implementing the adaptation measures may reduce the desired level of target achievement. Therefore, the participatory People's Process will ensure the maximum benefits are achieved. There will be coordination and information sharing among all stakeholders. Through consultations, stakeholders will identify capacity barriers, which will be addressed through training and capacity-building initiatives. A lack of technical expertise to interpret climate change projections could compound a lack of knowledge about locally relevant and practical information about potential climate impacts. Moreover, there is still uncertainty about the scale of climate risk changes, magnitude, and timing, where precise forecasts are difficult to obtain. Therefore, the proposed activities include the required support in a planning process that acknowledges and accommodates uncertainty. As UN-Habitat has done so in the past,

continuous dialogue/engagement and sharing of information about the Project will enable the support from political leaders and the buy-in for the Project. The table below summarizes the economic, social, and environmental benefits the Project will provide.

Table 4 Economic, Social and Environmental benefits

Benefit Types	Baseline	Benefits of Project Actions	Estimated benefits in numbers
Economic	<ul style="list-style-type: none"> - Households face damage and financial losses because of various climate change-related hazards, primarily floods, and storms. - Longer-term stresses such as sea level rise and droughts impact the economic well-being of agriculture/fisheries households and communities and reduce their ability to cope. - Rural and coastal settlements in the Kampot and Koh Kong provinces lack basic and resilient infrastructure, and residents have limited livelihood options. - Land and productive capacity are damaged by seawater and/or a lack of fresh water. 	<ul style="list-style-type: none"> - New climate-resilient infrastructure (hazard-resilient houses/latrines, medium/small irrigation tanks, sluice gates, etc.) and services contribute to economic benefits. - Target areas will have access to water during dry seasons and protection from floods during rainy season - Areas with significant potential for tourism will be protected - Improved protective infrastructure will have the co-benefit of protecting agricultural areas and other service infrastructure, which will also benefit livelihoods. - Training on adaptation methods to face extreme events lessens the social and economic impact and will reduce climate-induced poverty; active participation of women and marginalized groups will lead to strengthened lives for all. 	<ul style="list-style-type: none"> - 10 percent of the annual municipal budget that was previously invested in clear-up and recovery after flood events will be saved - At least 2 percent of the costs invested at the household level in recovery and clean up during and after flood events will be saved and can be used for other purposes - More than 50 percent of the health expenses which are provided to the affected population due to flooding impacts will be saved
Social	<ul style="list-style-type: none"> - Extreme events such as floods/inundations, saltwater intrusion, and droughts contribute to poverty and compound social problems such as disease, sanitation, food security, and safety, further degrading lives for women and marginalized groups. - Longer-term stresses such as sea level rise, floods, and droughts impact local communities' social well-being and cohesion and reduce the ability to cope. - The lack of (resilient) infrastructure and high poverty in informal settlements lead to social conflicts, diseases, and safety issues, especially for women, older persons, people with disabilities, and youth. 	<ul style="list-style-type: none"> - Strengthening strong social networks with women and youth in leadership roles to protect against disasters, fatality rates, diseases, and food security and safety issues due to increased resilience of settlement, communities and physical and natural assets, ecosystems, and livelihoods. - There will be improved adaptive capacity through greater awareness of climate risks and adaptation options at the community level. - Capacity development and involvement in adaptation actions will increase the resilience of disadvantaged women, youth and other marginalized groups. - There will be a reduction in health-related impacts due to lower flood risks 	<ul style="list-style-type: none"> - 162,374 people (81,839 of which will be women) will be protected from potential flooding risks - About 1,800 most vulnerable people (at least 50 percent of which will be women) will have improved, accessible and flood resilient toilets - At least a 15 percent reduction in water-borne disease incidence - 450 - 660 persons (at least 50 percent of which will be women) will participate in capacity building and awareness raising trainings
Environmental	<ul style="list-style-type: none"> - Extreme events such as floods and droughts increasingly lead to environmental losses, particularly important ecosystem services, and loss of livelihood options, flood protection etc. - Longer-term stresses such as sea level rise, floods, and droughts impact local environmental conditions. - Ecosystem degradation and increased waste production reduce livelihood options, health issues, and flood risks because of waste. 	<ul style="list-style-type: none"> - New climate-resilient infrastructure and services contribute to reduction in climate-induced environmental degradation and losses - Environmental benefits due to resilience actions in the informal settlements, clean-up campaigns and awareness raising. - Improved resource management practices with trained men and women ensure a protected and conserved environment with sustainable livelihoods. - Promotion of ecosystem-based adaptation, leading to environmental benefits. 	<ul style="list-style-type: none"> - Around 300ha reservoir and waterway rehabilitation (clearing of drainage, renovation, sluice gate installation, - 150 ha of mangrove restoration - 75,930 people to benefit from waste water treatment - About 1,800 people to benefit from resilient housing and toilets

C. Cost-effectiveness

Describe or provide an analysis of the cost-effectiveness of the proposed project/ programme

In ensuring the cost-effectiveness of the Project, several approaches are highlighted and will entail a combined approach to the quantification of beneficiaries/stakeholders and benefits. The Project will provide both improved resilience through small-scale infrastructure and increased cash income of communities through livelihood improvement.

The Project design is targeted to reduce the vulnerability of targeted communities through infrastructure interventions, securing livelihoods, and building capacities to face the challenges of climate change and climate variability in rural and coastal communities of Kampot and Koh Kong Provinces.

The proposed Project will maximize investment in physical infrastructure to ensure the greatest return on adaptation benefits per dollar spent. The Project will maximize the investment by emphasizing *hard* interventions over *soft* interventions, i.e., 75 percent of the implementation budget will be directed towards the investments proposed under Components 1 and 2. The *soft* initiatives directly support *hard* investments, viz. training in installation or operation and maintenance, or investments to strengthen commune/district level planning – which will assist in sustaining and replicating the benefits of the Project. This approach maximizes the adaptation benefits per dollar invested.

The cost incurred in restoring mangroves has to be compared with expenses incurred in alternative actions such as building costlier seawalls. Furthermore, restoring mangroves is a cost-effective solution to address productivity loss due to saltwater intrusion into coastal farming lands or costs incurred through infrastructure damage, roads in a storm/cyclone, and biodiversity loss where mangroves have been destroyed and denuded. Mangrove forests are highly productive. According to IUCN, "mangroves support rich biodiversity and high levels of productivity, supplying seafood at capacities large enough to feed millions" Mangroves have the potential to act as protective buffers for the coastal zone.

The interventions to minimize/eradicate saltwater intrusion will have profound economic benefits. Saltwater intrusion processes lead to poor-quality groundwater, which can lead to soil salinization problems and soil degradation, thus contributing to the loss of productivity of coastal agriculture. Coastal overexploitation also leads to saltwater intrusion. Loss of agriculture productivity is associated with economic implications, further burdening vulnerable communities. In addition, coastal aquifers are subjected to more pronounced climate change effects, including sea level rise and growing populations, further negatively affecting the quantity and quality of groundwater resources.

Hard investments in the Project will ultimately improve the quality of life of affected communities. However, infrastructure maintenance is a priority. Therefore, local officials and communities will receive training to manage, monitor and maintain infrastructure investments that will be officially handed over to them. Other hard investments under the sub-national level's purview will be formally handed over to the provincial or district government. Both relevant communities and Government officials will be responsible for maintenance. Business maintenance/development plans will be drafted where necessary.

The Project proposes replicable and development-oriented solutions ensuring cost-effectiveness. In particular financial, human, and material resources will be used cost-effectively. It will use existing Government extension services and administrative platforms by complementing and supporting their activities/objectives and will avoid duplication of funds. UN-Habitat already has excellent relationships with Government stakeholders/ provincial/ local authorities and communities, enabling implementation through existing structures at minimum logistic cost.

Adopting the People's Process participatory process, the Project will work with local communities. It will advocate access to resources and finances for communities with limited access to climate finance. So far, the local-level responses to extreme events and their associated impacts on settlements and livelihoods have been largely reactive. The project approach will enable climate finance to flow to activities implemented by vulnerable groups and provide an essential complementary adaptation response for higher-level systemic responses.

Cost-effectiveness and nexus between *hard* and *soft* interventions: The design and implementation of the Project focus on maximizing the size of the *hard* components to benefit the most vulnerable populations directly. Where the Project makes investments in *soft* activities, these will either directly support the *hard* investments through training in installation or operation and maintenance or invest in strengthening commune/district level planning – which will help to sustain and replicate the benefits of the Project. In addition, implementation arrangements for operation and maintenance will be conducted locally to ensure sustainability. Therefore, *the soft* component is required to support the appropriate implementation of the *hard* component to ensure the sustainability of the Project.

Cost-effective investments: Drawing lessons from previous climate change adaptation projects, when undertaking project action planning -- cost-effectiveness, adaptation-cost effectiveness, time to adaptation benefits, and 'no-regret' will all be factors in prioritizing investments. According to UN-Habitat's well-established Planning for Climate Change methodology, this is standard practice, i.e., cost-effectiveness, adaptation, and development effectiveness to be a part of the action planning process. Outputs 1.6 and 2.1 were derived based on the location and the cost-effectiveness of the intervention, and most importantly, with minimal impact on the environment. UN-Habitat will also explore partnering with technical institutions to conduct feasibility studies for environmental technology implementation.

Cost-effective operation through community contribution: The participatory process adopted in working with local communities to achieve the targets will advocate access to resources and investments for communities. UN-Habitat will implement the hard components through the People's Process where possible. Close partnerships with communities and provincial/district/local government institutions will be a prerequisite. This approach reduces implementation costs by 20 – 30 percent over the life of the Project when using community labor instead of external contractors and when procuring local materials where they are available.

Designs: UN-Habitat will ensure that it does not select the cheapest but will select the most cost-effective options. Even if resilient infrastructure has a higher investment cost, that option will be chosen over the alternative with a lower initial cost for a demonstrated longer lifespan and/or more significant adaptation benefits. Moreover, the alternative implementation model to the People's Process is to use external contractors, which, as highlighted above, is more expensive and less likely to foster local ownership of the Project.

Table 5 Cost Effectiveness Criteria

Proposed Action	Cost Effectiveness Criteria		Alternative Action	Cost Effectiveness Criteria	
Output 1.1. Rehabilitate and improve embankment in Ou Chreaneang Reservoir (Kampong Trach Khang Lech commune, Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/flooding/saltwater intrusion and controlling vector-borne and water-borne diseases.	Future cost of climate change	✓	Relocation of communities living along the drainage systems, large canals, and waterways Rebuilt new structures to facilitate the projected adaptation requirements.	Future cost of climate change	✓
	Project efficiency	✓		Project efficiency	x
	Community involvement	✓		Community involvement	x
	Cost/Feasibility	✓		Cost/Feasibility	x
	Environmental and social safeguarding risks	✓		Environmental and social safeguarding risks	Higher risk
Output 1.2. Establish/renovate five medium/small-scale wastewater treatment plants (with two in Kampot and three in Koh Kong Provinces).	Future cost of climate change	✓	Construct large wastewater treatment plants.	Future cost of climate change	✓
	Project efficiency	✓		Project efficiency	x
	Community involvement	✓		Community involvement	x
	Cost/Feasibility	✓		Cost/Feasibility	x
	Environmental and social safeguarding risks	✓		Environmental and social safeguarding risks	Higher risk
Output 1.3. Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste from discharging to the sea in Khemerak Phoumin City.	Future cost of climate change	✓	Take no action. Waste collection through usage of large machinery	Future cost of climate change	✓
	Project efficiency	✓		Project efficiency	x
	Community involvement	✓		Community involvement	x
	Cost/Feasibility	✓		Cost/Feasibility	x
	Environmental and social safeguarding risks	✓		Environmental and social safeguarding risks	Higher risk
Output 1.4. Renovate waterbodies (irrigation tanks and embankments) in Lompu Reservoir and rehabilitate Kampong Trach canal in Kampong Trach District.	Future cost of climate change	✓	Renovate/rehabilitation of medium or large/medium tanks. *Usage of pipe-borne water.	Future cost of climate change	✓
	Project efficiency	✓		Project efficiency	x
	Community involvement	✓		Community involvement	x
	Cost/Feasibility	✓		Cost/Feasibility	x

	Environmental and social safeguarding risks	✓		Environmental and social safeguarding risks	Higher risk
Output 1.5. Resilient housing and toilet designs developed, and demonstration housing units constructed in three vulnerable communities in Koh Kong Province.	Future cost of climate change	✓	Relocation. Addition of large-scale infrastructure to prevent flooding.	Future cost of climate change	✓
	Project efficiency	✓		Project efficiency	x
	Community involvement	✓		Community involvement	x
	Cost/Feasibility	✓		Cost/Feasibility	x
	Environmental and social safeguarding risks	✓		Environmental and social safeguarding risks	Higher risk
Output 1.6. Build five sluice gates and embankments to prevent saltwater intrusion in Krong Khemara Phoumin.	Future cost of climate change	✓	Building seawall.	Future cost of climate change	✓
	Project efficiency	✓		Project efficiency	x
	Community involvement	✓		Community involvement	x
	Cost/Feasibility	✓		Cost/Feasibility	x
	Environmental and social safeguarding risks	✓		Environmental and social safeguarding risks	Higher risk
Output 1.7. Establish Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Mondol Seima District.	Future cost of climate change	✓	Taking no action.	Future cost of climate change	✓
	Project efficiency	✓		Project efficiency	x
	Community involvement	✓		Community involvement	x
	Cost/Feasibility	✓		Cost/Feasibility	x
	Environmental and social safeguarding risks	✓		Environmental and social safeguarding risks	Higher risk
Output 2.1. Restoration of destroyed mangrove ecosystems to improve mangrove ecosystem resilience in Mondol Seima District.	Project efficiency	✓	Building seawall.	Project efficiency	✓
	Community involvement	✓		Community involvement	x
	Cost/Feasibility	✓		Cost/Feasibility	x
	Environmental and social safeguarding risks	✓		Environmental and social safeguarding risks	x
	Future cost of climate change			Future cost of climate change	Higher risk

D. Consistency with national or sub-national development programmes

The proposed Project has been designed to align with national and sub-national development policies, strategies, and plans on sustainable development, climate change, and disaster resilience reforms of the Royal Government of Cambodia on national poverty reduction. The proposed Project aims to enhance climate change adaptation and resilience of Cambodia's most vulnerable rural and coastal human settlements through concrete adaptation actions, particularly in areas where eco-tourism can sustain such interventions.

The project components are designed to align with (adaptation) priorities of key Government plans and consistent with national sustainable development and poverty reduction strategies in the current Vision for 2050, National Strategic Plan for Sustainable Development (NSPSD) 2019 – 2023, and the SDG goals. This includes the Cambodia Climate Change Strategic Plan (CCCSP) 2014 - 2023, the Climate Change Action Plan (CCAP), the Nationally Determined Contributions (NDC), Third National Communications to United Nations Framework Convention on Climate Change, which consider climate change impacts under four sectors, i.e., agriculture, water resources, human health, and coastal zone.

The Rectangular Strategy for Growth, Employment, Equity, and Efficiency: Building the Foundation Toward Realising the Cambodia Vision 2050 highlights the acceleration of governance reform at its core, along with contributing elements, namely, (1) Human resource development; (2) Private sector and job development; inclusive and

sustainable development; and (3) Economic diversification. The Cambodian government has also set environmental sustainability as one of its prioritized actions. Actions on environmental sustainability include reducing the impact of climate change by enhancing the adaptive capacity and resilience to climate change, mainly through implementing the CCCSP.

The CCCSP details Cambodia's strategic response to climate change and is implemented through the Climate Change Action Plan (CCAP). The Vision of CCCSP is to develop "towards a green, low-carbon, climate-resilient, equitable, sustainable and knowledge-based society" under eight (8) strategic objectives, namely, (1) Promote climate resilience through improving food, water and energy security; (2) Reduce vulnerability of sectors, regions, gender and health to climate change impacts; (3) Ensure climate resilience of critical ecosystems (Tonle Sap Lake, Mekong River, coastal ecosystems, highlands etc.), biodiversity, protected areas and cultural heritage sites; (4) Promote low-carbon planning and technologies to support sustainable development of the country; (5) Improve capacities, knowledge and awareness for climate change responses; (6) Promote adaptive social protection and participatory approaches in reducing loss and damage; (7) Strengthen institutions and coordination frameworks for national climate change responses; and (8) Strengthen collaboration and active participation in regional and global climate change processes. The proposed Project aligns with strategic objectives 1, 2, 3, 5, and 7.

The NDC identifies that national vulnerability to climate change is caused by geography, high reliance on agriculture, and lack of financial, technical, and human capacities. Coastal zones are recognized as one of the most vulnerable areas. The NDC also raises the profile of increased adaptive capacity to address climate change as a priority. The proposed Project is aligned with the NDC priority actions, namely, (a) Promoting and improving the adaptive capacity of communities, primarily through community-based adaptation actions; (b) Restoring the natural ecology system to respond to climate change; (c) Implementing management measures for protected areas to adapt to climate change; (d) Strengthening early warning systems and climate information dissemination; and (e) Developing and rehabilitating the flood protection dykes for agricultural and urban development.

In addition, according to the Sub-Decree 219 on Development Plan and Commune 3-Years Rolling Investment Plan dated 14 December 2009, one of the principles of the Preparation and Development of Commune 3-Years Rolling Investment Plan (CIP) focuses on Ensuring Natural Resources and Environmental Sustainability. Moreover, the Technical Guidance on the Preparation and Development of Commune 3-Year Rolling Investment Plan published in 2017 by the National Committee for Sub-National Democratic Development (NCDD) indicated that the content of the investment plan shall include a section on Natural Resources, Environment, and Climate Change Adaptation. Outcomes 1 and 2 of the proposed Project aim to increase coping capacity by promoting climate-resilient small-scale infrastructure and adapting to climate change's current impacts through recovering coastal ecosystems and livelihood improvement and diversification. Therefore, both outcomes are strongly aligned with the principles, structure, and content of the Commune 3-Year Rolling Investment Plan (CIP) as indicated in Sub-Decree 219 and the Technical Guidance, as well as the current CIP target areas. Below is the content of CIP: Moreover, UN-Habitat will further acquire information on ensuring complementarity and sustainability and avoiding the risk of maladaptation.

In line with the national or sub-national sustainable development strategies, the execution, coordination, and oversight of the proposed Project will be further agreed upon in close consultation with the Ministry of Environment, the national designated authority to the Adaptation Fund, the National Council for Sustainable Development (NCSD), the inter-ministerial body chaired by H.E. Minister of Environment and the sub-national government in the two target provinces.

Table 6 Key Government policies/strategies/plans adopted in the project

Key National Policy and Responsible Agency	Project elements consistent with policy
1. Rectangular Strategy Phase IV Vision 2018-2023, Royal Government of Cambodia (RGC)	The Rectangular Strategy for Growth, Employment, Equity, and Efficiency: Building the Foundation Toward Realizing the Cambodia Vision 2030 and 2050 puts acceleration of governance reform at its core, along with contributing elements: i) Human Resource Development, ii) Economic Diversification, iii), Promotion of Private Sector Development and Employment and iv) Inclusive and Sustainable Development. Specifically, the proposed outcomes and corresponding outputs are consistent with Rectangular 4, side four, on ensuring environmental sustainability and readiness for climate change.
2. Cambodia Sustainable Development Goals (CSDGs) 2016- 2030, Royal Government of Cambodia (RGC)	The proposed outcomes and corresponding outputs are contributing to the targets of Goals 13 to take urgent actions to combat climate change and its impacts such as the target 13.1 Strengthen resilience and adaptive capacity to climate related hazards and natural disasters in the country, target 13.2 Integrate Climate change measures into national policies, strategies, and planning, and target 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
3. National Strategic Development Plan (NSDP) 2019 – 2023, Royal Government of Cambodia (RGC)	NSDP 2019-2023 has been formulated for the implementation of the Rectangular Strategy Phase IV and the achievement of the CSDGs with the identification of the priorities, indicators, and timeframe for the implementation and with the identification of mechanism for the monitoring and evaluation of the Result Framework, especially setting the responsibility of the line ministries and agencies. In corresponding to proposed outcomes and outputs, NSDP 2019-2023 emphasizes that the MoE and the

	NCS D will continue implementing their priority activities in responses to adverse impact of climate change.
4. Cambodia Climate Change Strategic Plan (CCCSP) 2014 - 2023, Royal Government of Cambodia (RGC)	The CCCSP details Cambodia's strategic response to climate change with the vision to develop "towards a green, low-carbon, climate-resilient, equitable, sustainable and knowledge-based society." To achieve its vision, the Royal Government of Cambodia (RGC) sets eight strategic objectives in which the proposed outcomes are relevant to strategic objective 1 to promote climate resilience through improving food, water, and energy security, strategic objective 2 to reduce sectoral, regional, gender vulnerability and health risks to climate change impacts, strategic objective 3 to ensure climate resilience of critical ecosystems (especially coastal ecosystems), strategic objective 5 to improve capacities, knowledge, and awareness for climate change responses, and strategic objective 7 to strengthen institutions and coordination frameworks for national climate change responses.
5. Updated Nationally Determined Contributions (NDC) 2020, Royal Government of Cambodia (RGC)	Cambodia adopted NDC with 2030 target, containing both mitigation and adaptation. The NDC indicates that the infrastructures and coastal zones are recognized as one of the most vulnerable sectors to climate change. With this regard, the target areas and component 1 are strongly relevant. Moreover, the proposed outcomes and outputs correspond to the priority actions identified in NDC, such as promoting and improving the adaptive capacity of communities, especially through community-based adaptation actions, restoring the natural ecology system to respond to climate change, implementing management measures for protected areas to adapt to climate change, strengthening early warning systems and climate information dissemination, and developing and rehabilitating the flood protection dykes for agricultural and urban development.
6. Long-Term Strategy for Carbon Neutrality 2021, Royal Government of Cambodia (RGC)	Cambodia developed LTS4CN in 2021 to demonstrates her commitment to the Paris Agreement on Climate Change. It gives a policy scenario to realize a vision of a carbon-neutral and resilient society in 2050. The LTS4CN modeling suggests that Cambodia could achieve carbon neutrality in 2050, with the Forestry and Other Land Use (FOLU) sector providing a full carbon sink of 50 megatons of carbon dioxide equivalent (MtCO ₂ e). The energy sector is expected to be the highest emitter in 2050 at 28 MtCO ₂ e, followed by the agriculture sector at 19 MtCO ₂ e. The waste and Industrial Processes and Product Use (IPPU) sectors are projected to emit 1.6 and 1.2 MtCO ₂ e, respectively. In addition, the LTS4CN also considers the adaptation benefits. Therefore, component 2 contributes FOLU sector by restoration of the ecosystem in the coastal zone, such as through mangrove plantations and management.
7. Municipal Solid Waste Management Policy 2020-2030, Royal Government of Cambodia (RGC)	To address the main challenges in solid waste management in urban areas, the capital, cities, and districts, such as the rapid growth in both quantity and component of solid waste, lack of infrastructure, management, financing mechanisms, policies, and the limited engagement of all relevant actors, the Municipal Solid Waste Management Policy 2020-2030 sets specific measures and action plan for short-term (1-2 years), medium-term (3-5 years) and long-term (6-10 years). Particularly, the output related to the improvement of solid waste management will contribute to the action plan of this policy.
8. Circular Economy	To enable Cambodia to close the loop of the entire value chain, by minimizing resource and energy input as well as waste, while maximizing resource value and creating new economic opportunities for the country. This CE Strategy and Action Plan supports Cambodia's transition to a circular economy by identifying priority areas to enhance economic, environmental, and social outcomes. This will not only contribute to sustainable development in Cambodia but also to global goals for reducing plastic pollution and mitigating climate change.
9. Environmental and Natural Resource Code	One of the main objectives is to strengthen the adaptive capacity and increase climate resilient in the Kingdom of Cambodia.

Table 7 Project alignment with national plans and strategies

Project Components	Cambodia NAP Process 2017 – Key Objectives of NAP Process	Cambodia NAP Process 2017 – Key Objectives of NAP Process	Cambodia NAP Process 2017 – Key Objectives of NAP Process	Cambodia NAP Process 2017 – Key Objectives of NAP Process
1. Increasing coping capacity by promoting climate resilient small-scale infrastructure	Upgrade drainage systems, canals and waterways, and waterbodies to adapt to the current impacts of climate change	Broadly in line with the CCFF as financial resources for climate change response focus on infrastructure investment.	- Promote climate resilient through improving food, water, and energy security. *Reduce sectoral, regional, and gender vulnerability and health risks to climate impacts. - Ensure climate resilience of critical ecosystems (Tonle Sap Lake, Mekong River, coastal ecosystems, highlands, etc.), biodiversity, protected areas, and cultural heritage sites. - Promote adaptive social protection and participatory approaches in reducing loss and damage due to climate change.	
2. Adapting to current impacts of climate change	Medium- and long-term approaches to reducing		- Promote climate resilient through improving food, water, and energy security.	

through recovery of coastal ecosystems, and livelihood improvement and diversification	vulnerability to the adverse effects of climate change		<ul style="list-style-type: none"> - Ensure climate resilience of critical ecosystems (Tonle Sap Lake, Mekong River, coastal ecosystems, highlands, etc.), biodiversity, protected areas, and cultural heritage sites. - *Promote adaptive social protection and participatory approaches in reducing loss and damage due to climate change. 	Consistent with the short-medium- and long-term recommendations and also in line with the 40 priority actions of the NAP Financing Framework.
3. Building capacity and knowledge sharing to reduce vulnerability to climate change	Integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programs, and activities, in particular, development planning processes and strategies, within all relevant sectors and at different levels.	Largely in line with the CCFF's climate change response as it also focuses on capacity building, awareness, and training.	<ul style="list-style-type: none"> - Improve capacities, knowledge, and awareness of climate change responses. - Promote adaptive social protection and participatory approaches in reducing loss and damage due to climate change. - *Strengthen institutions and coordination frameworks for national climate change responses. 	

E. Compliance with relevant technical standards and policies

Describe how the project/programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy of the Adaptation Fund.

The proposed Project is obligated to follow and comply with national technical standards and relevant legislation. The Project was selected for submission to the Adaptation Fund through a national consultation process and, in the future, will be implemented and monitored in line with national legislation and standards outlined below. In addition, the proposed Project is relevant to the Adaption Fund principles, such as compliance with the law, marginalized and vulnerable groups, gender equity, women's empowerment, and land and soil conservation, among others. The implementation and monitoring of the Project will ensure that the principles of the AF, as well as the relevant national technical standards, are adhered to during the lifetime of the Project.

Project components and outputs will meet technical standards prescribed in coastal ecosystem management, the fisheries sector, disaster management, solid waste management, water resources management, and technical guidelines and norms. Technical safeguards for *hard* interventions will be followed and incorporated during activity design and implementation by the relevant focal agencies engaged in implementing and monitoring the Project at the national and provincial/district/commune levels. The Project will also identify needs and gaps in appropriate sector technologies aligned with adaptation needs and develop/field test suitable solutions with community participation.

Please also note that the design and construction of the interventions will be following the various norms and standards mentioned in Article 5 - 11 Drinking Water Quality Standards in the Law on Water Resource Management (Ministry of Industry, Mines and Energy); Law on Environmental Protection and Natural Resources Management (1996), Technical Guidelines for Commune/Sangkat (2009), and the National Strategic Plan on Green Development 2013 – 2030. In addition, the construction of resilient houses and toilets will follow the National Housing Policy (to provide people, especially low- and medium-income households and vulnerable groups, with access to decent housing or improving a house to ensure the right to adequate housing).

Outcomes 1 and 2 are strongly aligned with the principles, structure, and content of the Commune 3-Year Rolling Investment Plan (CIP) as indicated in Sub-Decree 219 and the Technical Guidance, as well as the current CIP target areas. The proposed project activities align with strategic objectives 1, 2, 3, 5, and 7 of the Cambodia Climate Change Strategic Plan (CCCSP) 2014 – 2023. Furthermore, the Ministry of Environment reviewed all the project activities and outputs during the full proposal development stage. The Project Sub-Working Group (Provincial Level) in each province, consisting of representatives of the different sectoral offices, will monitor project activities and outputs to comply with national standards and regulations.

Table 8 Compliance with laws and national technical standards

Expected concrete output or intervention	AF ESP	Relevant laws, regulations, standards and procedures	Compliance, procedure and authorizing office	Potential risks and impacts identified during proposal preparation
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Output 1.1. Rehabilitate and improve embankment in Ou Chreaneang Reservoir (Kampong Trach Khang Lech commune, Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/flooding/saltwater intrusion and controlling vector-borne and water-borne diseases.	4, 6, 8, 9, 12, 13 and 15	Technical Guidelines for Commune	Department of Water Resources and Meteorology	<p>Risk: The technical studies do not actively consider AF Environmental and Social Policy principles.</p> <p>Activities under these outputs trigger the following risks under the AF's Environmental and Social Policy</p> <p>Mitigation: Consideration of AF Environmental and Social principles will be a contractual obligation for the contractor.</p>
Output 1.2. Establish/renovate five medium/small-scale wastewater treatment plants (with two in Kampot and three in Koh Kong Provinces).	2, 5, 6, 10, 12 and 15	Law on Water Resource Management Article 5 - 11 Drinking Water Quality Standards (Ministry of Industry, Mines and Energy) Law on Environmental Protection and Natural Resources Management (1996)	Department of Water Resources and Meteorology	
Output 1.3. Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste from discharging to the sea in Khemerak Phoumin City.		National Strategic Plan on Green Development 2013 - 2030		
Output 1.4. Renovate waterbodies (irrigation tanks and embankments) in Lompu Reservoir and rehabilitate Kampong Trach canal in Kampong Trach District.	2, 5, 6, 10, 12 and 15			
Output 1.5. Resilient housing and toilet designs developed, and demonstration housing units constructed in three vulnerable communities in Koh Kong Province.	2, 3, 5, 6, 11, 12, 13	National Housing Policy (to provide people, especially low- and medium-income households and vulnerable groups with access to decent housing or improving a house to ensure the right to adequate housing)	Department of Land Management, Urban Planning and Construction – Kampot and Koh Kong Provinces	<p>Risk: Beneficiary households will be selected preferential or unequal.</p> <p>Mitigation: Selection of beneficiary households based on specific selection criteria based on IDPoor level with accountable manner.</p>
Output 1.6. Build five sluice gates and embankments to prevent saltwater intrusion in Krong Khemara Phoumin.	4, 6, 8, 9, 12, 13, 15	Technical Guidelines for Commune/Sangkat (2009) Law on Water Resource Management Article 5 - 11	Department of Water Resources and Meteorology – Kampot and Koh Kong provinces	<p>Risk: The technical studies do not actively consider AF Environmental and Social Policy principles.</p> <p>Activities under these outputs trigger the following risks under the AF's Environmental and Social Policy</p> <p>Mitigation: Consideration of AF Environmental and Social principles will be a contractual obligation for the contractor.</p>
Output 1.7. Establish Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Mondol Seima District.	9, 10, 11 and 14	CCSP, Updated NDC	Department of Water Resources and Meteorology	

Output 2.1. Restoration of destroyed mangrove ecosystems to improve mangrove ecosystem resilience in Mondol Seima District.	6, 8, 9, 10 and 15	Law on environmental protection and natural resources management (1996) National Strategic Plan on Green Development 2013 - 2030	Provincial Halls of respective provinces will be responsible for ensuring the construction/main tenance is implemented in accordance with national laws and technical standards.	Risk: Activities under this output trigger the following risks under the AF's Environmental and Social Policy Mitigation: Development of Mangrove Plantation Management Plan based on field assessment and inspection prior to the plantation activities.
Output 2.2. Develop Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems, including prevention of waste/pollution in Mondol Seima District.	6, 8, 9, 10 and 15	Law on environmental protection and natural resources management (1996) National Strategic Plan on Green Development 2013 - 2030	Provincial Halls of respective provinces will be responsible for ensuring the construction/main tenance is implemented in accordance with national laws and technical standards.	Risk: Developed EbA management plans are unfeasible. Mitigation: EbA management plans will be developed through the People's Process and numerous consultation and discussions with local stakeholders.
Output 3.3. Capacity building of sub-national level Government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems. [Linked to Outputs 1.2 and 1.3]	9 and 12	Sub-decree on Urban Solid Waste Management Sub-decree on Plastics Bags Management	Adherence to national technical standard and localising capacity building at the community level.	Risk: Solid waste and wastewater pilot activities in each target city/district will not be continued after the project termination, and people dispose solid waste inappropriately. Mitigation: While building capacity of communities and local authorities on solid waste management, pilot activities will be identified through participatory approach to enhance ownership of local stakeholders.

F. Duplication with other funding sources

Describe if there is duplication of project/programme with other funding sources, if any.

The Project will be implemented in Kampong Trach district and Krong Kampot in Kampot Province and Khemarak Phoumin and Mondul Seima districts in Koh Kong Province, where minimal initiatives on climate adaptation have been implemented. No activities are included that are already being supported by other funding sources. In addition, the sites selected for the proposed Project were chosen based on the high vulnerability and inability to adapt to climate change and based on coastal zones being prioritized by the Royal Government of Cambodia.

The Project will complement, build on and learn from several ongoing projects, as detailed below, particularly for supplementary knowledge in implementing the proposed activities. This will add to the understanding gained from the stakeholder mapping and consultation at the Project's detailed design stage through interactions with provincial/local government members and communities. The Project will be responsive and responsible for board execution as a government-led effort to implement an adaptation project based on policy and identified priorities. It will complement ongoing government programs/projects being implemented to manage, mainly focused on flooding/inundation, drought, sea level rise/saltwater intrusion, waste management, improving rural livelihoods, water management, EbA, and coastal biodiversity conservation.

The Project focuses on the community resilience of rural and coastal settlements and the preservation of ecosystems as an adaptation strategy. To this end, the experience of lessons and practices from many donor-implemented micro-projects, especially the successful Community-Based Adaptation pilot projects of the Global Environment Facility/Small Grants Programme (GEF/SGP), have influenced the design of activities and delivery/monitoring and assessment modality of the Project.

Table 9 summarizes recently concluded, ongoing, and pipeline projects that deal with rural livelihoods, water management, climate change, habitat conservation, biodiversity, and peacebuilding and empowerment. As highlighted above, the proposed Project has considered overlap and potential synergies with 12 other ongoing and completed projects. The "Strengthening the Resilience of the Mekong Region Wetlands" project is not included as it does not overlap in the area of EWS. However, synergies could be built, and lessons could be drawn from that project in awareness raising, livelihood improvement, and community engagement in protecting trees, mangroves, and seagrass. Useful information from the Mekong Project on extreme weather events in Koh Srolao and Koh Kapik, such as drought, storms, etc. could be used to establish EWS. The challenges facing the natural habitats and livelihood in Koh Kapik and Koh Sralao are rather complex, and strong engagement from relevant stakeholders, including local communities and authorities, is significant in addressing such challenges. However, further synergies could be built, and lessons could be drawn from that project in awareness raising, livelihood improvement, and community engagement in protecting trees, mangroves, and seagrass. Useful information from the Mekong Project on extreme weather events in Koh Srolao and Koh Kapik, such as drought, storms, etc. could be used to establish EWS. The challenges facing the natural habitats and livelihood in Koh Kapik and Koh Sralao are rather complex, and strong engagement from relevant stakeholders, including local communities and authorities, is significant in addressing such challenges.

Table 9 Summary of ongoing/pipeline projects

Project Name/Funding Institution	Implementation Arrangement, Project Timeline and Budget	Project Objective(s)/ Lessons Learnt from the Project	Potential Synergies
1. Pilot Programme for Climate Resilience (PPCR)	-Funded by Asian Development Bank (ADB) -Executed by the Ministry of Environment & Ministry of Economy and Finance -Total Budget: USD 561,810,000 Duration: 2011 - 2023	The implementation/infrastructure component of PPCR doesn't overlap target areas with the proposed project.	UN-Habitat is a partner in a small component of PPCR, so is well-placed to coordinate lessons learned at the National Level.
2. Building Climate Resilience of Urban Systems through Ecosystem-Based Adaptation (EbA) In the Asia-Pacific Region	-Funded by LDCF -Implemented by UNEP -Executed by the Ministry of Environment -Total Budget: USD 1,078,300 (Cambodia) Duration: 2018 - 2024	The aim of the project is to reduce the vulnerability of poor urban communities in Asia-Pacific Least Developed Countries (LDCs) to climate change impacts using Ecosystem-based Adaptation (EbA), with interventions in selected municipalities in four LDCs: Thimphu (Bhutan), Kep (Cambodia), Phongsaly and Oudomxay (Lao PDR), and Mandalay (Myanmar).	UN-Habitat is an implementing partner on the UNEP project, which enables it to ensure complementarily potential. Lessons learned from the Building Climate Resilience of Urban Systems through Ecosystem-Based Adaptation (EbA) In the Asia-Pacific Region project will be reviewed and reflected in Output 2.1 and Output 2.2.
3. Cambodia Climate Change Alliance (CCCA) – Phase III	-Funded by European Union & Swedish Government -Implemented by National Council for Sustainable Development (NCSD) -Total Budget: USD 11,868,895 Duration: 2019 - 2024	The overall objective is to strengthen national systems and capacities to support the coordination and implementation of Cambodia's climate change response and contribute to a greener, low-carbon, climate-resilient, equitable, sustainable, and knowledge-based society.	The program focuses on strengthening both the mitigation and adaptation capacity of the national and local authorities of Cambodia. UN-Habitat focuses on strengthening the adaptation capacity at local levels and this could be a potential synergy or UN-Habitat could complement the existing work implemented by the CCCA3.
4. Public-Social-Private Partnerships for Ecologically-Sound Agriculture and Resilient Livelihood in Northern Tonle	-Funded by Green Climate Fund (GCF) -Executing Entities: Food and Agriculture Organization of the United Nations (FAO), the Ministry of Agriculture, Forestry and Fisheries (MAFF), and the Ministry of Environment (MoE)	PEARL aims to enhance the climate change resilience of smallholder farmers and local communities in the Northern Tonle Sap Basin (NTSB) by increasing their access to growing premium market segments while using their improved market access to incentivize their transition to climate-resilient practices,	Farmers' capacities are enhanced to manage climate impacts and related risks. The adaptive capacity of smallholder farmers and other local value chain actors, particularly vulnerable women farmers, is increased through market incentives that promote climate-resilient, higher-value, diversified, and sustainable production, and processing.

Sap Basin (PEARL)	-Total Budget: USD 42,850,231 Duration: 6 Years	mainly through effective public-social-private partnerships.	Regulatory and institutional frameworks and capacities for climate-resilient agricultural certification, and cross-sectoral coordination.
5. Establishing an Evidence-Based National Adaptation Plan (NAP) process at National and Subnational Scales in Cambodia Phase 1	-Implemented by the Department of Climate Change of the General Secretariat of the National Council for Sustainable Development (GSSD) -Total Budget: USD 1,602,097 Duration: 1.8 Years	The overall objective of the project is to Strengthen the institutional and scientific capacity in Cambodia to formulate and implement national, sectoral, and subnational climate change adaptation strategies and actions.	Evidence basis produced to design adaptation solutions for maximum impact. Adaptation planning governance and institutional coordination strengthened. Private sector engagement in adaptation catalyzed.
6. Combatting Marine Plastic Litter in Cambodia	-Implemented by the National Council for Sustainable Development (NCSO) -Total Budget: USD 2,401,922 Duration: 2020 – 2023	The project aims to prevent and minimize plastic waste pollution on land and in the ocean through the promotion of a 4R framework.	The proposed project could complement the work that has been done by this project. Lessons learned from the project will be reflected in the Output 3.3 in managing solid waste and wastewater to strengthening of waste collection and existing management systems during implementation.
7. Climate Change Adaptation through Small-scale and Protective Infrastructure Interventions in Coastal Settlements of Cambodia	-Funded by the Adaptation Fund -Executed by UN-Habitat - Implemented the National Council for Sustainable Development -Total Budget: USD 5,000,000 Duration: 4 Years	The main objective of the project is to enhance climate change adaptation and resilience of the most vulnerable coastal human settlements of Cambodia through concrete climate change adaptation actions, particularly in areas where ecotourism has the potential to sustain such interventions.	The project is being implemented in Cambodia by the NCSO with UN-Habitat and focuses on the Kep and Preah Sihanouk Provinces. Lessons learned and practices from the current project have influenced the design and will contribute to the implementation stage. For example, the project adjusted the project governance structure from this experience.
8. Cambodia: Sustainable Coastal and Marine Fisheries Project	-Funded by Asian Development Bank (ADB) -Implemented by the Ministry of Agriculture, Forestry, and Fisheries (MAFF) -Total Budget: USD 73,000,000 Duration: 2022 – 2030	The project will help the country's four coastal provinces—Kampot, Kep, Koh Kong, and Preah Sihanouk—reverse the sharp decline in fisheries, promote sustainable mariculture, and enhance fish landing sites to improve seafood safety.	The proposed project could take lessons learned from this project regarding the improvement of local people's livelihoods dependent on the fisheries sector.

G. The learning and knowledge management component

If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

The Project recognizes that documenting learning, knowledge management, and disseminating lessons learned is very important. Therefore, Component 3 of the Project addresses knowledge management and sustainability. Initiatives on adaptation are being practiced increasingly, and providing empirical evidence with factual data is a prerequisite for projects that work with communities on adaptation. To disseminate information and share lessons with those in similar circumstances facing rapid and intense changes of climate challenged by coping capacities, as well as for policymakers and academics in the discussion of the topic, are paramount. Moreover, it is obligatory to document the practices as part of the learning curve of all stakeholders involved in climate change interventions in Cambodia. Careful monitoring and assessment of results and impacts are decisive in testing the effectiveness of Government-prescribed adaptation measures, especially in water and waste management, livelihood improvement, EbA, EWS, etc. The proposed Project will undoubtedly serve as part of that learning curve that will allow national technical agencies to test their assumptions for community-based adaptation interventions. It will enable the Government to review context-specific approaches and scale-up successful activities to achieve the resilience of communities and ecosystems to climate impacts in a broader landscape.

The proposed Project will adopt a participatory approach to implementation, intensely practiced by UN-Habitat. The approach will promote building knowledge at the provincial/local and community levels, including planning, particularly at the district/community level, and technical/vocational skills for constructing and maintaining small-scale resilient infrastructure at District/community level.

The Project has included an output under Component 3, 'Share knowledge and lessons through documentation of resilient climate actions for increased adaptive capacities', especially targeting the upscaling of lessons and best practices; and generating opportunities for autonomous adaptation in communities with similar ecological and socio-economic conditions. In addition, lessons from the Project implementation sites will be shared directly and continuously. This is part of the sustainability/exit strategy of the Project. The Project will also use a participatory monitoring process, which will enable the beneficiary communities to work directly with the Monitoring and Evaluation Officer of the Project. This will allow the communities to highlight delivery issues and strengthen adaptation benefits, including replication and sustaining the gains of the Project. In addition, the Project will trigger institutional learning processes, participation, knowledge exchange, and replication and scale-up of good practices.

At the national level, other vulnerable districts and communes will be able to derive lessons learned from the Project. Information will be consolidated in reports, and the project investment will support developing or refining tools and guidelines for developing resilient infrastructure. The Project will be executed through the Ministry of Environment and National Committee for Sustainable Development (NCSD) in partnership with Provincial/Local/District government entities. This structure will be supported by facilitating links with other relevant Government bodies, particularly the NCDD at the national level and the Provincial Departments of Water Resources and Meteorology and Land Management, Urban Planning, and Construction in both Provinces.

In addition, to guarantee lessons and experiences of the Project can reach target audiences at the local, national, and international levels, a communication plan will be established in the inception phase of the Project. This will facilitate in clearly identifying stakeholders of the Project that are required to reach, how and through which channel(s) to reach them. The Project will capture gender disaggregated and other relevant data pre, during, and end of the Project. Apart from being beneficial for monitoring and evaluation, the data and information gathered will also facilitate the development of case studies and stories of change.

Specific activities related to Component 3 will be finalized based on the most suitable channels of dissemination, i.e., news media, social media, and web media. For instance, local people can be effectively reached through leaflets and local radio, popular in Cambodia, while social media can broadly reach citizens all over Cambodia. In addition to printed media (articles in national and local newspapers), non-printed media (television, national radio). The use of social media would be particularly relevant to reach the youth (aged 15 - 24), which represents 20.6 percent of the total population of Cambodia.

A social media platform to promote regular interaction can also be an opportunity to forge partnerships with a broader adaptation network partner. In all selected districts, provincial and national media persons will have access to knowledge products such as photos, testimonials, interviews, and case studies for publication. Stories of success and challenges will be developed and shared in relevant national or international climate change fora. Policy briefs with recommendations will help inform local and national policy development. UN-Habitat will work with university networks to encourage student study/internship opportunities for learning and promote support and mentorship.

Moreover, UN-Habitat is part of several international dissemination mechanisms. The Knowledge Centre on Cities and Climate Change (K4C) provides a knowledge management platform for Climate Change and Human Settlements interventions. It is proposed to use this platform (as well as the UN-Habitat website) to disseminate the lessons learned from this Project. UN-Habitat will also work to integrate knowledge generated from the Project with the knowledge management component of the Cambodia Climate Change Alliance (CCCA) program and through the 'camclimate' website. The agency also coordinates the UN System representation of human settlements at the Conference of the Parties.

H. Stakeholder Consultations

Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy and Gender Policy of the Adaptation Fund.

Initiated by the Ministry of Environment, the Project formulation started through a consultation process at different levels: governmental stakeholders, decision-makers, technical professionals, and community representatives. The Ministry of Environment was involved from the beginning of the formulation and supported the process to define the activities corresponding to the national adaptation priorities. Throughout the formulation of the concept note and the current design of the Project, several bilateral discussions were held with the Ministry of Environment for feedback and

validation. This ensured that the Project was aligned with the Government's priorities, namely the Cambodia Climate Change Strategic Plan 2014 – 2023 (CCCSP).

UN-Habitat undertook a joint mission to the provinces/districts from 14 to 17 November 2022. The meeting with the Ministry of Environment, held on 18 November 2022, followed by the missions to the field, focused primarily on alignment with national priorities and coordination, including avoiding duplication with other development partner initiatives, the implementation modality, and the target districts/communes. In addition, the discussion aimed at better understanding the climate hazards and underlying vulnerabilities and the types of vulnerabilities the proposed Project should address.

At the local level in the Project area, discussions with local officials went into greater detail on the priority areas, the development challenges/underlying vulnerabilities they face, and the climate hazards. The local-level meetings with local authorities and community leaders and representatives also discussed various adaptation options and investments required in the target areas. The discussions with Kampot and Koh Kong Provinces officials identified that the climate adaptation interventions they highlighted reflected in the Commune Investment Plan (CIP), the official priority investment at the commune level. The CIPs offer 'pre-packaged' actions that could enhance alignment between donor-funded development projects and government priorities. These meetings also helped to understand the priorities of the different line departments at the provincial and district levels.

As mentioned in Section D, the gaps, complementarity, and synergies with CIPs were identified. For example, the issues discussed with provincial and district-level stakeholders were reconfirmed through consultation with the target commune councils and vulnerable groups. The discussions help understand the local issues and smaller-scale interventions not covered by the CIP. These meetings also reconfirmed acceptance by the communes and outlined alternative options for increasing resilience and potential environmental and social risks and impacts of the interventions. In addition, gender inclusivity was given prominence. The discussions/ meetings were represented by women and men, with at least 40 percent being women, who provided gender-specific climate change-related priorities and challenges already reflected in the outputs. UN-Habitat will ensure women's and men's issues are fully represented while adhering to the UN principle of Leaving No One Behind.

UN-Habitat has built a good rapport with the provincial/district/commune-level entities through these discussions. The consultative process at the Provincial/District/Commune levels stakeholders is an ongoing process to ensure optimum participation in project actions.

Table 10 Overview of Focus Group Discussions and individual meetings

Meeting and date	Participants	Discussion points	Outcome
14 November 2022	Environmental Officers and city authority/ community in Kampot (12 people)	Climate change challenges and what priorities that we can include in the proposal to the Adaptation Fund.	The proposal should be focused on the natural resources' restoration, livelihood improvement, capacity building, waste management, and infrastructure rehabilitation related to water resource management.
15 November 2022	Kampong Trach District Officers and local communities (6 people)	What is the district facing challenges in relation to climate change and disaster?	They suggested to propose a rehabilitation of some reservoirs: 1) Rebuild Kampong Trach reservoir with 1.5km width and 2km length near eco-tourism' Kampong Trach Mountain, 2) Lompu reservoir, and 3) Ou Chaneang reservoir. Other suggestions were on resilient housing and capacity building
16 November 2022	Koh Kong Officers, Environmental officer and local authorities (12 people)	What are the challenges and priorities of Kong Kong in relation to climate change?	Strong recommendations for consideration are wastewater management in the city, flood management, solid waste management, affordable housing, urban planning, canal and water gates rehabilitation, mangrove and fishery improvement as well as capacity building and warming system.
18 November 2022	Director of Climate Change Department and their officers (9 people)	To brief on the results of the field consultation and propose priorities for the AF concept note preparation	Appreciated and recognized the local needs and recommendation. The proposal should focus on water resource management, wastewater management, resilient housing, mangrove and fishery, solid waste

			management, livelihood and capacity development.
26 June 2023	Provincial and community representatives from Kampot Province (35 people)	Consultation on related outputs in Kampot City including output 1.2, 2.3, 3.1, 3.2, and 3.3	All outputs to be implemented in Kampot Province were discussed, joint site visits were conducted and activities to be implemented were agreed including the locations
27 June 2023	District and community representatives from Kampong Trach District (34 people)	Consultation on related outputs in Kampong Trach District including output 1.1, 1.4, 1.5, 2.3, 3.1, 3.4, 3.5	All outputs to be implemented in Kampong Trach District were discussed, joint site visits were conducted and activities to be implemented were agreed including the locations
28 June 2023	Provincial department and city representatives from Khmerak Phoumin City and several Sangkats (30 people)	Consultation on related outputs in Khmerak Phoumin City including output 1.2, 1.3, 1.5, 1.6, 2.2, 2.3, 3.1, 3.3, and 3.4	All outputs to be implemented in Kampong Trach District were discussed, joint site visits were conducted and activities to be implemented were agreed including the locations
29 June 2023	Representatives from Mondol Seima District community, representatives from several communes (32 people)	Consultation on related outputs in Mondol Seima including output 1.5, 1.7, 2.1, 2.3, 3.1, and 3.4	All outputs to be implemented in Mondol Seima were discussed, joint site visits were conducted and activities to be implemented were agreed including the locations
4 July 2023	Representatives from the Ministry of Environment (6 people)	Discussion on the proposed outputs/ activities and project modality/ approaches in the AF Full Proposal.	Secretary of State (Ministry of Environment) provided his insights as well as recommendations for the intended activities and the AF Full Proposal Development.

The Project team surveyed potential target areas for each intervention and communicated with community people, especially women, to obtain more information and understand their challenges and needs (Detail report on Annex A). Possible environmental and social risks and adverse impacts were also discussed with local stakeholders while triangulated through field observations. For example, the team visited the vulnerable fisheries communities, the potential target communities for Output 2.3 on livelihood diversification. Through interviews with community people, especially women, possible livelihood options were considered based on their capacity and current income sources.

As shown in Table 11, discussions with the community representatives and vulnerable communities were held in Daun Teav Kroam village, Fishery Community, Sangkat Traeuy Kaoh, Smach Meanchey Village, Sangkat Smach Meanchey, Peam Karasoub commune, etc. Now that the project concept note had been approved, these discussions helped in clarifying the location of the project activities, discussing roles and responsibilities and post-construction management of the infrastructure, commitment from local communities to plant trees around the embankment (e.g., in Kampong Trach), locate land for wastewater treatment and discuss options, locate sites to place trash brooms, etc. Suggestions received through these discussions helped in finalizing the technical report attached to the project proposal (Annex B), where the project site/location, beneficiaries, options for physical infrastructure interventions, etc., were discussed and finalized. Detailed design of these activities will be conducted after the proposal is approved.

Another example is initial resilient housing design (Pages 132-163). International expert visited the site and directly communicated with the potential target communities to identify their shelter structure, materials, and issues including climate vulnerability. Based on the result of direct consultation and field observation, possible resilient housing design was proposed with climate resilient design with the condominial wastewater treatment system.

During the discussion on the training needs in the consultation meetings, local authorities and commune representatives in all target areas raised the issue of solid waste management because they aware inappropriately managed solid waste is one of factors to cause flooding. Therefore, the Project proposed the capacity building to sub-national level government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems (Output 3.3).

Table 11 Overview of Focus Group Discussions and individual meetings

Date	Location	Communities	Community Representative Present	Female	Discussion
16 November 2022	Koh Kong	Sangkat Smach Meanchey, Sangkat Steung Veng	2 community chiefs	1	Consultation on existing challenges and needs of Koh Kong Province
26 June 2023	Kampot	Kampong Kandal, Krang Ampil, Andoung Khmer	5 Commune Council members and community representatives	5	<ul style="list-style-type: none"> - Discussions related to waste and wastewater, livelihood improvement and diversification, and community capacity strengthening - Recommendations received regarding livelihood alternatives, waste segregation, household composting, plastic reduction - Site visits made to several vulnerable communities like Daun Teav Kroam village, Fishery Community, Sangkat Traeuy Kaoh to discuss the situation with the community members <p><i>Discussions focused on Outputs 1.2, 2.3, 3.1, 3.2, and 3.3</i></p>
27 June 2023	Kampong Trach	Phnom Khchong, Khang Lech, Derm Pour, Chrous Tasoum, Puoy Tong Khang Cherng, Prasat Phnom Doung, Angsophy, Bay Tea, Kampong Trach Khang Kert, Kampong Trach Ti Mui	14 Commune Council members and community representatives	-	<ul style="list-style-type: none"> - information received about current management of the reservoir; district commits to plant the trees in this reservoir to make it more greenery. - Recommendation received for housing compotent (Ang Sophy, Svay Tong Khang Tboung, and Svay Tong Khang Cheurng communities) and site visits made to discuss with the residents - Participants suggested to form water user groups in five communes located nearby the reservoirs (Kampong Trach Khang Lech, Prasat Phnom Khyang, Damnak Kantuot Khang Cherng, Damnak Kantuot Khang Tboung, and Ang Sophy communes) <p><i>Discussions focused on Outputs 1.1, 1.4, 1.5, 2.3, 3.1, 3.4, 3.5</i></p>
28 June 2023	Koh Kong	Prek Svay village, Steung Veng, Dang Tong, Smach Meanchey	7 Commune Council members and community representatives	2	<ul style="list-style-type: none"> - Participants recommended use of filter nets - Site visit made to informal settlement in Smach Meanchey Village, Sangkat Smach Meanchey to discuss the situation with the community members <p><i>Discussions focused on Outputs 1.2, 1.3, 1.5, 1.6, 2.2, 2.3, 3.1, 3.3, and 3.4</i></p>
29 June 2023	Peam Krasoab	Bak Krorng, Beung Kachhang, Tuol Korkei	10 Commune Council members and community representatives	4	<ul style="list-style-type: none"> - community leader stressed ton need to conserve the mangrove forest. - participants recommended to implement livelihood component in Peam Krasoub Community and Boeng KaChhang Community - Site visit made to Peam Karasoub commune, Mondul Seima district to discuss the situation with the community members <p><i>Discussions focused on Outputs 1.5, 1.7, 2.1, 2.3, 3.1, and 3.4</i></p>

I. Justification

Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

The Project's sustainability has been considered from the planning stage, as highlighted in Component 3. The Project outcomes are designed to address gaps in adaptation and community needs in facing climate challenges. They align with Government priorities as detailed in the National Strategies, Plans and Policies on adaptation, and outcomes of the Adaptation Fund as stated in the Adaptation Fund results framework. They are designed to complement each other and reinforce actions taken to achieve sustainability. The alignment has resulted in the design of a comprehensive approach in which the different components strengthen each other and in which outputs and activities are expected to fill identified gaps in climate change response in Cambodia. Although activities could be seen as traditional adaptation approaches, they support broader resilience actions that pursue reducing current-day vulnerabilities and building a solid platform for future adaptation pathways. They are, therefore, efficient climate finance instruments that can help the local-level adaptation needs of vulnerable members in the selected targeted areas of Kampot and Koh Kong Provinces and sustain once the Adaptation Fund investment concludes. Empowering communities challenged by climate change with training, learning, and capacity building upholds avoiding future costs related to climate change and can be integrated into national plans and policies. The Project approach will also provide robust lessons and insights for future funding opportunities.

The Project maximizes the funding amount for the investments programmed under Components 1 and 2. It allocates 75 percent of the project budget (excluding executing costs and project cycle management) to investments in Components 1 and 2. The funding for *soft* activities under Component 3 is required for complementarity/support for Components 1 and 2 and for sustainability and quality assurance of the Project.

Social integration of the project outputs will be achieved by fully engaging communities, particularly women and youth. The households' awareness raising and capacity enhancement will also lead to long-lasting interest. Most importantly, the increased resilience of communities will reduce vulnerabilities in the long run. Once the benefits are shared nationally, other district authorities will likely welcome adaptation initiatives for their communities. This will facilitate the up-scaling/out-scaling of project activities and open ways for local and national governments to replicate and reach out to other areas needing such initiatives. Trained government officials at different levels with planning and implementing experience will support in aligning adaptation planning processes at district, provincial, and national levels to influence an enabling policy environment.

Table 12 Effect of project outcomes with AF funding compared to no funding (baseline)

Project Components	Project Outcomes	Baseline (without AF)	Results achieved (with AF)
Component 1. Increasing coping capacity by promoting climate resilient small-scale infrastructure.	Outcome 1 - Increased adaptive capacity of built infrastructure and communities to withstand extreme weather and climate variability and change.	The vulnerable communities have little support received so far to tackle issues related to flooding/inundation/ drought, saltwater intrusion, solid waste management etc. that are directly or indirectly affecting their economic activities. The dependency on agriculture/fisheries that are vulnerable to climate change/ variability increase the vulnerability of these communities to climate shocks.	The targeted vulnerable communities are protected from flooding/inundation, and saltwater intrusion and are capable withstand droughts with their livelihood activities being affected through climate change/variability.
Component 2. Adapting to current impacts of climate change through recovery of coastal ecosystems, and livelihood improvement and diversification,	Outcome 2 - Improved conditions of coastal ecosystems and income diversification of vulnerable communities have enhanced the resilient capacity of these communities.	Vulnerable coastal communities are mainly reliant on fisheries as the main source of income, and degradation of coastal ecosystems (predominantly mangroves) have led to their income sources being affected. In addition, destructions in coastal ecosystems have led to saltwater intrusion that is affecting agricultural productivity.	The restoration of coastal ecosystems improves the fauna diversity that will support the livelihoods fisher communities and minimize coastal erosion and flooding. With the minimization of saltwater intrusion, the productivity of agricultural land could be improved.
Component 3. Building capacity and knowledge sharing to reduce vulnerability to climate change.	Outcome 3 - Improved effectiveness of climate adaptation planning/implementation to increase coping capacity to	Resilience capacity of the selected districts of Kampot and Koh Kong Provinces are low and capacity to prepare for and respond to climate change and natural hazards are poor. The most vulnerable people (women, youth, people with	The most vulnerable people are the main beneficiaries. Training and capacity building of officials and the identified vulnerable members

	address climate variability/risk reduction, and to sustain/scale-up actions for transformative adaptation interventions at the local level.	disability, agriculture workers, fisher communities), are not identified or reached by local authorities/agencies through their plans and programs as officers have limited capacity to act on climate change adaptation activities.	enable them to cope to climate change/variability, while improving capacities of officials to lead climate change adaptation planning/implementing activities.
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J. Sustainability

Describe how the sustainability of the project/programme outcomes has been taken into account when designing the project/programme.

The Project will deliver economic, social, and environmental benefits to vulnerable groups, particularly women and marginalized groups, in the targeted project locations in Kampot and Koh Kong Provinces. With access to funding to implement sustained adaptation practices, in particular, upgrade drainage systems, canals and waterways, and waterbodies to adapt to current impacts of climate change; and reduction of the impacts of coastal flooding through the recovery of coastal ecosystems, the vulnerable households will benefit from improvements in coping capacity heightened by income security. Protecting assets against hazards and building resilient livelihoods are actions of adaptation to climate change that deliver social benefits leading to personal material well-being and environmental benefits. The gendered approach of providing equal access to opportunities to marginalized women who carry the majority burden in household upkeep, including older persons and persons with disabilities, will deliver on household food security, diversity, and income per se. The interventions on resilience improvement through the protection of habitats and vulnerable ecosystems improve the local environment and natural resources with less pollution and better air and water quality.

The project outcomes are designed to address gaps in adaptation and community needs in facing climate challenges. These align with Government priorities as detailed in the National Strategies, Plans and Policies on adaptation, and outcomes of the Adaptation Fund as stated in the Adaptation Fund results framework. They are designed to complement each other and reinforce actions taken to achieve sustainability. As mentioned elsewhere, activities could be seen as traditional adaptation approaches. Still, they support broader resilience actions that pursue reducing current-day vulnerabilities and building a solid platform for future adaptation pathways. They are, therefore, well-planned climate finance instruments that can support local level adaptation needs of vulnerable members in the selected targeted areas of Kampot and Koh Kong Provinces and sustain once Adaptation Fund investment concludes. As mentioned elsewhere, the proposed activities were derived based on the current needs and increased climate variability and change in the future.

The proposed Project has been designed to align with Cambodia's efforts and commitment to global contributions through the planning and development of policies and strategies in response to climate change, such as CCCSP (2014 - 2023), the updated NDC, and LTS4CN focusing on GHG reduction, adaptation, budget mobilization, and facilitation mechanisms. In the updated NDC in Section 7, the total funding required for mitigation (USD 5.8 billion) and adaptation (over USD 2 billion) for the ten years is over USD 7.8 billion, around USD 780 million annually. The share of climate change expenditure in GDP in 2020 and 2021 were 2.2 percent and 2.3 percent, respectively, mainly focused on infrastructure development, public health intervention, and cash distribution for social protection, especially for the poor and the vulnerable. Climate change spending, financed by domestic resources, kept increasing in 2021 and represented 48 percent of total climate change expenditure, up from 46 percent in 2020. Furthermore, during COP27, the Minister Ministry of Environment expressed that mitigation ambition must be further increased, and actions on adaptation need to be accelerated and the USD100 billion per year.

a. Institutional

The Project will open ways for provincial/local and national governments to carry forward the adaptation work implemented in Kampot and Koh Kong Provinces to replicate and reach out to other areas needing such initiatives. Trained government officials at different levels with planning and implementing experience will support in aligning adaptation planning processes at district, provincial, and national levels to influence an enabling policy environment. The stakeholder interactions and consultations of the Project, promoting a participatory approach, will lead to establishing a solid relationship with provincial/district-level authorities. Interactions with the provincial/district government have created a sense of local ownership. Where relevant, lessons learned will explore the potential to implement and/or amend local by-laws and influence national policy/legislation. The Project has the potential not only to be well aligned with the climate change adaptation priorities of the Government but also to obtain the buy-in and support of district/divisional/local authorities for programs and initiatives on adaptation that go beyond the time frame of this Project. Moreover, DCC has been the leading project implementer of various climate change-related projects, including this proposed one. Therefore, Government has a strong sense of ownership of the proposed Project, and government staff are involved in various activities and have capacities to mainstream the climate change works into practices with both domestic and external resources.

b. Social

Social integration of the Project outputs will be achieved through fully engaging communities in the targeted settlements, particularly women and youth, and maintaining a gender balance in the Project activities by ensuring the participation of both men and women. The participants are involved in the development of plans/strategies, assessments, and monitoring of the Project to confirm their interest in adaptation in the long term. The households' awareness raising and capacity enhancement will also lead to long-lasting interest. Most importantly, the increased resilience of communities and their infrastructure will reduce community vulnerabilities in the long run, i.e., Activities under Component 3 on capacity building and knowledge sharing will help the communities especially the vulnerable groups, particularly the women, elderly, persons with disability and the poor, to enhance their knowledge and work towards minimizing the impacts of climate change and enhance adaptive capacity, and reduce overall vulnerability. Once the benefits to local, vulnerable communities are shared nationally, other provincial/district authorities will likely welcome adaptation initiatives for their communities. This will facilitate the up-scaling/out-scaling of project activities to other areas for vulnerable communities.

c. Economic

The project activities promote investing in the resilience of vulnerable physical, natural, and social assets and ecosystems as a sustainable economic approach. This approach enhances livelihood options for communities challenged by climate change/variability. It promotes training, learning, and capacity building to avoid future costs related to climate change and the impacts of extreme climate events or disasters. The approach plans for future savings in high costs infrastructure, such as damaged housing and roads due to flooding. For communities, it will include economic and resilience-building opportunities. These economic benefits of resilience can be integrated into district/provincial/national plans and policies. The project approach will also provide powerful lessons and insights for future funding opportunities.

Furthermore, developing the infrastructure under Component 1 will promote women's active engagement. This will be guaranteed through Community Action Planning (CAP) and Community Implementation Agreement (CIP), where communities themselves will be engaged in the construction and maintenance of infrastructure, i.e., instead of using external contractors, the Project will hire communities where unskilled labor is required for construction. In this regard, the Project can guarantee that at least 50 percent of those engaged in the Project at the community level will be women. In addition, the communities, including the poor and vulnerable areas, increase capacities and opportunities to gain income from eco-tourism resulting from recovering coastal ecosystems under Component 2. Livelihood improvement and diversification activities under this Component will also target at least 50 percent of the vulnerable groups, including women, persons with disabilities, and other vulnerable groups, ensuring the living standards are uplifted. Capacity building activities under Component 3 will target at least 30 percent to 50 percent representation of women.

d. Financial

Financial sustainability of project outputs and outcomes is foremost in designing the Project as assurances for long-term consistency are needed for community livelihoods and income generation. The government investment and interest in the Project can be maintained when financial commitments are in place. The Project promotes joint management of project components, especially in delivering public utilities (i.e., provision of water) where additional resources are necessary going forward. Better service provision will avoid future high costs such as relocation of households due to saltwater intrusion into drinking water. At the community level, improved skills, livelihoods, and income (or avoided losses) are expected to enhance the financial strength of households. Infrastructure elements, if necessary, will be designed using resilience to ascertain durability/sustainability. Community participation in the maintenance of public utilities ensures that infrastructure systems are maintained after the Project. Empowered communities can utilize skills developed through the training and implementation processes of the Project, manage resources effectively, and are better equipped to access additional climate finance resources. They have improved their ability to identify risks and priorities and formulate and implement further responses to climate change that can be sustained in the long term.

e. Environmental

Ensuring environmental sustainability is central to the planning of the Project and is considered an integral and necessary condition. An EbA approach based on natural resource management is essential in fragile coastal habitats. The Project adaptation benefits include increased resilience of ecosystems (particularly mangroves) to provide critical ecosystem provisioning and regulating services, flood control and prevention, erosion prevention, freshwater for human consumption and agricultural use, and improved habitat biodiversity. In addition, habitat protection with mangrove rehabilitation and possible near-shore habitat conservation will yield a better fish catch and an increased income encouraging the communities to continue the practices in the long term. Moreover, the improvement of the drainage, wastewater treatment, and solid waste management systems under Component 1 is designed to rectify a local environmental problem and prevent further environmental damage from a lack of intervention to address wastewater and solid waste management issues. These will directly address issues and reduce the risks to vulnerable groups, including the urban poor who have settled along the canals in low-quality housing units. These areas are vulnerable to the runoff created by floods and the dumping of wastes that clog waterways.

f. Infrastructure sustainability in the communities

With significant funds being invested on *hard* investment, post construction maintenance will be a priority. The infrastructure under the sub-national level's purview will be formally handed over to the provincial or district government. The interventions will be institutionalized within the ministries, local government, and communities to ensure sustainable delivery of (post-) project implementation, including formal agreements for infrastructure maintenance (at the national level) and operation and management structures at the sub-national level. Communities will be involved in project implementation/decision-making throughout the project. Communities will have a stake in the construction, operation, and maintenance of the infrastructure (capacity building under Component 3, construction under Component 1. To ensure ownership and sustainability, community members must bring in 10 percent of the value of the houses (cash or in-kind contributions).

K. Environmental and social impacts and risks

Provide an overview of the environmental and social impacts and risks identified as being relevant to the project/programme.

The proposed Project must comply with national technical standards and relevant legislation. The Project was selected for submission to the Adaptation Fund through a national consultation process and, going forward, will be implemented and monitored in line with national legislation and standards. The relevance to principles of the Adaptation Fund, such as compliance with the law, marginalized and vulnerable groups, gender equity, women's empowerment, etc., are ensured. The implementation and monitoring of the Project will guarantee that the principles of the Adaptation Fund, as well as the relevant national technical standards, are adhered to during the lifetime of the Project. Project components and outputs will meet technical standards, guidelines, and norms prescribed in EbA, disaster management, water resources management, etc. Technical standards and safeguards for proposed small-scale infrastructure will be followed and incorporated.

The proposed Project has been designed in compliance with the set of environmental and social principles as detailed in the Environment and Social Policy of the Adaptation Fund. Environmental and social safeguards are essential tools to prevent and mitigate the potential for undue and unintended harm that could arise from project activities. In line with the Adaptation Fund's ESP and Gender Policy and The UN-Habitat's Environmental and Social Safeguard Policy System Version 3 (ESSS 3.1), UN-Habitat and its partners are required to conduct risk screenings and impact assessments of all activities that have even a negligible risk of causing unintended harm. The checklist of ESSS 3.1 will be used during the technical design stage of all identified sub-projects and activities.

The Project outputs and activities have been identified, ensuing a participatory, consultative process with communities and local authorities articulating their concerns. This process has further ensured that no project component will adversely impact any priority biodiversity or ecosystem support areas and that there are no negative impacts on local communities or vulnerable groups.

During implementation, particular attention will be given to the monitoring and mitigation of any identified minor risks and of any unanticipated environmental and social risks through visits to project sites, annual ESP screening, and risk assessment by the project team based on the reports received from the facilitating agencies and the field offices. Through this process, environmental and/or social risks will be identified, remedial actions will be executed immediately, and a set of recommendations on how these should be addressed in future implementation activities will be developed.

It should be noted at this point that only activities under Components 1 and 2 involve physical works (construction, installation of facilities, maintenance, and so on). All other activities in the balance outputs proposed by the Project are *soft* activities that involve training, reports, and publications.

As such, the investments under Component 1 are considered category B risk and require further screening. The remaining activities under Component 3 are considered Category C and, as no risks arise, impact assessments are not necessary yet will follow UN-Habitat ESSS for factors such as where the training needs to be emphasized gender equality and women's empowerment.

Table 13 Checklist of compliance with AF Environmental and Social Principles

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law		√
Access and Equity		√

Marginalized and Vulnerable Groups		√
Human Rights		√
Gender Equality and Women's Empowerment		√
Core Labour Rights		√
Indigenous Peoples	√	
Involuntary Resettlement		√
Protection of Natural Habitats		√
Conservation of Biological Diversity		√
Climate Change		√
Pollution Prevention and Resource Efficiency		√
Public Health		√
Physical and Cultural Heritage	√	
Lands and Soil Conservation		√

Table 14 Brief description of risks and possible mitigation measures

Adaptation Fund environmental and social principles	Possible Risks	Possible Risk Mitigation Measures
Compliance with the Law	The physical construction activities in Component 1 require design approval from national and local governments. During construction activities, related laws and regulations should be followed by the EEs and subcontractors.	Consultations were held with relevant national and local authorities. The first round of consultations was during the project identification stage to ensure compliance with relevant laws and technical standards. More specifically, under Components 1 and 2, further consultations will be held and continued during the detailed design stage to ensure respective mandatory laws are considered. Compliance with the law will be written into all contractual agreements with third-party contractors. Regular monitoring/inspection will be done during implementation.
Access and Equity	Unequal distribution among target population/communities and households of project benefits.	During baseline data collection and mapping exercises will further capture the needs of the target population/communities/households and act upon them. Components 1 and 2 will be implemented through community organizations with the involvement of district/commune administration systems. The project will ensure that vulnerable groups have access to the infrastructure and are actively engaged in the project. Under Component 3, all training and capacity-building activities will be inclusive, leaving no one behind and particularly ensuring adequate gender, people with disabilities, and youth representation throughout. Management and monitoring of activity implementation will highlight irregularities to avoid discrimination and favoritism. A grievance mechanism will be introduced.
Marginalized and Vulnerable Groups	Risks of adverse effects impacting disproportionately on marginalised and vulnerable groups i.e., women and girls, youth, the older persons, the displaced, people with disabilities and others.	All project Components (1, 2, and 3) are targeted to address the needs of the vulnerable groups. Target geographic coverage of project interventions represents predominantly poor and vulnerable communities. Consultations have and will continue to capture all issues and needs of marginalized and vulnerable groups, assessed through vulnerability assessments and mapping needs. The project will adopt the Leaving No One Behind (LNOB) principles. A grievance mechanism will be introduced.
Human Rights	Inability to proactively protect the rights of stakeholders affected by the project	Human rights risks relate primarily to land rights related to Components 1 and 2. See also the section on "in involuntary resettlement" below. Consultations have and will continue to capture concerns related to human rights. UN UDHR standards will be included during project implementation. During project implementation, awareness raising of international human rights standards to all stakeholders of the project will be conducted.
Gender Equity and	Women and men do not have equal opportunities to	In Cambodian culture, women's rights and freedom are limited in almost all spheres. Customs, beliefs, and social norms reinforce

Women's Empowerment	participate in the project and do not benefit equally from interventions. This can be caused by males taking over decision-making. There is a risk that any negative impact of the project may disproportionately affect women. There is also a risk that the project's soft activities under Component 3 may exclude women.	discrimination against women and thus strengthen subordination to men. Women have been particularly marginalized, which has prevented them from developing their full potential and has hindered social and inclusive sustainable development. In many communities, cultural norms and time-intensive household care duties often impede women's abilities to participate in community consultations and decision-making processes about sustainable management initiatives. Therefore, the Project has included and will actively pursue equal participation of genders in project activities under Components 1, 2, and 3. Capacity development activities under Component 3 will specifically promote gender equality and empowerment. Activities will be screened for this risk during the project. Gender analysis and other related assessments will be further conducted before implementation.
Core Labour Rights	Executing entities for the project may not adhere to the ILO Labour Standards and national labor laws.	The Project will use unskilled and semi-skilled labor sourced from the communities for the construction works under Components 1 and 2. Without management and mitigation measures, there is a risk that these laborers could be mistreated. This includes low salaries below minimum wage or market rate, hiring school-age workers, discrimination against women, poor facilities, and lack of safety equipment and informality. The Project will ensure that labor laws and codes are respected for any work that may be carried out in relation to the Project. This includes the eight (8) International Labour Organisation (ILO) Convention core labor standards related to fundamental principles and rights of workers. Contracts will be reviewed to ensure compliance with these laws.
Indigenous Peoples	No risks were identified. There are no indigenous people identified as living in the target area. Rural-urban migrants are captured under the access and equity and marginalized and vulnerable groups safeguarding the area.	Numeral consultations with sub-national and commune-level authorities ensure that any indigenous people live in the target areas based on the census and local registration database.
Involuntary Resettlement	Project actions lead to unintended resettlement consequences. The project does not advocate resettlements or eviction.	Small-scale infrastructure investments under Components 1 and 2 are made entirely on public land, and all sites are accessible by public roads. The consultation process indicated no plans of resettlements or evictions by concerned agencies in the target areas in the Kampot and Koh Kong Provinces. However, during the implementation of all sub-projects, MOUs/AoCs/contracts will be ensured to include standard clauses regarding the non-eviction of people involuntarily due to project activities and monitored throughout the Project life.
Protection of Natural Habitats	Proposed activities could have negative impacts on natural habitats and the environment. Some investments under Component 1 are located in or near critical habitats and inherently involve mangrove areas. With this, habitats can be disrupted through construction activities, transporting materials to and from the sites.	The initial screening process showed minimal environmental impacts on natural habitats because interventions will focus on enhancing ecosystems and developing infrastructure and services. However, further assessment and screening will be conducted during the proposal development stage. At the design stage priority of the Project regarding safeguarding the environment, ecosystems, and natural resources were underscored and accepted. Natural habitat 'triggers' will be included in the planning, management, and monitoring process for all components, particularly under Components 1 and 2 activities. The Project will ensure compliance with international conventions, national plans, and standards. Activities will be further screened for this risk before starting implementation. Investment in mangrove plantations (Component 2) is intended to benefit the natural habitat. There is a risk, without management or mitigation measures, that the investment could be counterproductive and damage the mangrove it is designed to help. For example, without a mangrove planting and management plan, there is a risk (even though the Project is addressing this aspect) that invasive or incompatible species could be introduced to the area, risking project failure and existing mangroves.
Conservation of Biological Diversity	Activities lead to the reduction or loss of biological diversity. Some investments under Component 1 are in protected area.	The initial screening and vulnerability assessment found minimal risk of reduction or loss of biological diversity. Further assessments are needed to enhance ecosystems and biodiversity during the implementation stage.

		Some investments under Component 1 will be implemented in or close to mangrove areas. As such, this ecosystem is critical to support marine biology and coastal human livelihoods (particularly fishing, a common form of livelihood). Biological diversity 'triggers' will be included in the vulnerability assessments. All activities will be screened for this risk during the project implementation.
Climate Change	Project activities cause maladaptation, increasing greenhouse gas emissions.	The project is designed to bring adaptation benefits. However, there is a risk that if any of the investments were unsuccessful, they could be maladaptive – either by failing to bring benefits or by shifting climate change-related risks and vulnerabilities to other areas. Mitigation and management measures are required to minimize this risk. Climate change policies and guidelines will be explained and understood by executing entities and Project personnel before implementing and monitoring activities throughout. Contractors will be required to source local materials where possible (reducing emissions from transportation). Avoiding maladaptation risks will factor in selecting design companies at the implementation stage.
Pollution Prevention and Resource Efficiency	Project activities may cause pollution and may not use resources efficiently.	The initial assessment found that there is a low risk of inefficient use of resources for project activities. There are some small risks arising from the construction under Component 1 activities. All investments under Component 1 involve construction using common building materials, such as concrete and building sand/fill material. Without management and mitigation measures, there is a risk of small-scale, localized pollution in and around the construction sites. No construction will involve hazardous materials such as chemicals). Contractors will be required to source local materials where possible (reducing emissions from transportation). Activities will be screened for this risk during the project and monitored throughout project activity implementation.
Public Health	Project activities will lead to negative impacts on public health Risks to public health (and safety) could arise from the following: 1) Poor site management, 2) contamination of wastewater (either directly or indirectly from project activities), 3) Maladaptation (where infrastructure is ineffective or directs flood waters elsewhere)	The initial screening and vulnerability assessment found a low risk of negative impacts on public health. Investments under Component 1 involve creating a temporary construction site during implementation. This carries typical construction site risks (i.e., risks from vehicles entering and leaving the site, risks to children, etc.). During the project's inception, a safety plan for construction sites will be developed following Government's and ILO safety requirements, and health 'triggers' will be included in the vulnerability assessments and in the management and monitoring process for implementing components. Activities will be screened for this risk throughout the project.
Physical and Cultural Heritage	No risks identified	The initial screening and vulnerability assessment did not identify cultural heritage sites in selected project locations. There are no UNESCO World Heritage sites in any of the target areas. There are also no sites of national heritage interest in the target area.
Lands and Soil Conservation	Project activities lead to soil degradation or conversion of productive lands that provide valuable ecosystem services.	Investments under Components 1 and 2 involve disturbing soil. Thus, this risk has been triggered. Further investigations will be conducted during the detailed design stage. The project will formulate a mitigation plan to conserve soils and lands in all locations and sites of project implementation.

PART III IMPLEMENTATION ARRANGEMENT

A. Describe the arrangements for project/programme implementation

The following mechanisms for project execution, coordination, and oversight have been agreed upon in close consultation with the Ministry of Environment (MoE), the national designated authority to the Adaptation Fund, the National Council for Sustainable Development (NCSD), the inter-ministerial body chaired by H.E. Minister of Environment and the sub-national government in the two target provinces.

The Project will be executed at two levels; 1) national and 2) sub-national (which consists of the provincial and commune levels).

At the national level, the NCSD, within the Ministry of Environment, will be the executing entity for all project activities. UN-Habitat will enter into an Agreement of Cooperation with NCSD to implement all activities identified under the Project's Results Framework and Budget. The NCSD will also ensure that the Project is executed on time, chair the Project Management Committee, and coordinate its activities and results across the Cambodian government system.

In the Cambodian government system, Provincial Halls are the central, provincial-level administration unit headed by a governor. They coordinate the other line departments at the provincial level and are accountable to the Ministry of Interior. The Provincial Governors of Kampot and Koh Kong Provinces will be a member of the Project Management Committee to execute the Project. The day-to-day oversight of the Project will be the responsibility of the Provincial Administration Unit. The Provincial Halls will coordinate with other departments to deliver the physical works. The table below shows the execution responsibility. Note that in this table, the executing entity is characterized by fund flow – they will receive funding from UN-Habitat.

The commune councils, elected bodies that work in each commune, will support the Project's implementation at the local level. While there will be no fund flow to the commune level, the councils will each chair a local commune committee (described below) that will, among other things, support the organization of communities, facilitate the construction works, and act as a first point of contact for community members to engage with the Project (including offering a possible channel to discuss potential grievances).

Table 15 Executing Responsibilities

Outputs	Executing Partner	Executing Entities
Output 1.1. Rehabilitate and improve embankment in Ou Chreaneang Reservoir (Kampong Trach Khang Lech commune, Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/flooding/saltwater intrusion and controlling vector-borne and water-borne diseases.	NCSD	Provincial Department of Water Resources and Meteorology (Kampot), Provincial Department of Environment, Kampong Trach District Administration and target communes,
Output 1.2. Establish/renovate five medium/small-scale wastewater treatment plants (with two in Kampot and three in Koh Kong Provinces).	NCSD	Provincial Department of Public Work and Transport, Department of Environment, and local authorities (Both provinces)
Output 1.3. Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste from discharging to the sea in Khemerak Phoumin City.	NCSD	Provincial Department of Public Work and Transport, Department of Water Resources and Meteorology and local authorities (Koh Kong)
Output 1.4. Renovate waterbodies (irrigation tanks and embankments) in Lompu Reservoir and rehabilitate Kampong Trach canal in Kampong Trach District.	NCSD	Provincial Department of Water Resources and Meteorology and Kampong Trach District and target Communes (Kampot)
Output 1.5. Resilient housing and toilet designs developed, and demonstration housing units constructed in three vulnerable communities in Koh Kong Province.	NCSD Community Contracts	Provincial Department of Land Management, Urban Planning and Construction, local authorities and target communities (Koh Kong)
Output 1.6. Build five sluice gates and embankments to prevent saltwater intrusion in Krong Khemara Phoumin.	NCSD	Provincial Department of Water Resources and Meteorology, and local authorities (Koh Kong)
Output 1.7. Establish Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Mondol Seima District.	NCSD	Provincial Department of Water Resources and Meteorology (Koh Kong)

Output 2.1. Restoration of destroyed mangrove ecosystems to improve mangrove ecosystem resilience in Mondol Seima District.	NCSD	Provincial Department of Environment, local authorities and Communities (Koh Kong)
Output 2.2. Develop Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems, including prevention of waste/pollution in Mondol Seima District.	NCSD	Provincial Department of Environment, local authorities and communities (Koh Kong)
Output 2.3. Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to increase the income of the vulnerable households (including women and youth) with initiation of these livelihoods.	NCSD	Provincial Department of Environment, local authorities and communities (Both provinces)
Output 3.1. Conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, including community-based in community/sub-national/district development plans and promote climate change/disaster resilience in local development plans.	NCSD	Provincial Department of Environment, local authorities and communities (Both provinces)
Output 3.2. Capacity building of provincial and sub-national level Government entities and communities on mainstreaming climate change adaptation.	NCSD	Provincial Department of Environment, local authorities and communities (both provinces)
Output 3.3. Capacity building of sub-national level Government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems. [Linked to Outputs 1.2 and 1.3]	NCSD	Provincial Department of Environment, local authorities and communities (Both provinces)
Output 3.4. Training communities in target locations on resilient housing/latrines construction technique. [Linked to Output 1.5]	NCSD	Department of Land Management, Urban Planning and Construction (Both provinces)
Output 3.5. Organizing communities and local authority to manage, monitor and maintain infrastructure investments to ensure sustainability and establish an adaptive pathway plan for flood response. [Linked to Outputs 1.1, 1.3, 1.4, and 1.6]	NCSD	Provincial Department of Environment, local authorities and communities (both provinces)
Output 3.6. Share knowledge and lessons through documentation of climate-resilient actions for increased adaptive capacities. (<i>Special note: Material produced will be disability inclusive</i>)	NCSD	Ministry of Environment, and Provincial Administration (both provinces)

UN-Habitat is the multilateral implementing entity and will provide project management support and oversight the project implementation. It will also be part of the team that implements the Project, providing technical knowledge and expertise based on its experience implementing other climate change projects in Cambodia and the Asia-Pacific region. The agency will further oversee compliance with its Environmental and Social Safeguard System and the Environmental and Social Safeguard Policy of the Adaptation Fund.

Governance Arrangement / Organogram

Project Management Committee (PMC)

At the national level, the project will be supported by a Project Management Committee (PMC). The PMC will be formed to oversee and keep abreast of project progress and facilitate project implementation, including overseeing and cooperating with the Project Executing Unit (PEU), the technical advisors, the local committees, and the project oversight group.

The PMC will be chaired by the NCSD/MoE, and vice-chaired by the Governors of Kampot and Koh Kong Provinces or their appointed deputies. The PEU will provide the secretariat function of the PMC. A representative of the UN-Habitat Regional Office for Asia and the Pacific will also be a member of the PMC.

Other members of the PMC will be representatives of the following; the NCSD/MoE, the Department of Climate Change, MoE; working-level representatives of the Provincial Governments of Kampot and Koh Kong Provinces; the Ministry of Water Resources and Meteorology; the Fisheries Administration; the Ministry of Women's Affairs; and, Ministry of Land Management, Urban Planning, and Construction.

The Project Management Committee will:

- support regarding environmental administration issues relating to the construction all the infrastructure in the target areas
- assist in completing Environmental Impact Assessments where applicable
- support to the organisation of meetings and workshops relating to the relevant activities under all outcomes of the project
- approve annual work plans and review key project periodical reports.
- review and approve the contractual agreements with a particular emphasis on environmental and social safeguards, budgets, and payment schedules
- review any deviations and grievances and consider amendments to work plans and contractual arrangements.

The PMC will meet at least twice yearly throughout the project implementation and whenever needed to fulfill the above functions. The PMC will also convene *ad-hoc* meetings to address serious Environmental and Social safeguard risks and grievances if these arise. At least 30 percent of committee members will be women. This is designed to ensure female representation at the decision-making heart of the project to ensure integration of gender consideration.

Project Oversight

Project oversight will be incorporated into the core function of the PMC (rather than being a separate oversight body) and will be led by the responsible officer in UN-Habitat's Regional Office for Asia and the Pacific (ROAP) under the guidance of the Regional Director and supported by Project Management Officers (financial management and administration) and UN-Habitat's Headquarters (HQ) Monitoring and Evaluation Unit, the Programme Division including the Climate Change Planning Unit, and the External Relations Division, in particular, the Advocacy, Outreach, and Communications will ensure project management compliance following UN-Habitat and AF standards and requirements.

Project Executing Unit (PEU) and Project Team

The national-level **Project Executing Unit (PEU)** will be headed by the Director of the Department of Climate Change, Ministry of Environment.

Within the PEU will be a **Project Team**, headed by the Project Manager (The Director of the DCC), to oversee the day-to-day implementation of the Project and will be responsible for managing project activities and ensuring compliance with all commitments contained in this project document, such as the 15 Environmental and Social Safeguards Principles of the Adaptation Fund, the Environmental and Social Management Plan (see Part III. Section E for the results framework, Annex C for the ESMP), and the Project Gender Action Plan, as well as providing day-to-day support to the executing entity. The PEU will include at least 30 percent of women as the members in order to ensure reflection of gender considerations throughout the implementation and monitoring stages and to receive and respond to gender-related grievances on the ground. The PEU includes a gender focal person to ensure reflection of gender considerations throughout the implementation and monitoring stages and to receive and respond to gender-related grievances on the ground.

The PEU will ensure the following:

- efficient and effective implementation of project activities;
- efficient coordination with project partners;
- efficient coordination with the UN-Habitat Cambodia office for necessary supervision and support to the project implementation
- identification of bottlenecks and potential impediments to project execution and raise with the Project Management Committee to ensure decisions and action are taken
- identify any issues or delays relating to project execution at the earliest possible stage and raise them with the Project Management Committee and UN-Habitat Country Office as early as possible so that any potential delays can be mitigated and, if appropriate, communicated to the focal person from the Adaptation Fund.
- identification of synergies with potential project partners to add value to the project and facilitate cooperation as necessary
- efficient coordination with beneficiary communities
- take the lead in monitoring through periodic visits to the intervention sites and generating learning from the project
- ensuring that cross-cutting issues, such as gender equality and youth responsiveness, ensure human rights throughout the implementation of the project.
- efficient coordination with the key stakeholders for successful project implementation; and
- any other activities that facilitate project execution, as necessary.

The management, design, and operational setup of administration and logistics for all of the components will be done via the PEU. The PEU will develop a Monitoring and Evaluation Plan with technical assistance of UN-Habitat during the project's inception phase, which will be distributed to targeted stakeholders, and reported to the Project Management Committee.

The PEU will work consistently with the Project Management Committee and other Executing Entities to ensure the project will be implemented in a timely manner. With the project allocating approximately 2/3rd of the project funds on the implementation of concrete adaptation measures, the timing of planning/design/contracting and implementation will have been coordinated carefully to coincide with the construction season. Any delays would significantly hinder the smooth implementation of the physical measures.

The PEU will also identify any issues or delays relating to project execution at the earliest possible stage and raise them with the Project Management Committee/UN-Habitat Country Office as early as possible, so that any potential delays can be mitigated and, if appropriate, communicated to the focal person from the Adaptation Fund.

Furthermore, the PEU will be responsible for ensuring that cross cutting issues such as gender equality and youth responsiveness, ensuring human rights throughout the implementation of the project. The assurance of gender, youth and human rights will be the role of the PEU and particularly the Project Manager. The Project Manager will also be responsible for ensuring that the project is executed in accordance with the Adaptation Fund Environmental and Social Policy.

Project Sub-Working Group at Provincial Level

There will then be a Project Sub-Working Group (Provincial Level) in each province located in Provincial Hall. The Project Sub-Working Group will be chaired by the Deputy Governor of Kampot and Koh Kong Provinces. This unit will include a provincial-level coordinator overseeing the day-to-day running of each activity underway in each respective province.

The Project Sub-Working Group will consist of representatives of the following offices at the subnational level:

- Provincial Hall
- Provincial Department of Environment
- Provincial Department of Water Resources and Meteorology
- Provincial Department of Land Management, Urban Planning and Construction
- Provincial Department of Public Works and Transport
- Provincial Fisheries Administration
- Provincial Department of Women's Affairs and
- Each of the municipalities and districts in the project.
- Selected NGOs

The provincial execution unit will target 30 percent female representation and include representation from the Provincial Department of Women's Affairs. They will be a champion to mainstream gender-responsive decision-making and actions based on the local needs.

The Provincial Halls will not have a formal executing or reporting role in the project, but will support it in the following ways:

- supporting the establishment of and co-chairing project sub-working groups in the target districts
- provide support to overcome administrative issues relating to the construction infrastructure in the target areas
- provide assistance to the completion of various administrative formalities relating to construction design, permission, approval and other related administrative matters
- will conduct field monitoring of the infrastructure construction activities regularly and provide feedback to the Project Team
- will contribute in the plantation of trees particularly around the reservoirs and canals to protect the embankment
- will prepare the management plan together with the district, commune and community representatives to create a viable approach to run, manage and maintain the completed infrastructure (for example creating user committee and implementing user fees managed by the local communities/beneficiaries)
- provide support to the organisation of workshops, meetings and related activities at the sub-national level
- provide staff time to the Project Management Committee and to facilitate project implementation as necessary.
- upon completion of the infrastructure construction activities, they will be handed over to the Provincial Hall (Governor) to ensure proper management, maintenance and functioning of the projects.

In addition to the above, the Provincial, District and Commune level officials and their staff will play an important role in mobilising the communities targeted by the project.

The main recipients of the capacity building trainings on vulnerability/risk assessments (Output 3.1), on mainstreaming climate change adaptation (Output 3.2), and on managing solid waste and wastewater to strengthening of waste collection (Output 3.3) will be the Provincial, District and Commune level authorities identified as partners for the project areas. NGOs will be identified to carry out some activities under Components 2 and 3.

Communities (Local Commune Committee)

At the community level, representatives of each elected commune council will form a Local Commune Committee with district officials and community representatives. The Local Commune Committee will guide the investment activities in the target areas and take a role in oversight, especially regarding emerging environmental and social risks. As members of the Local Commune Committee are the closest to the beneficiaries and the field sites, they will be best placed to review any breaches of the project's environmental and social safeguard system and to flag any risks. Therefore, each Local Commune Committee will target 30 percent female representation and be responsible for addressing voices of women in the communities.

The LCC will meet every month during the construction season:

- to review status of all planning aspects of the physical works in the area
- to review implementation status and progress
- to review any breaches of the project's environmental and social safeguard system and to flag any risks
- to assist in solving issues at community level and at official level
- to provide suggestions on managing the project

The main recipients of the trainings to be conducted as part of the People's Process and on resilient housing/latrines construction technique will be the Provincial, District and Commune level authorities identified as partners for the project areas. Through community consultation consensus will be sought and gained across the entire community, by the community, before moving ahead to the next stage of project execution. Furthermore the selection of the representatives that form these groups are done by the community through a vote using the principle of participation, hence the communities will take extra care in the selection of individuals they believe would represent their best interests as a whole and who would not engage in activities that are detrimental to the financial/economic, physical/environmental and human/social dimensions of the project and would be questioned by the communities themselves in such events, thus minimizing risk. This approach fosters trust, strengthens the social fabric and builds resilient communities. Through a consultative process agreement will be reached on identifying the beneficiaries for the resilient housing and toilets.

The communities will be key partners in the execution of activities relating resilient housing and toilets. The project will consider signing Community Implementation Agreement with each group to implement the resilient housing and toilet component. The Project Team will hire social mobilizers and field level technical staff to provide support to the community groups to successfully implement this component. Therefore, UN-Habitat will mainstream the participatory approach (People's Process) throughout the project life cycle.

Sub-National Mechanism for Disaster Management

Involve Community Disaster Management Committees, Commune Emergency Coordination Mechanism, and District Committee for Disaster Management to prepare an adaptive action plan with short-term actions and longer-term options (pathways) when defined tipping points are reached. The plan will include enabling actions and identifying adaptation pathways, showing the multiple sequences of additional actions over time when defined tipping points (thresholds) are reached. (See Output 3.5)

Legal and Financial Arrangements

UN-Habitat and the National Council for Sustainable Development (NCSA) will sign a joint Memorandum of Understanding (MoU) as a legal commitment to implement the project. This Project Document will be attached to ensure that all partners are fully committed to the project. UN-Habitat will enter into an Agreement of Cooperation with NCSA/MoE to implement specific project activities. This will be the legal basis for transferring funds to be invested in the project. The Project Management Committee will review this agreement and detail the activities to be implemented by the project, the timeframe, and the deliverables required. The PEU will develop an operational manual that clearly outlines the roles and responsibilities of the critical project stakeholders and contains all the tools, forms, and templates required to administer the project. The deputy chair of the NCSA will authorize the payments against the contractual agreements upon recommendations from the project manager. The Director, Climate Change Department and the UN-Habitat Program Manager for Cambodia will provide advisory support.

Launch of the Project (Inception Workshop)

UN-Habitat will hold the inception workshop within three months of approval of the project by the Adaptation Fund and clearance through UN-Habitat systems inviting all key stakeholders, academia, civil society, donors, and community representatives. The Project concept, approach, and proposed outputs will be presented and solicit feedback and inputs on a wide scale in a participatory manner. Comments and feedback will be sought, captured, and incorporated for designing the most appropriate implementation work plan for the project.

The Inception Workshop will address several key issues, including:

- assist all participants in fully understanding the project objectives and activities and take ownership of the project
- discuss the organizational structure of the project
- discuss the roles and responsibilities of all agencies involved in the project, including decision-making, reporting, and lines of communication
- discuss conflict resolution mechanisms.
- review and agree on the indicators, targets, and their means of verification, and recheck assumptions and risks.
- prepare and framework finalize the annual work plan for year one.
- discuss project monitoring, evaluation, and reporting requirements
- discuss financial procedures.

The inception workshop report will be presented to the Project Management Committee.

Governance Arrangements

The project organogram, which reflects the governance and management arrangements described above, is presented below in Figure 17.

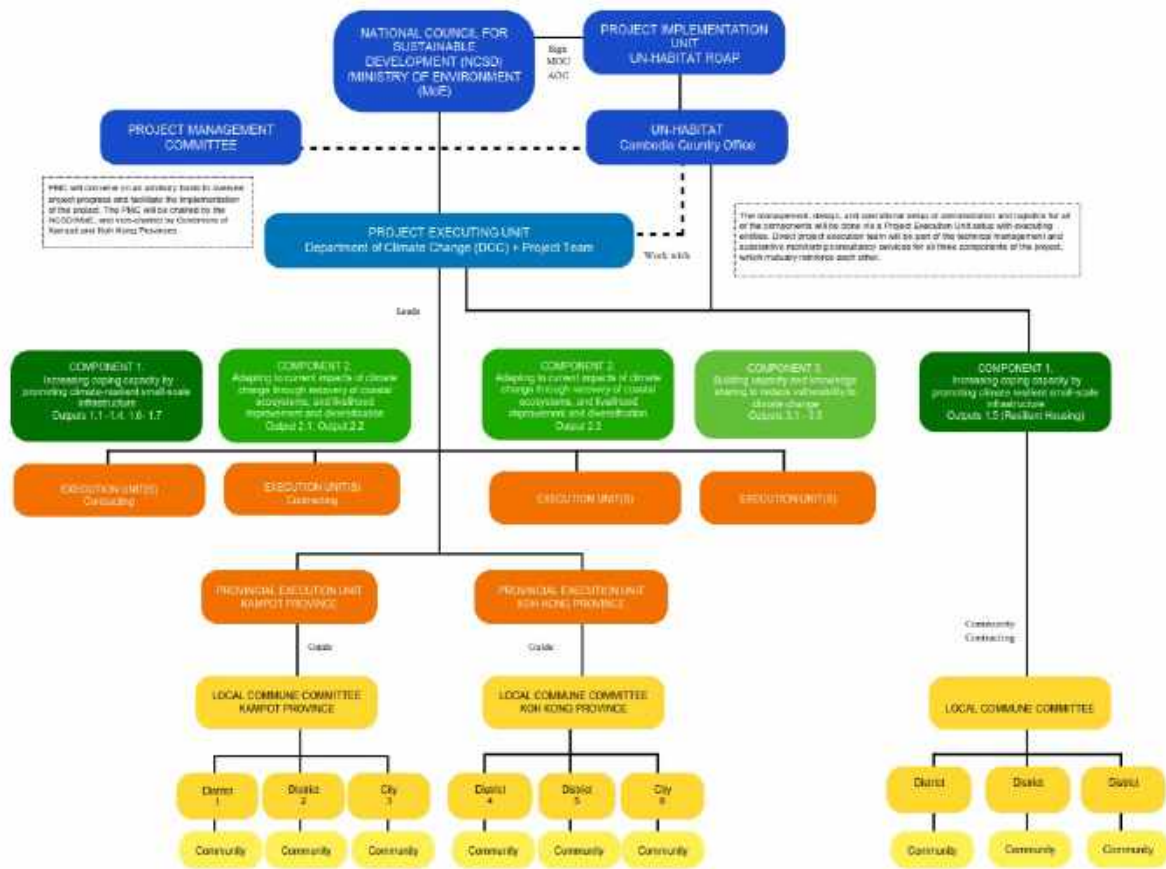


Figure 17 Project Organogram

B. Describe the measures for financial and project/programme risk management

Under the guidance of the UN-Habitat Regional Office and the Country Office in Cambodia, the Project Manager will monitor throughout the project status of financial and project management risks, including those measures required to avoid, minimize or mitigate these risks, throughout the project. Table 16 below gives an overview of overall project management and financial risks, and an assessment of the significance of the pertaining risks in terms of probability and impact. It outlines measures embedded in the project design to manage and/or mitigate these risks. Outcomes will need to be reconfirmed during the inception workshop. If and when changes in activities or additional activities are required, a 'screening safeguarding procedure' will be used, including consultation with beneficiaries and vulnerable groups. The Project Manager will have direct management, oversight / final compliance responsibility of the Environment and Social Management Plan (ESMP). The Project Management Committee will approve and change or additional activities. The related Ministry/Department will be requested to provide inputs in the assessment of potential risks if required.

Table 16 Overview of financial and management risks and measures to mitigate these

Nr	Category and risk	Rating of probability and impact (1: Low 5: High)	Management/ Mitigation Measure
1	Environmental/ social: Current climate and seasonal variability and/or hazard events result in infrastructure construction delays or undermine confidence in adaptation measures by local communities	Impact: 3 Prob: 2	<ul style="list-style-type: none"> • Current climatic variability has been taken into account in the planning and design of the project activities and especially into Component 1: The detailed project sheets (click here) identify where physical works need to take place during the dry season, for example • All selected investments under Component 1 have been extensively consulted with communities, local elected officials, government staff at the sub-national and national level and other organizations working in the target area.
2	Institutional: Loss of government support (at all levels) for the project (activities and outputs) may result in lack of prioritization of AF project activities.	Impact: 2 Prob: 3	<ul style="list-style-type: none"> • Establishment of a Project Management Committee (PMC) and the overall participatory and inclusive project design will improve national, municipal, and beneficiary level ownership throughout, thus enhancing government support for project implementation. • UN-Habitat will enter into legal agreements (MoUs and AOCs) with the NCSD to ensure the executing partners deliver project activities and outputs. • Government staff working on climate change, environment, disaster management, land use, and housing will be strongly integrated into the project's structure (see Part III, Section A)
3	Institutional: Capacity constraints of local institutions may limit the effective implementation of interventions	Impact: 3 Prob: 4	<ul style="list-style-type: none"> • The project has a strong capacity building and training component designed to promote effectiveness and sustainability at the community, district, and provincial government levels as part of Components 3
4	Institutional/social Lack of commitment/buy-in from local communities may result in delay at intervention sites.	Impact: 2 Prob: 1	<ul style="list-style-type: none"> • Community stakeholders have been consulted during the full project development phase to ensure their buy-in into the AF project. • A bottom-up approach integrating the community into the AF project's implementation phases – including community contracting - will be followed. • Where possible, the community will have an active role through the 'People's Process' that ensures ownership of the project particularly, through community participation in project implementation and monitoring
5	Institutional/social: Disagreement amongst stakeholders with regards to adaptation measures (infrastructure) and site selection.	Impact: 3 Prob: 1	<ul style="list-style-type: none"> • Adaptation measures and locations have been selected using extensive and detailed criteria and through several rounds of in-depth consultation • There will be a participatory approach to the construction of the infrastructure to be built under Component 1 through the People's Process (Annex E)
6	Institutional: Communities may not	Impact: 3 Prob: 1	<ul style="list-style-type: none"> • The interventions will be institutionalized within the ministries, local government, and communities to ensure sustainable delivery of (post-) project implementation, including formal agreements for infrastructure maintenance (at

	adopt activities during or after the AF project, including infrastructure maintenance		<p>the national level) and operation and management structures at the sub-national level. Given the commitment of the national government, the policy alignment of this project, and the direct reporting mechanisms of local government to the national government, it can be assumed that such agreements will be honored.</p> <ul style="list-style-type: none"> • Officials of sub-national (provincial, district/city, and commune/sangkat) level will support the participating communities beyond the project implementation, ensuring community-level governance support and maintenance support. • Capacity building and training of communities will be undertaken to improve their awareness and understanding of the benefits of the activities, including infrastructure maintenance (Component 3). • Communities will be involved in project implementation/decision-making throughout the project. Communities will have a stake in the construction, operation, and maintenance of the infrastructure (Capacity building under Component 3, construction under Component 1) • To ensure ownership and sustainability, community members must bring in 10 percent of the value of the houses (cash or in-kind contributions).
7	Financial: Complexity of financial management and procurement. Certain administrative processes could delay the project execution or could lack integrity Inflation and instability of the national currency leading to budget issues and increased prices for infrastructure delivery	Impact: 2 Prob: 2	<ul style="list-style-type: none"> • Financial management arrangements have been defined during project preparation. • UN-Habitat's control framework, under the financial rules and regulations of the UN secretariat, will ensure documentation of clearly defined roles and responsibilities for management, internal auditors, the governing body, and other personnel and demonstrates proof of payment/disbursement. • Procurement will be done by the NCSD as agreed in the Agreement of Cooperation. The project manager and the Project Executing Team (PET) have a certifying role (for key procurements/ expenditures). All expenditures/costs/payments will be paid in US\$. In Cambodia, US\$ is used to procure goods and services (including salaries). Hence, there is no risk of exchange rate fluctuation. • All budgets will be in US\$ • A clause will be included in contracts with the private sector that they can't increase the costs during the project duration once the contract has been signed.
8	Institutional Delays in project implementation, and particularly in the development of infrastructure interventions	Impact: 2 Prob: 2	<ul style="list-style-type: none"> • The ownership by the Government has been high during the project preparation phase, which will reduce this risk. • Through partnerships with key government agencies, the infrastructure and community resilience project planning will be started early on – in tandem with the community action planning. Institutional arrangements will be put in place well before the finalization of community action plans. • Lessons learned from other relevant projects (see Part II, Section F), done by MoE and NCDD are incorporated in the project design.
9	Institutional: A lack of coordination between and within national government partners.	Impact: 1 Prob: 1	<ul style="list-style-type: none"> • The Project Management Committee will be established to ensure coordination between and within the national government partners. Should UN-Habitat observe coordination problems, the agency will try to resolve issues directly with concerned parties and or the Project Management Committee.

C. Describe the measures for environmental and social risk management, in line with the environmental and social policy and gender policy of the Adaptation Fund

The proposed project seeks to fully align with the Adaptation Fund's Environmental and Social Policy (ESP). For that purpose, environmental and social risks and adverse impacts of the project and related activities must be identified and addressed (so that the project does not unnecessarily harm the environment, public health, or vulnerable communities). As shown in Sections E and K of Part II, systematic screening and assessment have been done based on broad consultation with national and local government stakeholders, various other concerned stakeholders, and the target communities. The project design has benefitted from this process.

During the project preparation phase, all project activities were screened against the 15 environmental and social risks (ESP) areas. A gender-specific approach has been developed to comply with the Adaptation Fund's principles-based Gender Policy (GP) and its accompanying Gender Action Plan (GAP) and ESP principle 5. There are no specific budget requirements for project compliance with the ESP and GP. The proposed interventions will not require residents to resettle elsewhere during construction. The grievance mechanism will be used to express concerns regarding possible risks and impacts.

To ensure that remaining risks are well managed, the project management and governance (Part III. Section A), Monitoring, and Evaluation (Part III. Section D) fully take the management of environmental and social risks into account. In addition, an Environmental and Social Management Plan (ESMP) has been developed to ensure full compliance with the Adaptation Fund's Environmental (Annex C) and Social and Gender Policies (Annex D). The ESMP for this project, detailed in Annex C, identifies measures and actions that reduce potentially adverse environmental and social impacts to acceptable levels. The plan includes compensatory measures, if applicable. Specifically, the ESMP

- Identifies and summarizes all anticipated adverse environmental and social risks and impacts in line with the Adaptation Fund's ESP principles;
- Describes mitigation measures, both from the perspective of mitigating risks at each activity and from the perspective of upholding all ESP principles;
- Describes a process that supports the screening and assessment of all project activities and the conditions under which screening and mitigation action is required;
- Clearly assigns responsibilities for screening, assessment, mitigation actions, approval, and monitoring;
- Takes into account and is consistent with other technical standards required for the project, particularly those related to national law.

It should also be noted that each investment that forms a part of Component 1 has been designed to provide environmental and social benefits based on the Environmental and Social Policy of the Adaptation Fund. A summary of the benefits and how ESP principles have been incorporated into the design of the investments is included in each investment sheet, which can be found here.

For the activities under the three components of the project, the ESP will be upheld by ensuring that:

- All MoUs and Agreements of Cooperation with the Executing Entity will include detailed references to the ESMP, particularly the 15 ESP Principles.
- The ToR of Committees and Advisory Groups, project personnel, and focal points will include detailed references to the ESMP, particularly the 15 ESP Principles.
- The Executing Entity and other relevant government agencies will receive training/capacity development to understand the 15 ESP Principles, the ESMP including potential environmental and social risks and mitigation measures, and particularly their responsibilities. This will include members of the Project Management Committee, the Local Commune Committees, and the Communities.
- A Monitoring and Evaluation Framework will be developed by the project implementing unit (PIU) and presented for approval to the Project Management Committee (PMC).
- All project monitoring will be done based on the 15 ESP principles, and ensure the ESMP Strategy mainstreamed in the project design, approach, and activities. In addition to upholding the ESP of the Adaptation Fund and familiarizing all project stakeholders with the 15 ESP principles, this will also ensure that all stakeholders fully take ownership of the environmental and social safeguards procedures of the project and that any activity that may have been altered or not yet assessed in detail is captured.
- A grievance mechanism is also part of the plan. This will allow any affected stakeholder to anonymously raise concerns to the community leaders on the Local Commune Committee, the project team, or the PMC.

A confidential telephone number is the primary means for affected beneficiaries and/or community members to raise grievances¹⁵¹. In addition to the grievance mechanism, local staff will be trained to have an 'open-door' policy with communities so that communities can discuss any aspect of the project at any time. This less formal mechanism will

¹⁵¹ Note that an address was considered. However, Cambodia does not have a reliably functional postal service and literacy rates are far from 100% across the beneficiary communities. Given that telephone penetration is significantly higher, and a far more frequently used and reliable means of communication, it was decided that this is the best confidential and private means to address grievances.

also enable project staff to listen to communities' concerns or ideas and promote them in implementing the project. More formal consultations and workshops held at local and national levels throughout the project implementation will also serve as a means for stakeholders to raise concerns or suggestions with the project's implementation.

D. Describe the monitoring and evaluation arrangements and provide a Budgeted M&E Plan, in compliance with the ESP and the Gender Policy of the Adaptation Fund

The Monitoring and Evaluation (M&E) of progress in achieving project results will be based on targets and indicators established in the Project Results Framework (see below) and monitoring of the status of identified environmental and social risks and measures required to avoid, minimize, mitigate environmental and social risks, and financial and project management risks and mitigation measures. In this process, the project will comply with formal guidelines, protocols, and toolkits issued by the AF, UN-Habitat, and the Royal Government of Cambodia.

Monitoring and Evaluation Framework

Table 17 below defines a more detailed Monitoring and Evaluation Framework in which the Monitoring and Evaluation (M&E) of progress in achieving project results will be based on targets and indicators established in the Project Results Framework (see also below). Besides that, the status of identified environmental and social risks, UN-Habitat's Environmental and Social Safeguard System, and the ESMP (Annex C), including those measures required to avoid, minimize, or mitigate environmental and social risks, will be monitored throughout the project (at the activity level and through annual project performance, mid-term and terminal reports). The same applies to financial and project management risks and mitigation measures.

UN-Habitat will ensure the timeliness and quality of project implementation. The Project Management Committee will provide oversight and general guidance of the project. UN-Habitat will ensure that the project team and the critical national executing partners are fully briefed on the M&E requirements. Please see the detailed budget for the M&E (Table 18) and a breakdown of how implementing entity fees will be utilized in supervising the M&E function (Part III, Section G). Please see the project proposal results framework for related data, targets, and indicators (Part III, Section E).

M&E Activities

Participatory monitoring mechanisms (involving different levels of government and communes) will be put in place to collect and record data to support the M&E of indicators. The project formulation has gathered demographic data (some in this public domain) and generated maps through Google Maps and Google Earth, which will be handed over to the Project Management Committee for use in the project, including in monitoring. The M&E activities will be implemented as proposed in the table below. UN-Habitat will ensure the timeliness and quality of project implementation. The Project Management Committee will provide oversight and general guidance of the project.

The Project Manager will develop an M&E Plan (Table 19), which will be disseminated to all stakeholders during the inception workshop. The emphasis of the M&E plan will be on (participatory) outcome/result monitoring, project risks (financial and project management risks and environmental and social safeguard risks), and learning and sustainability of the project. Periodic monitoring will be conducted through visits to the intervention sites.

During the project implementation stage, Annual ESP screening and risk assessment will be carried out by the project team (external consultant) for which a template will be prepared before the inception workshop. The Annual Project Performance Review will include environmental and social risks (i.e., the status of implementation of ESMP, including those measures required to avoid, minimize, or mitigate environmental and social risks). The reports shall also include, if necessary, a description of any corrective actions that are deemed necessary.

UN-Habitat will ensure that all executing partners are fully briefed on the M&E requirements to ensure that baseline and progress data is fully collected and that a connection between the Knowledge Management component and M&E is established. The Agreement of Cooperation will also reflect these.

Given the erratic and intensified climate impacts observed over the last few years and the lack of data, close monitoring of climatic events will be required, particularly where the project has rehabilitated the embankments. The existing caretaker mechanism at the site of Output 1.1 will be strengthened and replicated in the location of Output 1.4 to monitor changes in parameters in drivers (like sea level rise, peak river discharge, and water levels in the reservoirs) against the threshold parameters (tipping points). An early warning system will also be installed and linked to response mechanisms of Community Disaster Management Committees including evacuation protocols. It is confirmed that the operational costs will be covered by the district administration.

Table 17 Monitoring and Evaluation (M & E) Framework

Expected Result	Indicators	Baseline	Targets	Interim Targets	Data Sources	Frequency	Reporting	Responsibility
Project Objective: to support climate resilient and adaptive development and increase capacity for climate variability/change adaptation of target communities living in Kampot and Koh Kong Provinces.	Number of direct and indirect beneficiaries that are less vulnerable to climate variability/ change (AF Core Indicator)	0	451,776 (Women: 225,314)	225,000 (Women: 112,207)	<ul style="list-style-type: none"> - Sex disaggregated attendance sheet - Meeting minutes - Evaluation reports 	Annual basis	<ul style="list-style-type: none"> - Inception report - Periodic progress reports - Project evaluation reports 	<ul style="list-style-type: none"> - Project Manager - PEU - PMC - UN-Habitat ROAP
	Number of people living in partner cities and human settlements that are less vulnerable to climate change impacts (UN-Habitat DOC3 Domain level indicator)							
	Percentage of women that are less vulnerable to climate change-related issues	0	50%	50%				
Component 1. Increasing coping capacity by promoting climate resilient small-scale infrastructure								
Outcome 1: Increased adaptive capacity of built infrastructure and communities to withstand extreme weather and climate variability and change.	Number of people that benefit from climate resilient small-scale infrastructure, access to rehabilitated natural assets to withstand extreme weather and climate variability/ change	0	274,351 (Women: 135,955)	15,000 (Women: 7,432)	<ul style="list-style-type: none"> - Related technical reports - Site visits 	Annual basis	<ul style="list-style-type: none"> - Project periodical reports - Project evaluation reports 	<ul style="list-style-type: none"> - Project Manager - PEU - PMC
	Percentage of women participated in the required review and risk assessment activities and workshops	0	50%	50%				
Output 1.1. Rehabilitate and improve embankment in Ou Chreaneang Reservoir (Kampong Trach Khang Lech commune, Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/flooding/saltwater intrusion and controlling vector-borne and water-borne diseases.	Dimension of Ou Chreaneang Reservoir rehabilitated	0	23 ha	10 ha	<ul style="list-style-type: none"> - Related technical reports - Site visits 	Quarterly basis	<ul style="list-style-type: none"> - Technical study report - Field mission reports - Project periodical reports 	<ul style="list-style-type: none"> - Project Manager - PEU
	Early warning system installed	0	1	1				
	Percentage of women that are less vulnerable to climate change-related issues	0	50%	50%				

Output 1.2. Establish/renovate five medium/small-scale wastewater treatment plants (with two in Kampot and three in Koh Kong Provinces).	Number of wastewater treatment plants established/renovated	0	5	2	- Related technical reports - Site visits	Quarterly basis	- Inspection report - Field mission reports - Project periodical reports	- Project Manager - PEU
Output 1.3. Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste from discharging to the sea in Khemarak Phoumin City.	Number of drainage system/canals/ waterways cleared and renovated	0	3	1	- Related technical reports - Site visits	Quarterly basis	- Inspection report - Field mission reports - Project periodical reports	- Project Manager - PEU
	Number of filter nets installed to capture solid waste	0	9	5				
Output 1.4. Renovate waterbodies (irrigation tanks and embankments) in Lompu Reservoir and rehabilitate Kampong Trach canal in Kampong Trach District.	Dimension of the reservoir and canal renovated	0	350 ha	50 %	- Related technical reports - Site visits	Quarterly basis	- Inspection report - Field mission reports - Project periodical reports	- Project Manager - PEU - Executing Entities
	Early warning system installed	0	1	1				
Output 1.5. Resilient housing and toilet designs developed, and demonstration housing units constructed in three vulnerable communities in Koh Kong Province.	Number of populations benefitted from on-site upgrading	0	12,000 (Women: 6,000)	6,000 (Women: 3000)	- Site visits - Interviews with target population	Quarterly basis	- Field mission reports - Project periodical reports - Survey report	- Project Manager - PEU - UN-Habitat
	Number of resilient housings with toilets that are appropriate for women, elderly and persons with disability	0	60	30				
	Percentage of female labours participated in the construction works	0	50%	50%				
	Number of a resilient housing guideline developed and shared	0	1					
Output 1.6. Build five sluice gates and embankments to	Number of sluice gates treatment plants established/renovated	0	5	2	- Related technical reports - Site visits	Quarterly basis	- Field mission reports	- Project Manager - PEU

prevent saltwater intrusion in Krong Khemara Phoumin.								- Project periodical reports	
Output 1.7. Establish Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Mondol Seima District.	Number of early warning system (EWS) installed	0	1	0	- Related technical reports	Quarterly basis	- Project periodical reports	- Project Manager - PEU	
	Number of beneficiaries covered by the installed EWS	0	15,041 (Women: 7,520)	0					
Component 2. Adapting to current impacts of climate change through recovery of coastal ecosystems, and livelihood improvement and diversification									
Outcome 2: Improved conditions of coastal ecosystems and income diversification of vulnerable communities have enhanced the resilient capacity of these communities.	Percentage reduction of the impacts of coastal flooding through recovery of coastal ecosystems.	0	100%	50%	- Related technical reports	Annual basis	- Project periodical reports - Project evaluation reports	- Project Manager - PEU - PMC	
Output 2.1. Restoration of destroyed mangrove ecosystems to improve mangrove ecosystem resilience in Mondol Seima District.	Area of mangrove planted in the damaged area	0	150 ha	70 ha	- Activity reports - Site visits	Quarterly basis	- Mangrove Plantation Management Plan - Project periodical reports - Monitoring reports	- Project Manager - PEU	
	Percentage of women participated in the mangrove plantation activities	0	50%	50%					
	Percentage of women participated in the required review and risk assessment activities and workshops	0	50%	50%					
Output 2.2. Develop Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems, including prevention of waste/pollution in Mondol Seima District.	Number of EbA management plans developed	0	1	0	- EbA management plan	Quarterly basis	- EbA management plan - Project periodical reports	- Project Manager - PEU	
	Number of sessions for awareness raising and education on EbA	0	6	3					
	Percentage of women participated in the awareness raising sessions	0	50%	50%					
Output 2.3. Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat	Number of participants in the capacity building trainings/ vocational trainings promoting alternate livelihood options	0	162,374 (Women: 81,839)	80,000 (Women: 40,320)	- Activity reports - Participants list	Quarterly basis	- Activity reports - Project periodical reports	- Project Manager - PEU	

making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to increase the income of the vulnerable households (including women and youth) with initiation of these livelihoods.	Percentage of women and youth promoted alternative livelihood options	0	75%	75%			- Monitoring reports	
	Number of alternate income sources for the vulnerable households generated under climate change scenario (AF indicator 6.2.1)	0	+1	+1				
Component 3. Building capacity and knowledge sharing to reduce vulnerability to climate change								
Outcome 3: Improved effectiveness of climate adaptation planning/ implementation to increase coping capacity to address climate variability/risk reduction, and to sustain/scale-up actions for transformative adaptation interventions at the local level.	Percentage increase in capacity to respond to climate variation/ changes.	0	100%	40%	- Sex disaggregated attendance sheet - Survey reports	Annual basis	- Periodic progress reports	- Project Manager - PEU - PMC - UN-Habitat
	Percentage of women aware of predicted adverse impacts of climate change, and of appropriate responses	0	50%	50%				
Output 3.1. Conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, including community-based in community/sub-national/ district development plans and promote climate change/disaster resilience in local development plans.	Number of risk and vulnerability assessments in line with AF indicator 1.1	0	23	12	- Sex disaggregated attendance sheet - Assessment reports	Quarterly basis	- Periodic progress reports	- Project Manager - PEU - UN-Habitat
	Percentage of women participating in the risk and vulnerability assessments	0	50%	50%				
Output 3.2. Capacity building of provincial and sub-national level Government entities and communities on mainstreaming climate change adaptation.	Number of community investment plan introduced or adjusted to address climate change adaptation	0	23	10	- Updated climate community investment plans - Participants list	Quarterly basis	- Periodic progress reports - Updated climate community investment plans	- Project Manager - PEU - UN-Habitat
	Percentage of women participating in capacity building trainings on mainstreaming climate change adaptation	0	50%	50%				

Output 3.3. Capacity building of sub-national level Government officials/ communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems. [Linked to Outputs 1.2 and 1.3]	Number of awareness campaigns and trainings on solid waste and wastewater management	0	23	12	- Sex disaggregated attendance sheet - Reports of related survey and assessments	Quarterly basis	- Periodic progress reports - Assessment reports	- Project Manager - PEU - UN-Habitat
	Number of solid waste and wastewater pilot activities implemented at local level (at least one per city/district)	0	4	2				
	Percentage of women participating in capacity building trainings and pilot activities on solid waste management	0	50%	50%				
Output 3.4. Training communities in target locations on resilient housing/latrines construction technique. [Linked to Output 1.5]	Number of trained unskilled or semi-skilled labours on resilient housing/ latrine construction technique based on a resilient housing guideline	0	150 (Women: 45)	80 (Women: 24)	- Sex disaggregated attendance sheet - Training reports	Quarterly basis	- Periodic progress reports	- Project Manager - PEU - UN-Habitat
	Number of women labours in the training sessions	0	30%	30%				
Output 3.5. Organizing communities and local authority to manage, monitor and maintain infrastructure investments to ensure sustainability and establish an adaptative pathway plan for flood response [Linked to Outputs 1.1, 1.3, 1.4, and 1.6]	Number of responsible community groups organized to manage, monitor, and maintain infrastructure	0	4	2	- Sex disaggregated attendance sheet	Quarterly basis	- Project periodical reports - List of community groups	- Project Manager - PEU - UN-Habitat
	Percentage of women in the community groups	0	50%	50%				
	Action plan prepared (related to Output 1.1 and 1.2)	0	2	1				
Output 3.6. Share knowledge and lessons through documentation of climate-resilient actions for increased adaptive capacities. <i>(Special note: Material produced will be disability inclusive)</i>	Number of stories, information, cases, observations posted in media including project webpages and social media	0	10	5	- Qualitative content analysis	Quarterly basis	- Project periodical reports	- Project Manager - PEU - UN-Habitat
	Percentage of women engagement participating on knowledge sharing and capacity building program implemented at the sub-national and community level	0	50%	50%				

Table 18 M & E Budget

Type of M&E Activity	Total	Year 1	Year 2	Year 3	Year 4
Monitoring Progress of Outputs	105,000	20,000	30,000	30,000	25,000
Mid-term & Final Evaluation (inc HQ costs)	79,112	-	10,000	-	69,112
Project management committee meetings	32,000	8,000	8,000	8,000	8,000
Total	216,112	28,000	48,000	38,000	102,112

In addition to the above, budget (\$88,248) is allocated for UN-Habitat Regional Office to supervise project implementation monitoring of implementation, AF and UN-Habitat policies compliance, and IE staff supervision and reporting. UN-Habitat Head Quarters will provide overall project supervision including compliance to UN-Habitat policies and standards (gender, human rights, climate change, etc.) for which 7 percent of the total project cost is allocated. \$10,000 is allocated for project supervision mission from UN-Habitat Regional Office. UN-Habitat Evaluation Unit will provide support for evaluation during and after the project implementation (\$40,000).

Table 19 Monitoring and Evaluation (M & E) Plan

	Type of M&E Activities	Responsible Parties	Time Frame	Reporting	Budget
1a	Community consultations / workshops / training	National Project Manager	Within one week after each event	Documentation	40,000
1b	Visits to field sites [Table 23 : 2.3e; 3.5c (1)]	Project Management Committee UN-Habitat	Annually	Field report	40,000 25,000
2	2. Mid-Term and Final Evaluation [Table 23 : 4.9, 6]	National Project Manager UN-Habitat ROAP Project Management Committee External Consultants	Final: At least three months before the end of project implementation Report: before the end of the project	Final Evaluation Report	39,112 40,000 TOTAL: 79,112
3	Periodic status/ progress reports [Table 23: 3.6f]	National Project Manager	Quarterly	Quarterly Report	32,000
4	Project supervision missions for monitoring of implementation, AF and UN-Habitat policies compliance, and IE staff supervision and reporting [Table 23 : 5]	UN-Habitat ROAP	Periodic	Mission Report	98,248
5	Inception Workshop and Report [Table 23 : 3.6a]	National Project Manager Project Management Committee UN-Habitat ROAP	Workshop: within first three months of start Report: within first quarter	Inception Report	20,000
6	Annual report	National Project Manager Project Management Committee UN-Habitat ROAP	Report: within first quarter of next quarter	Annual report	Operational budget
7	Project Terminal Report	National Project Manager UN-Habitat ROAP Local consultant	At least three months before the end of the project	Terminal Report	Operational budget
8	Audit [Table 23 : 4.8]	UN-Habitat ROAP National Project Manager	As per UN-Habitat regulations	Audit Reports	12,963

CLARIFICATION NOTES (Table 19):

1a. \$40,000 has been budgeted for training materials development, training, and seminars conducted about resilient housing guideline formulation and for the implementation of the People Process (Budget note 1.5f)

1b. \$40,000 has been budgeted for implementing a system to monitor and evaluate the progress and impact of the project, ensuring its effectiveness and making necessary adjustments. (Budget note

- 2.3e); \$25,000 is budgeted for monitoring progress, plus \$9,000 for local travel and other expenses under this output. (Budget note 3.5c)
2. \$39,112 has been budgeted for the project mid-term and final evaluation with support from UN-Habitat HQ for which additional \$40,000 is budgeted. (Budget Note Project Execution Cost no.4)
 3. Community Consultations, Project Board Meetings, and Project Team Meetings: The Project Board meetings and Project Team Meetings will be scheduled every six months and three months. \$8,000 per year is allocated for expenses related to these meetings. (Budget Note 3.6f)
 - 4a Project support by the UN-Habitat Regional Office is budgeted at \$88,248 (1.0 percent of the total cost) for guidance and assistance to finalization of a variety of reports including periodic reports, annual reports, and project terminal reports.
 - 4b Project supervision mission from the UN-Habitat Regional Office is budgeted at \$ 10,000 for a bi-annual project supervision mission for monitoring of implementation, AF and UN-Habitat policies compliance, and IE staff supervision and reporting.
 5. Inception workshop: A lump sum of \$20,000 is budgeted for the inception workshop that will invite all involved stakeholders in the target provinces. This cost includes the Inception Report preparation and translation. (Budget note 3.6a)
 6. Included in operational budget
 7. Included in operational budget
 8. Final Audit will be conducted for which \$12,963 is allocated (Budget Note Project Execution Cost no.4)

a. Project Management Committee

The Project Management Committee will meet annually, and ad-hoc meetings will be held as needed. The meeting will review the delivery of inputs and outputs and project progress and provide guidance and coordination. The first Project Management Committee meeting will be held within the first six months of the start of the project.

b. Annual Project Performance Review

An Annual Project Performance Review (PPR) will be prepared to monitor progress made since the project's start and, in particular, the previous reporting period.

This report will be presented to the Project Management Committee. The PPR includes, but is not limited to, reporting on the following:

- Progress on the project's objective and outcomes – each with indicators, baseline data, and end-of-project targets (cumulative)
- Project outputs delivered per project outcome (annual)
- Lessons learned/good practice
- Annual Work Plan and expenditure
- Roles and responsibilities related to the activities
- Environmental and social risks (i.e., the status of implementation of ESMP, including those measures required to avoid, minimize, or mitigate environmental and social risks. The reports shall also include, if necessary, a description of any corrective actions that are deemed necessary
- Project financial and management risks (same as above).

c. Periodic Project Site Visits

Members of the Project Management Committee and representatives of UN-Habitat will visit project sites and hold meetings with the local stakeholders to review the implementation of project activities. It will be a good opportunity to assess environmental and social risks and impacts as well as learning from direct and indirect beneficiaries about their concerns or recommendations related to the project interventions.

d. Community Level Participatory Monitoring

The communes will be involved in further data collection and community consultations in data analysis. This will allow beneficiary communes to work directly with the project's M&E mechanism, highlight project delivery issues, and strengthen adaptation benefits, including replication and sustaining the project's gains. Data collected will consist of marginalized groups (i.e., women) aggregated (if possible). Project site visits will be jointly conducted based on an agreed schedule to assess project progress firsthand.

e. Mid-term Review and Final Evaluations

A mid-term and final evaluation will be conducted at the midpoint and three months before the end of the project, respectively, following UN-Habitat guidelines. An independent team of international and national experts will lead the evaluations. The scheduling of the evaluations and the terms of reference will be discussed at the Project Management Committee. The Terms of Reference will be prepared by UN-Habitat, focusing on the delivery of project activities as initially planned (or modified after the mid-term evaluation) and will also look at the impact and sustainability of the

results. The evaluation will provide recommendations for follow-up activities including adjustment of the project approaches to minimize environmental and social risks, necessary environmental and social mitigation measures. The evaluation process will include community feedback with women and men from diverse groups.

f. Financial Audits

A professional, certified organization will review the financial management of the project and adherence to required standards and regulations.

g. Monitoring of the potential intervention risks and mitigation measures

For risk identification – PART II Section E (Table 8 Compliance with technical standards) shows which of the risk areas (i.e., principles) have been triggered per project output/activity and per concrete intervention. This is based on a risk screening and impacts assessment (see Annex C), which are based on community inputs and field visits. For the non-concrete activities, information is provided about how to minimize risks monitoring/reporting on these will be done annually.

The Environment and Social Management Plan (ESMP) in Annex C includes monitoring indicators and frequency and monitoring responsibilities for monitoring for identified potential risks and mitigation measures for the flood protection and drainage and resilient latrines concrete interventions and supporting measures under other components.

Risks monitoring arrangements:

- This monitoring program is commensurate with actions identified below and will report on the monitoring results to the Fund in the mid-term, annual, and terminal performance reports. Monitoring will be done to ensure that actions are taken in a timely manner and to determine if actions are appropriately mitigating the risk / impact or if they need to be modified in order to achieve the intended outcome.
- Annual reporting will include information about the status of implementation of this ESMP, including those measures required to avoid, minimize, or mitigate environmental and social risks. The reports shall also include, if necessary, a description of any corrective actions that are deemed necessary.
- Direct monitoring responsibilities will be under the national project manager. The project manager will have oversight / final compliance responsibility. When changes or additional activities are required, monitoring indicators will be changed or added as well.
- Gender-specific indicators and targets have been developed as shown in the results framework and summarized in Annex D
- There are no specific budget requirements for risks monitoring other than shown in PART III Section D and the budget.

The focal person for Environmental and Social Safeguards in UN-Habitat ROAP will review the project reports and guide on the implementation design, environmental and social risks and adverse impacts, capacity building on the environmental and social safeguards, and necessary mitigation measures based on the experiences from other country offices.

Reporting

a. Inception Workshop and Report

A Project Inception Workshop will be held within the first three months of the start of the project to help build ownership of the project. One of the workshop outputs will be to prepare the annual work plan for year one. By the end of the first quarter of the start of project implementation, an Inception Report will be submitted to the Project Management Committee and the donor.

b. Quarterly Reports

The Project Manager will be responsible for preparing the Quarterly Reports to be submitted to the Project Board and the donor. The Project Manager will prepare the report based on information from the field staff and reports from the field activities. A qualitative periodic status/ progress report will be prepared once a quarter, and an annual report, including a financial status report once a year. The report will be submitted by the end of the first month of the next quarter.

c. Annual Project Reports

The Project Manager will prepare the Annual Reports to be submitted to the Project Management Committee and the donor. The Project Manager will prepare the report based on information from the field staff and reports from the field activities. The Annual Report will include project activities implemented from 1 January to 31 December and submitted by 31 January. The Annual Report will include:

- progress made towards the project objectives and project outcome with indicators for cumulative progress
- project outputs delivered as per annual targets in the annual plan
- lessons learned and better practices identified
- comments on risk assessment and adaptive measures
- environmental and social risks (i.e. status of implementation of ESMP, including those measures required to avoid, minimize, or mitigate environmental and social risks. The reports shall also include, if necessary, a description of any corrective actions that are deemed necessary;
- project financial and management risks (same as above).
- financial status
- other issues, concerns, and observations.

d. Site Visit and Community Level Meeting /Workshop / Training Reports

The Project Team will prepare photo-documented site visit reports and reports on all community-level meetings, workshops, and training within one week of the event.

e. Final Evaluation Report

The Team Leader of the independent consultants will prepare the Final Evaluation Team, which will describe the achievements made by the project based on the project reports, field visits, and consultations with all stakeholders. The report will provide reasons for discrepancies between the expected and actual results and elaborate on the results' impact and sustainability.

f. Terminal Report

The Project Manager and members of the Project Management Committee will prepare a comprehensive Terminal Report during the last three months of the project. It will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems, and other relevant issues.

E. Project Results Framework

Table 20 Project results framework with indicators, their baseline, targets, risks & assumptions and verification means.

Expected Result	Indicators	Baseline	Targets	Interim Targets	Means of Verification	Frequency	Risk, Impact, Mitigation	Responsibility
Project Objective: to support climate resilient and adaptive development and increase capacity for climate variability/change adaptation of target communities living in Kampot and Koh Kong Provinces.	Number of direct and indirect beneficiaries that are less vulnerable to climate variability/ change (AF Core Indicator)	0	451,776 (Women: 225,314)	225,000 (Women: 112,207)	- Project annual report - Evaluation report	Annual basis	Key risks: - Emergencies of global concern such as Covid-19 pandemic - Continued post Covid-19 socioeconomic impacts and challenges such as shortage and cost increase of construction materials Mitigation measure: - The project team will develop alternative ways to reach the project objective and deliver the outputs depending on the situation.	UN-Habitat
	Number of people living in partner cities and human settlements that are less vulnerable to climate change impacts (UN-Habitat DOC3 Domain level indicator)							
	Percentage of women that are less vulnerable to climate change-related issues	0	50%	50%				
Component 1. Increasing coping capacity by promoting climate resilient small-scale infrastructure								
Outcome 1: Increased adaptive capacity of built infrastructure and communities to withstand extreme weather and climate variability and change.	Number of people that benefit from climate resilient small-scale infrastructure, access to rehabilitated natural assets to withstand extreme weather and climate variability/ change	0	274,351 (Women: 135,955)	15,000 (Women: 7,432)	- Document review - Qualitative content analysis	Annual basis	Risk: - Loss of government support (at national and sub-national level) for the project activities may result in lack of prioritization of the project activities and their support. - Capacity constraints of local institutions and communities to manage, operate, and maintain infrastructure.	Executing entity
	Percentage of women participated in the required review and risk assessment activities and workshops	0	50%	50%				
Output 1.1. Rehabilitate and improve embankment in Ou Chreaneang Reservoir (Kampong Trach Khang Lech commune, Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/flooding/saltwater intrusion and controlling vector-	Dimension of Ou Chreaneang Reservoir rehabilitated	0	23 ha	10 ha	- Document review	Quarterly basis	- Prolonged procurement process due to the bureaucratic process. - Preferential or unequal beneficiary selection	Executing entity
	Early warning system installed	0	1	1				
	Percentage of women that are less vulnerable to climate change-related issues	0	50%	50%	- Gender segregated participant list			

borne and water-borne diseases.							Mitigation measure: - Establishment of a PMC at national level and the overall participatory and inclusive project design will improve national, sub-national beneficiary level ownership throughout and thus enhance government support for project implementation. - UN-Habitat will establish agreements (AoCs) to ensure the executing entity will deliver project activities and outputs align with the project design with timely manner. - Capacity building and training of communities will be undertaken to improve their awareness and understanding of the benefits of the activities, including infrastructure maintenance. - Communities will be involved in project implementation/decision making throughout the project. In depth community consultations will continue to take place - All budgets will be in US\$ - A clause will be included in contract with private sector that they can't increase the costs during the project duration. - Diversity executing actors through AoC with the executing entity	
Output 1.2. Establish/renovate five medium/small-scale wastewater treatment plants (with two in Kampot and three in Koh Kong Provinces).	Number of wastewater treatment plants established/renovated	0	5	2	- Document review	Quarterly basis		Executing entity
Output 1.3. Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste from discharging to the sea in Khemarak Phoumin City.	Number of drainage system/canals/ waterways cleared and renovated	0	3	1	- Document review	Quarterly basis		Executing entity
	Number of filter nets installed to capture solid waste	0	9	5	- Document review			
Output 1.4. Renovate waterbodies (irrigation tanks and embankments) in Lompu Reservoir and rehabilitate Kampong Trach canal in Kampong Trach District.	Dimension of the reservoir and canal renovated	0	350 ha	50 %	- Document review	Quarterly basis		Executing entity
	Early warning system installed	0	1	1				
Output 1.5. Resilient housing and toilet designs developed, and demonstration housing units constructed in three vulnerable communities in Koh Kong Province.	Number of populations benefitted from on-site upgrading	0	12,000 (Women: 6,000)	6,000 (Women: 3,000)	- Sex disaggregated data collection	Quarterly basis		UN-Habitat
	Number of resilient housings with toilets that are appropriate for women, elderly and persons with disability	0	60	30	- Interviews with target population			
	Percentage of female labours participated in the construction works	0	50%	50%	- Sex disaggregated data collection			
	Number of a resilient housing guideline developed and shared	0	1	50%	- Document review			
Output 1.6. Build five sluice gates and embankments to prevent saltwater intrusion in Krong Khemara Phoumin.	Number of sluice gates treatment plants established/renovated	0	5	2	- Document review	Quarterly basis	Executing entity	
Output 1.7. Establish Early Warning System (EWS) for flooding and drought forecasting	Number of early warning system (EWS) installed (AF indicator 1.2)	0	1	0	- Document review	Quarterly basis	Executing entity	

to reduce disaster risks of vulnerable communities in Mondol Seima District.	Number of beneficiaries covered by the installed EWS	0	15,041 (Women: 7,520)	0	- Sex disaggregated data collection		- Select beneficiaries based on specific criteria and accountable procedures	
Component 2. Adapting to current impacts of climate change through recovery of coastal ecosystems, and livelihood improvement and diversification								
Outcome 2: Improved conditions of coastal ecosystems and income diversification of vulnerable communities have enhanced the resilient capacity of these communities.	Percentage reduction of the impacts of coastal flooding through recovery of coastal ecosystems.	0	100%	50%	- Document review	Annual basis	Risk: - National or sub-national government changes their policy and restrict construction and plantation activities in or nearby mangrove forests.	Executing entity
Output 2.1. Restoration of destroyed mangrove ecosystems to improve mangrove ecosystem resilience in Mondol Seima District.	Area of mangrove planted in the damaged area	0	150 ha	70 ha	- Document review	Quarterly basis	- Both Mangrove management plan and EbA management plans are unfeasible for communities and local authorities. - Local authorities and communities unable to manage and operate rehabilitated mangrove ecosystem.	Executing entity
	Percentage of women participated in the mangrove plantation activities	0	50%	50%	- Gender segregated attendance list	Quarterly basis		
	Percentage of women participated in the required review and risk assessment activities and workshops	0	50%	50%	- Gender segregated attendance list	Quarterly basis		
Output 2.2. Develop Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems, including prevention of waste/pollution in Mondol Seima District.	Number of EbA management plans developed	0	1	0	- Document review	Quarterly basis	- Restored mangrove areas destroyed by illegal encroachment, construction, and concessions. Mitigation measure: - Establishment of a PMC at national level and the overall participatory and inclusive project design will improve national, sub-national beneficiary level ownership throughout and thus enhance government support for project implementation. - Capacity building and training of communities will be undertaken to	Executing entity
	Number of sessions for awareness raising and education on EbA	0	6	3	- Document review			
	Percentage of women participated in the awareness raising sessions	0	50%	50%	- Gender segregated attendance list			

							<p>improve their awareness and understanding of the benefits of the activities, and management/ operation of mangrove ecosystem.</p> <ul style="list-style-type: none"> - Regular patrol will be included in the EbA management plan and community activities. 	
<p>Output 2.3. Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to increase the income of the vulnerable households (including women and youth) with initiation of these livelihoods.</p>	<p>Number of participants in the capacity building trainings/ vocational trainings promoting alternate livelihood options</p>	0	162,374 (Women: 81,839)	80,000 (Women: 40,320)	- Gender segregated attendance list	Quarterly basis	<p>Risk:</p> <ul style="list-style-type: none"> - No specific markets for the diversified livelihood options. - Workshops and vocational trainings on livelihood diversification are unmatched with the needs and capacity of the vulnerable households. <p>Mitigation measure:</p> <ul style="list-style-type: none"> - Decide workshop and vocational training contents through needs assessment and market survey with potential beneficiaries. - Capacity building and training of communities will be undertaken to improve their livelihood options. 	Executing entity
	<p>Percentage of women and youth promoted alternative livelihood options</p>	0	75%	75%	- Gender segregated attendance list			
	<p>Number of alternate income sources for the vulnerable households generated under climate change scenario (AF indicator 6.2.1)</p>	0	+1	+1	- Interviews with target population			
<p>Component 3. Building capacity and knowledge sharing to reduce vulnerability to climate change</p>								
<p>Outcome 3: Improved effectiveness of climate adaptation planning/implementation to increase coping capacity to address climate variability/risk reduction, and to sustain/scale-up actions for transformative adaptation interventions at the local level.</p>	<p>Percentage increase in capacity to respond to climate variation/ changes.</p>	0	100%	40%	- Document review	Annual basis	<p>Risk:</p> <ul style="list-style-type: none"> - A lack of coordination between and within national government partners. - Community investment plans integrating climate change adaptation planning and implementations do not 	UN-Habitat
	<p>Percentage of women aware of predicted adverse impacts of climate change, and of appropriate responses</p>	0	50%	50%	- Gender segregated attendance list			

Output 3.1. Conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, including community-based in community/sub-national/ district development plans and promote climate change/disaster resilience in local development plans.	Number of risk and vulnerability assessments in line with AF indicator 1.1	0	23	12	- Document review	Quarterly basis	be implemented in sub-national level. - Capacity constraints of local institutions and communities to implement the agreed actions. Mitigation measure: - Establishment of a PMC at national level and the overall participatory and inclusive project design will improve national, sub-national beneficiary level ownership throughout and thus enhance government support for project implementation.	UN-Habitat
	Percentage of women participating in the risk and vulnerability assessments	0	50%	50%	- Gender segregated attendance list			
Output 3.2. Capacity building of provincial and sub-national level Government entities and communities on mainstreaming climate change adaptation.	Number of community investment plan introduced or adjusted to address climate change adaptation	0	23	10	- Document review	Quarterly basis	- Capacity building and training of communities will be undertaken to climate change adaptation and management.	UN-Habitat
	Percentage of women participating in capacity building trainings on mainstreaming climate change adaptation	0	50%	50%	- Gender segregated attendance list			
Output 3.3. Capacity building of sub-national level Government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems. [Linked to Outputs 1.2 and 1.3]	Number of awareness campaigns and trainings on solid waste and wastewater management	0	23	12	- Document review	Quarterly basis		UN-Habitat
	Number of solid waste and wastewater pilot activities implemented at local level (at least one per city/district)	0	4	2	- Document review			
	Percentage of women participating in capacity building trainings and pilot activities on solid waste management	0	50%	50%	- Gender segregated attendance list			
Output 3.4. Training communities in target locations on resilient housing/latrines construction technique. Linked to Output 1.5]	Number of trained unskilled or semi-skilled labours on resilient housing/ latrine construction technique based on a resilient housing guideline	0	150 (Women: 45)	80 (Women: 24)	- Gender segregated attendance list	Quarterly basis		UN-Habitat
	Number of women labours in the training sessions	0	30%	30%	- Gender segregated attendance list	Quarterly basis		

Output 3.5. Organizing communities and local authority to manage, monitor and maintain infrastructure investments to ensure sustainability and establish an adaptive pathway plan for flood response [Linked to Outputs 1.1, 1.3, 1.4, and 1.6]	Number of responsible community groups organized to manage, monitor, and maintain infrastructure	0	4	2	- Document review	Quarterly basis	UN-Habitat
	Action plan prepared (related to Output 1.1 and 1.2)	0	2	1			
	Percentage of women in the community groups	0	50%	50%	- Gender segregated attendance list		
Output 3.6. Share knowledge and lessons through documentation of climate-resilient actions for increased adaptive capacities. <i>(Special note: Material produced will be disability inclusive)</i>	Number of stories, information, cases, observations posted in media including project webpages and social media	0	10	5	- Document review (qualitative content analysis)	Quarterly basis	UN-Habitat
	Percentage of women engagement participating on knowledge sharing and capacity building program implemented at the sub-national and community level	0	50%	50%	- Gender segregated data collection		

F. Demonstrate how the Project/Programme aligns with the Results Framework of the Adaptation Fund

Table 21 Project alignment with the Adaptation Fund Results Framework.

Project Objective(s) ¹	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Project Objective: to support climate resilient and adaptive development and increase capacity for climate variability/change adaptation of target communities living in Kampot and Koh Kong Provinces.	<ul style="list-style-type: none"> - Number of direct and indirect beneficiaries that are less vulnerable to climate variability/change (AF Core Indicator) - Number of people living in partner cities and human settlements that are less vulnerable to climate change impacts (UN-Habitat DOC3 Domain level indicator) - Percentage of women that are less vulnerable to climate change-related issues 	Increased adaptive capacity of communities to respond to the impacts of climate change	Number of beneficiaries (direct and indirect)	10,000,000
Project Outcome(s)	Project Outcome Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Outcome 1: Increased adaptive capacity of built infrastructure and communities to	Number of people that benefit from climate resilient small-scale infrastructure, access to rehabilitated natural assets to withstand	Outcome 4: Increased adaptive capacity within relevant development sector	4.2. Physical infrastructure improved to withstand climate	5,727,859

withstand extreme weather and climate variability and change.	extreme weather and climate variability/ change - Percentage of women participated in the required review and risk assessment activities and workshops	services and infrastructure assets	change and variability-induced stress	
Outcome 2: Improved conditions of coastal ecosystems and income diversification of vulnerable communities have enhanced the resilient capacity of these communities.	- Percentage reduction of the impacts of coastal flooding through recovery of coastal ecosystems.	Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted area	5. Ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress	1,584,613
Outcome 3: Improved effectiveness of climate adaptation planning/implementation to increase coping capacity to address climate variability/risk reduction, and to sustain/scale-up actions for transformative adaptation interventions at the local level	- Percentage increase in capacity to respond to climate variation/ changes. - Percentage of women and youth aware of predicted adverse impacts of climate change, and of appropriate responses	Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic & environmental losses Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	2.1 Capacity of staff to respond to, and mitigate impacts of, climate-related events from targeted institutions increased. 3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses. 3.2. Percentage of targeted population applying appropriate adaptation responses.	1,008,543
Project Output(s)	Project Output Indicator(s)	Fund Output	Fund Output Indicator	Grant Amount (USD)
Output 1.1. Rehabilitate and improve embankment in Ou Chreaneang Reservoir (Kampong Trach Khang Lech commune, Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/flooding/saltwater intrusion and controlling vector-borne and water-borne diseases.	- Dimension of Ou Chreaneang Reservoir rehabilitated - Percentage of women that are less vulnerable to climate change-related issues	Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)	811,600
Output 1.2. Establish/renovate five medium/small-scale wastewater treatment plants (with two in Kampot and three in Koh Kong Provinces).	- Number of wastewater treatment plants established/ renovated			920,000
Output 1.3. Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste	- Number of drainage system/ canals/ waterways cleared and renovated - Number of filter nets installed to capture solid waste			765,659

from discharging to the sea in Khemerak Phoumin City.					
Output 1.4. Renovate waterbodies (irrigation tanks and embankments) in Lompu Reservoir and rehabilitate Kampong Trach canal in Kampong Trach District.	- Dimension (area) of the reservoir and canal renovated				1,245,100
Output 1.5. Resilient housing and toilet designs developed, and demonstration housing units constructed in three vulnerable communities in Koh Kong Province.	- Number of populations with access to improved house and sanitation - Number of resilient housings with toilets that are appropriate for women, elderly and persons with disability - Percentage of female labours participated in the construction works - Number of a resilient housing guideline developed and shared				1,230,000
Output 1.6. Build five sluice gates and embankments to prevent saltwater intrusion in Krong Khemara Phoumin.	- Number of sluice gates treatment plants established/ renovated				643,500
Output 1.7. Establish Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Mondol Seima District.	- Number of early warning system (EWS) installed (AF indicator 1.2) - Number of beneficiaries covered by the installed EWS	Output 1.1: Risk and vulnerability assessments conducted and updated	1.2. No. of early warning systems (by scale) and no. of beneficiaries covered		132,000
Output 2.1. Restoration of destroyed mangrove ecosystems to improve mangrove ecosystem resilience in Mondol Seima District.	- Area of mangrove planted in the damaged area - Percentage of women participated in the mangrove plantation activities - Percentage of women participated in the required review and risk assessment activities and workshops	Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	5.1 No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability ad change (by type and scale)		799,613
Output 2.2. Develop Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems, including prevention of waste/pollution in Mondol Seima District.	- Number of EbA management plans developed - Number of sessions for awareness raising and education on EbA - Percentage of women participated in the awareness raising sessions	Output 7: Improved integration of climate-resilience strategies into country development plans	7.2. No. of targeted development strategies with incorporated climate change priorities enforced		255,000
Output 2.3. Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to Increase the income of the vulnerable households (including women and youth) with initiation of these livelihoods.	- Number of participants in the capacity building trainings/ vocational trainings promoting alternate livelihood options - Percentage of women and youth promoted alternative livelihood options - Number of alternate income sources for the vulnerable households generated under climate change scenario (AF indicator 6.2.1)	Output 6: targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.2.1. Type of income sources for households generated under climate change scenario		530,000
Output 3.1. Conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, including community-based in community/sub-national/ district development plans and promote	- Number of risk and vulnerability assessments in line with AF indicator 1.1 - Percentage of women participating in the risk and vulnerability assessments	Output 1.1. Risk and vulnerability assessments conducted and updated	1.1. No. of projects/ programmes that conduct and update risk and vulnerability assessments (by sector and scale)		167,340

climate change/disaster resilience in local development plans.				
Output 3.2. Capacity building of provincial and sub-national level Government entities and communities on mainstreaming climate change adaptation.	- Number of community investment plan introduced or adjusted to address climate change adaptation - Percentage of women participating in capacity building trainings on mainstreaming climate change adaptation			118,880
Output 3.3. Capacity building of sub-national level Government officials/ communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems.[Linked to Outputs 1.2 and 1.3]	- Number of awareness campaigns and trainings on solid waste and wastewater management - Number of solid waste and wastewater pilot activities implemented at local level (at least one per city/district) - Percentage of women participating in capacity building trainings and pilot activities on solid waste management	Output 2.1: Strengthened capacity of national and sub-national centres and networks to respond rapidly to extreme weather events Output 7: Improved integration of climate-resilience strategies into country development plans	2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events (by gender) 7.2. No. of targeted development strategies with incorporated climate change priorities enforced	183,629
Output 3.4. Training communities in target locations on resilient housing/latrines construction technique. [Linked to Output 1.5]	- Number of trained unskilled or semi-skilled labours on resilient housing/ latrine construction technique based on a resilient housing guideline - Number of women labours in the training sessions	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.2. Type of income sources for households generated under climate change scenario	118,880
Output 3.5. Organizing communities and local authority to manage, monitor and maintain infrastructure investments to ensure sustainability and establish an adaptive pathway plan for flood response [Linked to Outputs 1.1, 1.3, 1.4, and 1.6]	- Number of responsible community groups organized to manage, monitor, and maintain infrastructure - Percentage of women in the community groups	Output 2.1: Strengthened capacity of national and sub-national centres and networks to respond rapidly to extreme weather events	2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events (by gender)	124,000
Output 3.6. Share knowledge and lessons through documentation of climate-resilient actions for increased adaptive capacities. <i>(Special note: Material produced will be disability inclusive)</i>	- Number of stories, information, cases, observations posted in media including project webpages and social media - Percentage of women engagement participating on knowledge sharing and capacity building program implemented at the sub-national and community level	Output 3.1: Targeted population groups participating in adaptation and risk reduction awareness activities	3.1 No. of news outlets in the local press and media that have covered the topic	295,814

G. Budget Summary, Detailed Budget, Budget Notes

Table 22 Budget Summary

Components	Outputs	TOTAL	Year			
			1	2	3	4
Component 1. Increasing coping capacity by promoting	Output 1.1. Rehabilitate and improve embankment in Ou Chreaneang Reservoir (Kampong Trach Khang Lech commune, Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/ flooding/saltwater intrusion and controlling vector-borne and water-borne diseases.	\$811,600	\$30,000	\$240,000	\$294,200	\$247,400

climate resilient small-scale infrastructure	Output 1.2. Establish/renovate five medium/small-scale wastewater treatment plants (with two in Kampot and three in Koh Kong Provinces).	\$920,000	\$65,000	\$450,000	\$255,000	\$150,000
	Output 1.3. Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste from discharging to the sea in Khmerak Phoumin City.	\$765,659	\$30,000	\$695,000	\$20,000	\$20,659
	Output 1.4. Renovate waterbodies (irrigation tanks and embankments) in Lompu Reservoir and rehabilitate Kampong Trach canal in Kampong Trach District.	\$1,235,100	\$40,000	\$490,000	\$521,600	\$183,500
	Output 1.5. Resilient housing and toilet designs developed, and demonstration housing units constructed in three vulnerable communities in Koh Kong Province.	\$1,230,000	\$61,000	\$543,000	\$543,000	\$83,000
	Output 1.6. Build five sluice gates and embankments to prevent saltwater intrusion in Krong Khemara Phoumin.	\$643,500	\$25,000	\$230,000	\$300,000	\$88,500
	Output 1.7. Establish Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Mondol Seima District.	\$132,000	-	-	-	\$132,000
Sub-total (Output 1)		\$5,727,859	\$251,000	\$2,658,000	\$1,933,800	\$905,059
Component 2. Adapting to current impacts of climate change through recovery of coastal ecosystems, and livelihood improvement and diversification	Output 2.1. Restoration of destroyed mangrove ecosystems to improve mangrove ecosystem resilience in Mondol Seima District.	\$799,613	\$40,000	\$250,000	\$255,000	\$254,613
	Output 2.2. Develop Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems, including prevention of waste/pollution in Mondol Seima District.	\$255,000	\$127,000	\$42,000	\$43,000	\$43,000
	Output 2.3. Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to Increase the income of the vulnerable households (including women and youth) with initiation of these livelihoods.	\$530,000	\$80,000	\$150,000	\$155,000	\$145,000
	Sub-total (Output 2)		\$1,584,613	\$247,000	\$442,000	\$453,000
Component 3. Building capacity and knowledge sharing to reduce vulnerability to climate change	Output 3.1. Conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, including community-based in community/sub-national/ district development plans and promote climate change/disaster resilience in local development plans.	\$167,340	\$49,500	\$72,500	\$34,000	\$11,340
	Output 3.2. Capacity building of provincial and sub-national level Government entities and communities on mainstreaming climate change adaptation.	\$118,880	\$32,000	\$32,000	\$32,880	\$22,000
	Output 3.3. Capacity building of sub-national level Government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems. [Linked to Outputs 1.2 and 1.3]	\$183,629	\$31,000	\$51,000	\$61,000	\$40,629
	Output 3.4. Training communities in target locations on resilient housing/latrines construction technique. [Linked to Output 1.5]	\$118,880	\$18,000	\$37,000	\$37,000	\$26,880
	Output 3.5. Organizing communities and local authority to manage, monitor and maintain infrastructure investments to ensure sustainability and establish an adaptive pathway plan for flood response [Linked to Outputs 1.1, 1.3, 1.4, and 1.6]	\$124,000	-	\$58,000	\$38,000	\$28,000

	Output 3.6. Share knowledge and lessons through documentation of climate-resilient actions for increased adaptive capacities. <i>(Special note: Material produced will be disability inclusive)</i>	\$295,814	\$81,000	\$71,000	\$71,000	\$72,814
	Sub-total (Output 3)	\$1,008,543	\$211,500	\$321,500	\$273,880	\$201,663
	Sub-total (Project activities)	\$8,341,015	\$709,500	\$3,421,500	\$2,660,680	\$1,549,335
	Project/Programme Execution cost (9.5%)	\$875,575	\$135,000	\$239,500	\$229,500	\$271,575
	Sub-total (Programme Cost)	\$9,216,590	\$844,500	\$3,661,000	\$2,890,180	\$1,820,910
	Project Cycle Management (on total operational budget) (7 percent)	\$645,162	\$59,115	\$256,270	\$202,313	\$127,464
	Project Support Cost (UN-Habitat Cambodia)	\$88,248	\$22,062	\$22,062	\$22,062	\$22,062
	Project Supervision Mission	10,000		5,000		5,000
	Project Evaluation Cost (HQ)	40,000	-	-	-	40,000
	Sub-total (Project Cycle Management)	783,410	81,177	283,332	224,375	194,526
	AMOUNT OF FINANCIAL REQUESTED	10,000,000	\$928,177	\$3,941,832	\$3,117,055	\$2,012,936

Detailed Budget

Table 23 Detailed Budget

Budget Note	Outputs	TOTAL	Year			
			1	2	3	4
	Output 1.1. Rehabilitate and improve embankment in Ou Chreaneang Reservoir (Lech commune, Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/flooding/saltwater intrusion and controlling vector-borne and water-borne diseases.					
1.1b (1)	Site investigation and inspections	30,000	10,000	10,000	10,000	-
1.1b (2)	Consultancy services and detail design	50,000	20,000	15,000	15,000	-
1.1c	Excavation and embankment	599,200	-	200,000	219,200	180,000
1.1d	Canal dredging	32,400	-	10,000	10,000	12,400
1.1f	Landscape	20,000	-	5,000	5,000	10,000
1.1f	Environmental enhancement	40,000	-	-	20,000	20,000
1.1e	Outlet structure modification and gauging station	30,000	-	-	15,000	15,000
1.1g	Installation of Early Warning System	10,000				10,000
	Sub-total	811,600	30,000	240,000	294,200	247,400
	Output 1.2. Establish/renovate five medium/small-scale wastewater treatment plants (with two in Kampot and three in Koh Kong Provinces).					
1.2b (1)	Site investigation and inspections	60,000	25,000	25,000	10,000	-
1.2b (2)	Consultancy services and detail design	60,000	40,000	10,000	10,000	-
1.2a (1)	Floating wetlands instalment in Kampot city	250,000	-	250,000	-	-
1.2a (2)	Subsurface flow constructed wetland and Household treatment system in Kampot city	265,000	-	100,000	100,000	65,000
1.2a (3)	Single household treatment system in Koh Kong	150,000	-	-	100,000	50,000
1.2a (4)	Natural Catchment improvements in Koh Kong	95,000	-	65,000	15,000	15,000

1.2c	Ancillaries	40,000	-	-	20,000	20,000
	Sub-total	920,000	65,000	450,000	255,000	150,000
	Output 1.3. Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste from discharging to the sea in Krong Khemara Phoumin.					
1.3b (1)	Investigation and research	20,000	10,000	10,000	-	-
1.3b (2)	Consultancy services and detail design	40,000	20,000	10,000	10,000	-
1.3a (1)	Clearing of the watercourses	450,000	-	450,000	-	-
1.3a (2)	Supply and Installation of Trash booms	225,000	-	225,000	-	-
1.3c	Community mobilization to involve the beneficiaries	30,659	-	-	10,000	20,659
	Sub-total	765,659	30,000	695,000	20,000	20,659
	Output 1.4. Renovate waterbodies (irrigation tanks and embankments) in Lompu Reservoir in Boeng Sala Khang Cheung commune and rehabilitate Kampong Trach canal.					
1.4e (1)	Site investigation and inspections	53,000	20,000	20,000	13,000	-
1.4e (2)	Consultancy services and detail design	60,000	20,000	20,000	20,000	-
1.4b	Dredging and on-site composting organic top-soil and vegetation	138,600	-	100,000	38,600	-
1.4c	Reservoir excavation and embankment	646,000	-	333,000	313,000	-
1.4d	Canal Dredging	196,500	-	-	100,000	96,500
1.4d2	Installation of Early Warning System	10,000	-	-	10,000	-
1.4f (1)	Landscape	30,000	-	-	-	30,000
1.4f (2)	Environmental enhancement	30,000	-	-	-	30,000
1.4g	Sustainable Planning (Environment) Specialist	81,000	-	27,000	27,000	27,000
	Sub-total	1,245,100	40,000	500,000	521,600	183,500
	Output 1.5. Resilient housing and toilet designs developed, and demonstration housing units constructed in three communities in Krong Kampot city and Mondol Seima District.					
1.5b	Consultancy and detailed design	60,000	20,000	20,000	20,000	-
1.5d	Resilient housing guideline developed	70,000	-	20,000	20,000	30,000
1.5c	Youth participations in the housing construction	40,000	-	10,000	10,000	10,000
1.5e	Three Community Contracts (60 houses)	900,000	-	450,000	450,000	-
1.5f	Field monitoring of Component 1 activities	40,000	10,000	10,000	10,000	10,000
1.6f	Community Deve Advisor (Coordinator)	130,000	31,000	33,000	33,000	33,000
	Sub-total	1,230,000	61,000	543,000	543,000	83,000
	Output 1.6. Build five sluice gates and embankments to prevent saltwater intrusion in Krong Khemara Phoumin.					
1.6b (1)	Site investigation and inspections	20,000	10,000	5,000	5,000	-
1.6b (2)	Consultancy services and detail design	40,000	15,000	15,000	10,000	-
1.6a (1)	Site clearance and embankment improvement	275,000	-	200,000	75,000	-
1.6a (2)	Five watrgates installment	278,500	-	-	200,000	78,500
1.6c	Environmental Enhancement	30,000	-	10,000	10,000	10,000
	Sub-total	643,500	25,000	230,000	300,000	88,500
	Output 1.7. Establish Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Mondol Seima District.					
1.7a (1)	Provision of wave and tide gauge	23,000	-	-	-	23,000
1.7a (2)	Installation, shipping and other costs	29,000	-	-	-	29,000
1.7a (3)	Automated Weather Station	50,000	-	-	-	50,000

1.7b	Capacity building and awareness raising	30,000	-	-	-	30,000
	Sub-total	132,000	-	-	-	132,000
	TOTAL OUTPUT 1	5,727,859	251,000	2,658,000	1,933,800	905,059
	Output 2.1. Restoration of destroyed mangrove ecosystems to improve mangrove ecosystem resilience in Mondul Seima District.					
2.1a	Site assessment and inspection	50,000	15,000	15,000	10,000	10,000
2.1b	Mangrove Plantation Management Plan	25,000	25,000	-	-	-
2.1c	Plantation of mangroves	675,000	-	225,000	225,000	225,000
2.1d	Supervision, transportation, travel and other expenses	49,613	-	10,000	20,000	19,613
	Sub-total	799,613	40,000	250,000	255,000	254,613
	Output 2.2. Develop Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems, including prevention of waste/pollution in Mondul Seima District.					
2.2a	Site assessment and inspection	20,000	20,000	-	-	-
2.2b	EbA management plans	100,000	100,000	-	-	-
2.2c	Workshops, dissemination and consultations at local level	60,000	-	20,000	20,000	20,000
2.2d	Raising awareness and education	30,000	7,000	7,000	8,000	8,000
2.2e	Yearly review and revision of EbA management plans	45,000	-	15,000	15,000	15,000
	Sub-total	255,000	127,000	42,000	43,000	43,000
	Output 2.3. Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to Increase income of vulnerable households (including women and youth) with initiation of these livelihoods.					
2.3a	Research and Assessment	50,000	50,000	-	-	-
2.3b	Training and Capacity Building	100,000	20,000	30,000	30,000	20,000
2.3c	Infrastructure Development	300,000	-	100,000	100,000	100,000
2.3d	Marketing and Promotion	40,000	-	10,000	15,000	15,000
2.3e	Monitoring and Evaluation	40,000	10,000	10,000	10,000	10,000
	Sub-total	530,000	80,000	150,000	155,000	145,000
	TOTAL OUTPUT 2	1,584,613	247,000	442,000	453,000	442,613
	Output 3.1. Conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, including community-based in community/sub-national/ district development plans and promote climate change/disaster resilience in local development plans.					
3.1a	Conduct vulnerability risk assessments and monitoring the progress	115,000	47,500	47,500	10,000	10,000
3.1b	Mainstream climate change adaptation into commune development plans	46,000	-	23,000	23,000	-
3.1c	Travel and other expenses	6,340	2,000	2,000	1,000	1,340
	Sub-total	167,340	49,500	72,500	34,000	11,340
	Output 3.2. Capacity building of provincial and sub-national level Government entities and communities on mainstreaming climate change adaptation.					
3.2a (1)	Define target groups	5,000	5,000	-	-	-
3.2a (2)	Training needs assessment	20,000	20,000	-	-	-
3.2a (3)	Prepare training materials	5,000	5,000	-	-	-
3.2b	Conduct training and refresher training and update training material	80,000	-	30,000	30,000	20,000
3.2c	Travel and other expenses	8,880	2,000	2,000	2,880	2,000
	Sub-total	118,880	32,000	32,000	32,880	22,000

	Output 3.3. Capacity building of sub-national level Government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems. [Linked to Outputs 1.2 and 1.3]					
3.3a (1)	Define target groups	5,000	5,000	-	-	-
3.3a (2)	Training needs assessment	20,000	20,000	-	-	-
3.3a (3)	Prepare training materials	5,000	5,000	-	-	-
3.3b	Conduct training	80,000	-	30,000	30,000	20,000
3.3c	Implement pilot projects	50,000	-	20,000	30,000	20,000
3.3d (1)	Travel and other expenses	3,629	1,000	1,000	1,000	629
	Sub-total	183,629	31,000	51,000	61,000	40,629
	Output 3.4. Training communities in target locations on resilient housing/latrines construction technique. [Linked to Output 1.5]					
3.4a (1)	Define target groups	5,000	5,000	-	-	-
3.4a (2)	Training needs assessment and monitoring the progress	20,000	5,000	5,000	5,000	5,000
3.4a (3)	Prepare training materials	5,000	5,000	-	-	-
3.4b	Conduct training in People's Process and Community Contracting	80,000	-	30,000	30,000	20,000
3.4c	Travel and other expenses	8,880	3,000	2,000	2,000	1,880
	Sub-total	118,880	18,000	37,000	37,000	26,880
	Output 3.5. Organizing communities and local authority to manage, monitor and maintain infrastructure investments to ensure sustainability and establish an adaptative pathway plan for flood response [Linked to Outputs 1.1, 1.4, and 1.6]					
3.5a (1)	Define target groups	5,000	-	5,000	-	-
3.5a (2)	Organize the communities (one for each output)	10,000	-	10,000	-	-
3.5a (3)	Training needs assessment	10,000	-	10,000	-	-
3.5a (4)	Prepare training materials	5,000	-	5,000	-	-
3.5b (1)	Conduct training	40,000	-	15,000	15,000	10,000
3.5b (2)	Preparation of flood response adaptive action plan and installation of early warning system (CT-Tide type guage)	20,000	-	-	10,000	10,000
3.5c (1)	Monitoring progress	25,000	-	10,000	10,000	5,000
3.5c (2)	Travel and other expenses	9,000	-	3,000	3,000	3,000
	Sub-total	124,000	-	58,000	38,000	28,000
	Output 3.6. Share knowledge and lessons through documentation of climate-resilient actions for increased adaptive capacities. (Special note: Material produced will be disability inclusive)					
3.6a	Inception Workshop	20,000	20,000	-	-	-
3.6b	Case Studies, Video production, Reports	30,000	-	10,000	10,000	10,000
3.6c	Seminar, Training, Workshops	60,000	15,000	15,000	15,000	15,000
3.6d	Visibility, Advocacy	40,000	10,000	10,000	10,000	10,000
3.6e	International Conference, Seminar participation	60,000	15,000	15,000	15,000	15,000
3.6f	Project Board Meeting/Working Group Meeting	32,000	8,000	8,000	8,000	8,000
3.6g	Travel and other expenses	53,814	13,000	13,000	13,000	14,814
	Sub-total	295,814	81,000	71,000	71,000	72,814
	TOTAL OUTPUT 3	1,028,543	211,500	321,500	283,880	211,663
	TOTAL PROGRAM COST	8,341,015	709,500	3,421,500	2,660,680	1,549,335
	PROJECT EXECUTION COST					
4.1	Project Team Leader (Part Time)	315,000	45,000	90,000	90,000	90,000

4.2	National Project Manager	273,000	39,000	78,000	78,000	78,000
4.3	Office Staff and Technical Support	96,000	24,000	24,000	24,000	24,000
4.4	Office Facilities (Rent)	63,000	9,000	18,000	18,000	18,000
4.5	Office Operation	21,000	3,000	6,000	6,000	6,000
4.6	Office Equipment	6,000	6,000	-	-	-
4.7	Travel and vehicle rent	49,500	9,000	13,500	13,500	13,500
4.8	Audit	12,963	-	-	-	12,963
4.9	Mid-Term and Final Evaluation	39,112	-	10,000	-	29,112
	TOTAL PROJECT EXECUTION COST	875,575	135,000	239,500	229,500	271,575
	TOTAL PROJECT COST	9,216,590	844,500	3,661,000	2,890,180	1,820,910
5	Project Cycle Management (on total operational budget) (7 percent)	\$645,162	\$59,115	\$256,270	\$202,313	\$127,464
6	Project Support Cost (UN-Habitat Cambodia)	\$88,248	\$22,062	\$22,062	\$22,062	\$22,062
7	Project Supervision Mission	10,000		5,000		5,000
8	Project Evaluation Cost (HQ)	40,000	-	-	-	40,000
	Sub-total (Project Cycle Management)	783,410	81,177	283,332	224,375	194,526
	AMOUNT OF FINANCE REQUESTED	10,000,000	928,177	3,941,832	3,117,055	2,012,936

Budget Notes. With reference to Table 23, detailed budget

Output 1.1: Rehabilitate and improve embankment in Ou Chreang Reservoir (Kampong Trach Khang Lech commune, Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/flooding/saltwater intrusion and controlling vector-borne and water-borne diseases.

- 1.1a This activity will be a part of the AOC with the principal executing partner [i] to increase the volume of water that can be stored and [ii] reuse the soil on site to widen the existing south and east embankments and build a new embankment along the west side.
- 1.1b It is estimated that site investigation and inspection will cost \$30,000, and \$50,000 has been budgeted for consultancy services and detailed design.
- Site investigation and inspections to include: ground investigation, topographical survey, asset condition of the existing embankment, environmental survey, and monitoring during the implementation.
 - Consultancy services to include: outline design, detailed design, design for construction, support during construction, geological investigation, geotechnical report, hydrology, and hydraulic studies, flood risk assessment, environmental assessment, and tree plantation.
- 1.1c The excavation and construction of the embankment, scheduled for the dry seasons in years 2, 3, and 4, is budgeted at \$599,200 for skilled and unskilled labor and hiring of excavators, compactors, and dumpers.
- 1.1d An additional \$32,400 is budgeted for dredging the canal to improve the water convey capacity for skilled and unskilled labor and the hiring of excavators.
- 1.1e Outfall modification to maximize water and gauging station use is budgeted at \$30,000.
- 1.1f Finally, landscaping to maximize the benefits and environmental enhancement through replanting local species is budgeted at \$20,000 and \$40,000. This may include viewing platforms with illustration boards containing biodiversity and climate change adaptation topics. The latter budget also includes community mobilization to involve the beneficiaries, particularly during the planning and their continued involvement after the construction.
- 1.1g \$10,000 has been included to install a portable early warning system equipment at the reservoir.

Output 1.2: Establish/renovate five medium/small-scale wastewater treatment plants (with two in Kampot and three in Koh Kong Provinces).

- 1.2a This activity will be a part of the AOC with the principal executing partner in two locations as follows:
- [i] in Kampot City:
- to install floating wetlands for wastewater disposal in floating villages [budget: \$250,000 in year 2]
 - to convert the canal into a subsurface flow-constructed wetland, where wastewater is treated as it percolates through a bed of porous media [budget: \$265,000 in years 2, 3, 4 to cover subsurface flow wetland, clear canal and culvert, and construct a single household treatment system]
- [ii] in Koh Kong:
- to install a single household treatment system for which several options are being considered [budget: \$150,000 in years 3, and 4 for 200 units at \$750 per unit]
 - improve natural catchment by intercepting discharges into the waterbodies showed, starting from the upper catchments [budget: \$95,000 in years 2, 3, 4]
- 1.2b It is estimated that site investigation and inspection will cost \$60,000, and \$60,000 has been budgeted for consultancy services and detailed design, including support during construction.
- 1.2c Finally, \$40,000 has been budgeted for monitoring and community mobilization to involve the beneficiaries, particularly during the planning and their continued involvement after the construction and miscellaneous expenses

Output 1.3 Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste from discharging to the sea in Khemarak Phoumin City.

- 1.3a This activity will be a part of the AOC with the principal executing partner:
- [i] to remove solid waste from the watercourses as much as reasonably possible in three locations and
 - [ii] to install some barriers to capture solid waste (especially plastic) in nine locations and facilitate regular maintenance.
- It is estimated that [i] will cost \$150,000 for each location and [ii] will cost \$25,000 for each site. So, a budget of \$450,000 and \$225,000 has been provided in year 2.
- 1.3b It is estimated that site investigation and inspection will cost \$20,000, and \$40,000 has been budgeted for consultancy services and detailed design.
- 1.3c Finally, \$30,659 has been budgeted for community mobilization to involve the beneficiaries, particularly during the planning and their continued involvement after the construction and miscellaneous expenses.

Output 1.4 Renovate waterbodies (irrigation tanks and embankments) in Lompu Reservoir and rehabilitate Kampong Trach canal in Kampong Trach District.

- 1.4a This activity will be a part of the AOC with the principal executing partner:
- [i] for vegetation cutting and dredging: vegetation will be selectively removed while dredging will be carried out within the predetermined range
 - [ii] to restore and build a deeper canal and ponds to maximize the ability of the system to store and convey water

- 1.4b Dredging and onsite composting of organic topsoil and vegetation are budgeted at \$138,600 in years 2 and 3 for skilled and unskilled labor and hiring of excavators.
- 1.4c The reservoir excavation in years 2 and 3 is budgeted at \$646,000 for skilled and unskilled labor and hiring excavators, compactors, and dumpers.
- 1.4d An additional \$196,500 is budgeted for dredging the canal to improve the water convey capacity for skilled and unskilled labor, hiring excavators, and placing three water gates.
- 1.4e It is estimated that site investigation and inspection will cost \$53,000, and \$60,000 has been budgeted for consultancy services and detailed design.
- Site investigation and inspections to include: ground investigation, topographical survey, asset condition of the existing embankment, environmental survey
 - Consultancy services to include: outline design, detailed design, design for construction, support during construction, geological investigation, geotechnical report, hydrology, and hydraulic studies, flood risk assessment, and environmental assessment.
- 1.4f Finally, landscaping to maximize the benefits and environmental enhancement through replanting local species is budgeted at \$30,000 and \$30,000. The latter budget also includes community mobilization to involve the beneficiaries, particularly during the planning and their continued involvement after the construction.
- Landscaping will incorporate landscaping techniques aimed at optimizing the benefits of the reservoir. This may include creating viewing platforms with illustration boards, which can provide educational information on topics such as biodiversity and climate change adaptation.
 - Environmental enhancement through replanting will be to promote the restoration of the ecosystem using local species. By reintroducing native vegetation, we can enhance the ecological value of the reservoir and support the recovery of indigenous flora and fauna.
- 1.4g \$10,000 has been included to install a portable early warning system equipment at the reservoir.

Output 1.5 Resilient housing and toilet designs developed, and demonstration housing units constructed in three vulnerable communities in Koh Kong Province.

- 1.5a This activity will be implemented through community contracting with the beneficiaries in consultation with the principal executing partner.
- 1.5b Consultancy, detail design, community mobilization, and monitoring of the construction is budgeted at \$60,000.
- 1.5c Youth participation in housing design and construction: ten young graduate architect students will be recruited to support the housing design, material survey, community empowerment, and monitor the house construction. \$30,000 is budgeted for four years.
- 1.5d \$70,000 is budgeted for the development of building manuals and guidelines with support from the Ministry of Land Management, Urban Planning and Construction
- 1.5e 60 units of resilient housing will be constructed in three locations in Koh Kong province at \$15,000 per unit, for which \$900,000 has been budgeted.
- ~~1.5f \$40,000 has been budgeted for training materials development, training, and seminars conducted about resilient housing guideline formulation and for the implementation of the People Process.~~
- 1.5f \$40,000 has been budgeted annually for implementing a system to monitor and evaluate the progress and impact of the project, ensuring its effectiveness and making necessary adjustments.

Output 1.6 Build five sluice gates and embankments to prevent saltwater intrusion in Krong Khemara Phoumin.

- 1.6a This activity will be a part of the AOC with the principal executing partner:
- [i] to clear the site and improve the embankment for which \$275,000 has been budgeted in years 2 and 3
 - [ii] to install five water gates to prevent flooding and saltwater intrusion to the agricultural land and nearby settlement and business areas, for which \$278,500 has been budgeted. \$200,000 is budgeted for five water gates at \$40,000 each. The remaining cost is for transportation and onsite concrete and steel works.
- 1.6b It is estimated that site investigation and inspection will cost \$20,000, and \$40,000 has been budgeted for consultancy services and detailed design. Site investigations and inspections will include topographical surveys, flood risk and environmental assessments. Consultancy services will consist of outline design, detailed design, design for construction, and support during construction.
- 1.6c Finally, environmental enhancement (solar street lights, tree plantation, etc.) is budgeted at \$30,000. The budget also includes community mobilization to involve the beneficiaries, particularly during the planning and their continued involvement after the construction.

Output 1.7 Establish Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Mondol Seima District.

- 1.7a This activity will be a part of the AOC with the principal executing partner:
- [i] to procure wave and tide gauge for remote, shallow location – type 'FSI Remote Coastal Reporter' including shipping, customs clearance, local shipping taxes, installment, transshipment to shallow draught vessel for access to site and delivery. A total budget of \$52,000 has been allocated.
 - [ii] an Automated Weather Station installation is budgeted at \$50,000.
- 1.7b In addition, \$30,000 is budgeted for the beneficiary community's capacity building and awareness raising.

Output 1.1 to 1.7 Project Staff

The following staff will be recruited by the principal executing partner drawing from the budget allocation for Outputs 1.1 to Output 1.7

National

- One Project Management Officer and one National Technical Officer
- One Operations Manager and one Finance/Procurement/Supply Chair Officer

International

To bring global knowledge on best practices to Implementing Partners and communities following two part-time international staff are budgeted under Output 1.4 and Output 1.5:

- Eight person-months (over the project period) of technical and supervisory support by one Community Development Advisor is budgeted at \$10,000 per month. The Advisor will be on mission every year for two to three weeks to provide training on and supervise the proper implementation of the People's Process which is a key component in ensuring effective participation and engagement of the beneficiaries, particularly the vulnerable groups. A total budget of \$120,000 is budget for the fees this included travel and DSA costs for the eight missions over four years.
- Six person-months (over the project period) of technical and supervisory support by one Sustainable Planning (Environment) Specialist is budgeted at \$8,000 per month. A total budget of \$81,000 is budget for the fees, travel and six missions.
- In case it is required, the above budget could be also used to contract one Climate Change Assessment Specialist utilizing the same budget allocation.

Output 2.1 Restoration of destroyed mangrove ecosystems to improve mangrove ecosystem resilience in Mondol Seima District.

- 2.1a. \$50,000 is budgeted for field site assessment, including investigation and inspections, i.e., ground investigation and topographical survey.
- 2.1b \$ 25,000 is allocated for establishing a mangrove nursery and preparing a mangrove planting management plan in consultation with local communities. The plan will include an outline design, detailed design, design for construction, support during construction, geological investigation, geotechnical report, hydrology and hydraulic studies, and environmental assessment.
- 2.1c Mangrove plantation will include seedlings, enclosure, bamboo poles, excavation and backfilling, planting, and management for which \$4,500 per ha for 150 ha has been budgeted (Total: \$675,000).
- 2.1d \$49,613 is allocated supervision, transportation and travel and other expenses during the implementation.

Output 2.2 Develop Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems, including prevention of waste/pollution in Mondol Seima District.

- 2.2a. \$20,000 is allocated for site assessment.
- 2.2b \$100,000 has been allocated in year 1 for developing an ecosystem-based adaptation (EbA) management plan for restoring mangrove ecosystems in Peam Krasoub and Boeng Kachhang Communities, including consultations with communities and hiring experts.
- 2.2c \$60,000 is allocated for workshops, dissemination and consultations at local level (at least once a year within the project implementation period and assuming the plan will be developed in the first year) of the progress of EbA implementation by local authorities at \$20,000 every year.
- 2.2d Raising awareness and education (at least two times per year in each community (a total of six times) and assuming the plan will be developed in the first year) is budgeted at \$7,000 per year in years 1 and 2 and \$8,000 per year in year 3 and 4 (Total \$30,000)
- 2.2e \$15,000 has been budgeted for the annual review and revision of EbA management plans (Total \$45,000)

Output 2.3 Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to increase the income of the vulnerable households (including women and youth) with initiation of these livelihoods.

- 2.3a. \$50,000 is allocated for conducting surveys, studies, and assessments to identify the most suitable livelihood diversification options in each location
- 2.3b \$100,000 is allocated for providing training programs and workshops to local communities and individuals to enhance their skills and knowledge in aquaculture, product processing/value addition, handicraft making, and ecotourism. This could involve hiring trainers, organizing training sessions, and developing educational materials.
- 2.3c Establishing necessary infrastructure and facilities to support the identified livelihood diversification options within the budget allocation of \$300,000. Examples are constructing aquaculture ponds, setting up handicraft-making workshops, etc.
- 2.3d Developing marketing strategies, creating promotional materials, and organizing events to raise awareness and attract visitors to the newly developed livelihood options for \$40,000.
- 2.3e \$40,000 has been budgeted annually for implementing a system to monitor and evaluate the progress and impact of the project, ensuring its effectiveness and making necessary adjustments.

Output 2.1 to 2.3 Project Staff

The following staff will be recruited by the principal executing partner drawing from the budget allocation for Output 2.1 to Output 2.3:

National

- One National Mangrove Specialist and one Training Expert (within the budget of output 2.1, 2.2 under the field assessment and research)
- One National Field Monitoring (within the budget allocation under the monitoring progress of Output 2.2)

Output 3.1 Conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, including community-based in community/sub-national/ district development plans and promote climate change/disaster resilience in local development plans.

- 3.1a. Conduct vulnerability risk assessments and monitor the progress of 23 target communes with a budget of \$5,000 per commune. A total of \$115,000 is budgeted for the vulnerability assessment report and monitoring the progress for four years. This study will be conducted during years 1 and 2, while the monitoring will be done in years 3 and 4 of the project. Technical specialists, Climate Change Assessment Specialist and Planning Specialists will support this assessment.
- 3.1b. Once the assessment reports are completed, training and guidance on mainstreaming climate change in the local plans will be conducted. \$2,000 per commune is allocated for 23 communes. A total budget of \$46,000 is allocated.
- 3.1c. \$6,340 is budgeted for local travel and other expenses under this output.

Output 3.2 Capacity building of provincial and sub-national level Government entities and communities on mainstreaming climate change adaptation.

- 3.2a. One Training Specialist will be recruited to conduct the training needs assessment, define training groups, and formulate the training materials with a lump sum budget of \$30,000.
- 3.2b. Upon approval of the training materials, the training specialist, with the support of the project team, will conduct a training course at the target province, districts, and communes/communities. \$80,000 is allocated for the training and refresher training during the project implementation and updating of training material.
- 3.2c. \$8,880 is budgeted for local travel and other expenses under this output.

Output 3.3 Capacity building of sub-national level Government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems. [Linked to Outputs 1.2 and 1.3]

- 3.3a. One Training Specialist will be recruited to conduct the training needs assessment, define training groups, and formulate the training materials with a lump sum budget of \$30,000.
- 3.3b. Upon approval of the training materials, the training specialist, with the support of the project team, will conduct a training course at the target province, districts, and communes/communities. \$80,000 is allocated for the training and refresher training during the project implementation.
- 3.3c. After the training, a selected pilot project will be conducted in 4 target districts that are budgeted \$12,500 per district with a total of \$70,000.
- 3.3d. \$3,629 is budgeted for local travel, and other expenses under this output.

Output 3.4 Training communities in target locations on resilient housing/latrines construction technique. [Linked to Output 1.5]

- 3.4a. One Training Specialist will be recruited to conduct the training needs assessment, define training groups, and formulate the training materials with a lump sum budget of \$30,000.
- 3.4b. Upon approval of the training materials, the training specialist, with the support of the project team, will conduct a training course, especially on the People Process in the target communities. \$80,000 is allocated for the training and refresher training during the project implementation.
- 3.4c. \$8,340 is budgeted for local travel and other expenses under this output.

Output 3.5 Organizing communities and local authority to manage, monitor and maintain infrastructure investments to ensure sustainability and establish an adaptative pathway plan for flood response [Linked to Outputs 1.1, 1.4, and 1.6]

- 3.5a. One Training Specialist will be recruited to conduct the training needs assessment, define training groups and community establishment, and formulate the training materials with a lump sum budget of \$30,000.
- 3.5b(1). Upon approval of the training materials, the training specialist, with the support of the project team, to conduct a training course in the target province, districts, and communes/communities. \$40,000 is allocated for the training and refresher training during the project implementation.
- 3.5b(2) Establish an adaptative pathway plan for flood response with stakeholder participation and install early warning system for which \$20,000 is allocated
- 3.5c. \$25,000 is budgeted for monitoring progress, plus \$9,000 for local travel, and other expenses under this output.

Output 3.6 Share knowledge and lessons through documentation of climate-resilient actions for increased adaptive capacities. (Special note: Material produced will be disability inclusive)

- 3.6a. Inception workshop: A lump sum of \$20,000 is budgeted for the inception workshop that will invite all involved stakeholders in the target provinces. This cost includes the Inception Report preparation and translation.
- 3.6b. Case studies, Video production, Reports: Production of various case studies, Videos, surveys, and reports is budgeted at \$60,000 for the project period.
- 3.6c. Seminar / Training / Workshops: National-level seminars/workshops/consultations will be organized to discuss project experience and findings and seek professional inputs. \$60,000 has been budgeted for this.
- 3.6d. Visibility, Web Development, Advocacy: Production of various project visibility and advocacy material and development of web page and maintenance is budgeted at \$40,000.
- 3.6e. Participation in regional/international events: A budget of \$60,000 in four-year project period has been allocated to cover costs for participation in climate change-related international conference/workshop by senior government officials
- 3.6f. Community Consultations, Project Board Meetings, and Project Team Meetings: The Project Board meetings and Project Team Meetings will be scheduled every six months and three months. \$8,000 per year is allocated for expenses related to these meetings.
- 3.6g. \$53,814 is budgeted for monitoring progress, local travel, and other expenses under this output.

**Output 3.1 to 3.6 Project Staff
National**

The costs following national staff (technical) have been budgeted to manage Output 3

- one Training Specialist (6 months in years 1 and 4; and 12 months each in subsequent years)
- one Climate Change Specialist (6 months in year 1; 6 months over one year in years 2, 3, 4)
- one Planning Specialist (6 months in years 1 and 4; and 12 months each in subsequent years)
- one Field Monitoring (6 months in year 1; 6 months over in years 2, 3, 4)
- one Livelihood Specialist
- three full-time Social Mobilizers (6 months in years 1 and 5; and 12 months each in subsequent years)

Project Execution Cost

1. One Team Leader will be recruited and contracted through UNOPS with the support of the Human Settlement Officer at the Regional Office of UN-Habitat. The Team Leader will be contracted for 42 person-months at \$7,500 per month with a total allocation of \$315,000.
2. One Project Manager will be recruited and contracted through UNON for 42 person-months at \$6,500 per month with a total allocation of \$273,000.
3. Office staff for technical support will be recruited and contracted through UNOPS for 48 person-months at \$2,000 per month with a total allocation of \$96,000.
4. Following Operations costs are budgeted:
 - Office rent at \$1,500 per month. Total budget \$63,000.
 - Office operations at \$500 per month. Total budget \$21,000.
 - \$6,000 is allocated for the purchase of various office equipment.
 - \$49,500 allocated for local travel and vehicle rental during the project implementation.
 - Final Audit will be conducted for which \$12,963 is allocated
 - \$39,112 has been budgeted for the project mid-term and final evaluation with support from UN-Habitat HQ for which additional \$40,000 is budgeted.

Project Cycle Management Fee

1. Project Cycle Management on total operational budget (7 percent) is for UN-Habitat Head Quarters overall project supervision including compliance to UN-Habitat policies and standards (gender, human rights, climate change, etc.)
2. Project support by the UN-Habitat Regional Office is budgeted at \$88,248 (1.0 percent of the total cost) for guidance and assistance to finalization of a variety of reports including periodic reports, annual reports, and project terminal reports.
3. Project supervision mission from the UN-Habitat Regional Office is budgeted at \$ 10,000 for a bi-annual project supervision mission for monitoring of implementation, AF and UN-Habitat policies compliance, and IE staff supervision and reporting.
4. \$40,000 is budgeted for UN-Habitat Evaluation Unit support for evaluation during and after the project implementation (in addition to the actual evaluation costs).

Monitoring Costs

1. The costs for monitoring activities detailed in section D have been allocated in different sections of the budget,
2. Field monitoring progress of all outputs under Component 1 is budgeted in Output 1.5, for Component 2 in Output 2.3 and for Component 3 in Output 3.5
3. Project management committee meetings, Working Group Meetings, community consultations is budgeted in Output 3.6.

Table 24 M & E Budget

Type of M&E Activity	Total	Year 1	Year 2	Year 3	Year 4
Monitoring Progress of Outputs	105,000	20,000	30,000	30,000	25,000
Mid-term & Final Evaluation (inc HQ)	79,112	-	10,000	-	69,112
Project management committee meetings, Working Group Meetings, Community Consultations	32,000	8,000	8,000	8,000	8,000
Total	216,112	28,000	48,000	38,000	102,112

H. Disbursement Schedule

Table 25 Disbursement schedule

Date	TOTAL	Upon Signing (January 2024)	January 2025	January 2026	January 2027
Funds (US\$)	8,341,015	709,500	3,421,500	2,660,680	1,549,335
Programme Execution	875,575	135,000	239,500	229,500	271,575
Programme Cycle Mgt	783,410	83,677	280,832	226,875	192,026
TOTAL	10,000,000	928,177	3,941,832	3,117,055	2,012,936


	Year 1	Year 2	Year 3	Year 4
	1st disbursement: Upon agreement signature	2nd disbursement: One year after project start -Upon First Annual Report -Upon financial report indicating disbursement of at least 70 percent of funds	3rd disbursement: Two years after project start -Upon Second Annual Report -Upon financial report indicating disbursement of at least 70 percent of funds	4th disbursement: Third years after project start -Upon Third Annual Report -Upon financial report indicating disbursement of at least 70 percent of funds
Milestone	Milestones (by end of year) -Inception workshop completed and report prepared. -Detailed design of year 2 infrastructure projects/activities initiated. -Capacity building programme for year 2 are planned. -Advocacy materials designed. -PMC meeting held.	Milestones (by end of year) -Monitoring and evaluation plan developed. -Detailed design of year 3 infrastructure projects/activities initiated. -Capacity building programme for year 3 are planned. -Advocacy materials produced. -PMC meeting held. -Annual report prepared.	Milestones (by end of year) -Detailed design of year 4 infrastructure projects/activities initiated. -Capacity building programme for year 4 are planned. -PMC meeting held. -Mid-term evaluation report prepared.	Milestones (by end of year) -100 percent of infrastructure/ natural assets constructed/ developed and handover of completed. -Advocacy materials produced. -Final evaluation report prepared. -Project terminal report submitted. -Regional advocacy -PMC meeting held.

PART IV ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government²

Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:

KINGDOM OF CAMBODIA
Nation Religion King


National Council for Sustainable Development

No: 006 NCS

Phnom Penh, 3rd August 2023

To: The Adaptation Fund Board Secretariat
c/o Global Environment Facility Secretariat
1818H Street, NW, MSN P-4-400
Washington DC, United States of America
Email: secretariate@adaptation-fund.org
Fax: +1 2025223240/5

Subject: Endorsement for Full Proposal on "Increasing climate resilience through small-scale infrastructure investments and enhancing adaptive capacity of vulnerable communities in Kampot and Koh Kong Provinces in Cambodia"

Dear Sir/Madam,


In my capacity, as Designated Authority for the Adaptation Fund in the Kingdom of Cambodia, I confirm that the above full proposal is in accordance with the government's national priorities, especially with the specific commitments to the Cambodia Climate Change Strategic Plan (2014-2023) and the Updated Nationally Determined Contributions (NDC), in implementing adaptation activities to reduce the adverse impacts and risks posed by climate change in Cambodia.


Accordingly, I am pleased to endorse the full project proposal with the support from the Adaptation Fund. The full project proposal builds on the relevant provincial, municipal/district, and community-level climate vulnerability and local development plans/strategies. As such the full project proposal is based on a number of in-depth consultations with the Government and beneficiary communities. In close collaboration with key national government entities and sub-national authorities, the proposal aims to support and build resilience to climate change for infrastructure, environment, and livelihoods through participatory planning and implementation with respect to the needs of women, youth, the elderly, and other vulnerable groups.

Furthermore, the full project proposal builds on the long-standing collaboration between the National Council for Sustainable Development/the Ministry of Environment and the UN-Habitat. Hence, we are grateful for your direct support in this regard.

I, sincerely, hope that this full project proposal will be considered favorably by the Adaptation Fund.

Yours sincerely,


H.E. Ponleak
Secretary of State



Meeoulek Techto Building, Lot 503, Sangkat Tonle Bassac, Khoo Chamkarmon, Phnom Penh, CAMBODIA, Tel: (855) 89 218 376

⁶ Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

B. Implementing Entity certification

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

I certify that this proposal has been prepared in accordance with the guidelines provided by the Adaptation Fund Board and prevailing national development and adaptation plans, including Cambodia Climate Change Action Plan, National Strategic Plan for Sustainable Development and the country's updated Nationally Determined Contribution to the Paris Agreement, and subject to the approval of the Adaptation Fund Board, commit to implementing the project in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the implementing entity will be fully (legally and financially) responsible for the implementation of the project.	
	
Raf Tuts, Director, Global Solutions Division, UN-Habitat	
Date : 18 th August 2023	Tel: +254-20-762-3736 Email: raf.tuts@un.org
Project Contact Person: Laxman Perera, Human Settlements Officer, Regional Office for Asia and the Pacific	
Tel: +81-92-724-7121	
Email: laxman.perera@un.org	

PART V ANNEXES

Annex A Minutes of Consultations

Minutes of Meeting at Kampot PdoE for existing challenges and needs		
Date: 14 November 2022	Venue: Kampot Provincial Department of Environment	Number of attendees: 12 Male – 8, Female – 4
Participant:		
<ul style="list-style-type: none"> - Representatives of Provincial Department of Environment Protection - Representatives of Provincial Department of Coastal and Marine Conservation - Representatives of Provincial Department of Environmental knowledge and Information 		
Objective: Consultation on existing challenges and needs of Kampot Province		

Agenda:

Topics	Remarks
Sharing the experiences of ongoing AF project in Kep Province and Prey Nob District, Preah Sihanouk Province	Mr. Vanna Sok, Habitat Programme Manager (HPM)
Introduction about the new AF proposal ideas	
Sharing of current challenges and existing supports from NGO in Kampot Province	Ms. Chan Soriya: Head of chief, Provincial Department of Environment (PdoE)
Discussion about existing challenges and needs in Kampot Province	All

Proceeding:

The introduction by Mr. Sok Vanna, project manager of the UN-Habitat: He was briefly about the profile of the previous project which were implemented in Kep and Preah Sihanouk provinces currently and we are preparing the new project proposal for submitting on early January 2023, the project will be extended into Kampot and Koh Kong provinces. He explained the purpose of the meeting with the provincial officers and relevant offices today. He also added, we take too long process to get the approval, and in order to submit to the downer, we need some baseline information from the local authorities who stay closely with people in the community. That is the reason why we are here today for get the basic information related the challenges and what can we included in the proposal.

Thereafter, Ms. Chan Soriya: Head of chief, Provincial Department of Environment (pDoE): She raised up about challenges in the Kampot city, currently, there are some supports from organization and NGO that used to implement in here. The problem is that some projects will be ended in short time period so there is very little of knowledge gain to the communities after it is ended. The raising awareness of people is not effective at all because there are ten fishery community and some ecotourism in the whole Kampot community. She suggested several activities in Kampot city such as: natural resources restoration, livelihood improvement (provide the technical of raising seafood eg. Crab, shrimp, and the last is for improvement the infrastructure in some locations are needed.

They recommend for:

- Sangkat Om Pil: Reactivate the Compost recycling which has been sponsor by SCARO project in recent year.
- They asked for proper drainage system due to people living over there disposed all the waste water into the sea directly.
- Extend the project into rural area because there are enough clean water services, they suggest doing in Kompong Bay district, there are damaged road whenever, it has been heavily raining.
- In Kampong Trach district, there are some traditional reservoirs that need to rebuild again for the agriculture, ecosystem services and tourism sector as well.

Participants list:

No.	Name	Gender	Position	Affiliation
1	Minh Chansoriya	F	Head of office	Environmental knowledge and Information
2	Phat Teng	M	Head of office	Environmental Protection
3	Chheng Tim	M	Vice head of office	Environmental knowledge and Information
4	Suy Mali	M	Vice head of office	Coastal and Marine Conservation
5	Kim Sreynea	F	Officer	Environmental knowledge and Information
6	Thanuja Dhamasena	F	GE Advisor	UN-Habitat
7	Din Phearun	F	Project Assistant	CCA4CS
8	Sok Vanna	M	Habitat Programme Manager	UN-Habitat
9	Ney Sophal	M	Vice head of office	City Hall
10	Et Sarith	M	Deputy governor	City Hall
11	Svay Mith	M	Head of office	Administration and Finance
12	Huy Phobraksmeay	M	Head of office	Administration and Finance

Photos of the Meeting



Meeting with Provincial Department of Environment and Municipality Governor, Kampot Province



Compost recycling station at Kampot Province

Minutes of Meeting at Kampong Trach District existing challenges and needs**Date:** 15 November 2022**Venue:** Kampong Trach District Meeting Hall**Number of attendees: 6**
Male – 4, Female – 2**Participant:**

- Representatives of Kampong Trach District Hall
- Representatives of Administration and Finance Office
- Representatives of Agriculture Natural Resources and Environment Office

Objective: Consultation on existing challenges and needs of Kampong Trach District, Kampot**Agenda:**

Topics	Remarks
Sharing the experiences of ongoing AF project in Kep Province and Prey Nob District, Preah Sihanouk Province	Mr. Vanna Sok, Habitat Programme Manager (HPM)
Introduction about the new AF proposal ideas	
Sharing of current challenges and existing supports from NGO in Kampot Province	Mr. Chanly, head of office (Agriculture), Kampong Trach district
Discussion about existing challenges and needs in Kampot Province	All

Proceeding:

Mr. Chanly, head of office (Agriculture), Kampong Trach district: He mentions that Kampong Trach district was supported by Kampu Chea Saart project in recent years. However, some reservoirs here are still needed for our support from Adaptation Fund. He suggests several reservoirs:

- Rebuild Kampong Trach Reservoir with 1.5km width and 2km length. It is located on the left-hand side of the road and close to the Kampong Trach Mountain.
- Lompu Reservoir is located on the right-hand side of the road close to Banteay Meas district and opposite to the Lompu pagoda. It is very important for people's livelihood and for ecotourism purposes.
- Ou Chaneang reservoir is located along national road 31 and close to the Kampong Trach Mountain. It was built since the Pol Pot regime and its benefits to the whole commune for their livelihood, and for fire prevention as well. We plan to get off the grass from the reservoir and then dig it deeper and store more water than in the previous situation.

Participants list:

No.	Name	Gender	Position	Affiliation
1	Nob Savuth	M	Officer	Agriculture Natural Resources and Environment
2	Chay Sophon	M	Officer	Agriculture Natural Resources and Environment
3	Choek Chanly	M	Officer	Agriculture Natural Resources and Environment
4	Thanuja Dhamasena	F	GE Advisor	UN-Habitat
5	Din Phearun	F	Project Assistant	CCA4CS
6	Sok Vanna	M	Habitat Programme Manager	UN-Habitat

Photos of the Meeting

1. Rebuild Kampong Trach reservoir



2. Lompu reservoir



3. Ou Chaneang reservoir

Minutes of Meeting at Koh Kong DoE for existing challenges and needs**Date:** 16 November 2022**Venue:** Koh Kong Provincial
Department of Environment**Number of attendees: 12**
Male –9, Female – 3**Participant:**

- Representatives of Provincial Hall
- Representatives of Provincial Department of Environment
- Representatives of Sangkat Planning and Support Office
- Representatives of Sangkat Dang Tong
- Representatives of Sangkat Smach Meanchey
- Representatives of Sangkat Steung Veng

Objective: Consultation on existing challenges and needs of Koh Kong Province**Agenda:**

Topics	Remarks
Sharing the experiences of ongoing AF project in Kep Province and Prey Nob District, Preah Sihanouk Province	Mr. Vanna Sok, Habitat Programme Manager (HPM)
Introduction about the new AF proposal ideas	
Remarks and appreciation for the selection of Koh Kong as the project target area	Mr. Brak Vichet, governor of Khemarak Phumin city, Koh Kong Province
Discussion about existing challenges and needs in Koh Kong Province	All

Proceeding:

The meeting started with an introduction by Mr. Sok Vanna, project manager of UN-Habitat. He briefly explained the profile of the previous project which has been implemented in Kep and Preah Seyhakhnouk provinces currently. In addition, we are preparing the new project proposal for submission in early January 2023 and UN-Habitat plans to extend the intervention to Kampot and Koh Kong provinces. He explained that the purpose of the meeting is to collect basic information on local challenges and baseline information because sufficient baseline information is required to develop and submit a quality project concept note/ proposal to the donor. Therefore, he requested the support of local authorities who stay close to the potential target communities to support baseline information collection.

Mr. Brak Vichet, governor of Khemarak Phumin city, Koh Kong Province responded to Mr. Vanna that they were very grateful for supporting the project and happy that the Krong Khemara Phoumin was selected as the target area. In addition, participants raised several existing problems in Khemara Phoumin, such as floating houses, solid waste management, wastewater treatment, and lack of sanitation for people living along the canals. Meanwhile, there are some activities that had been done by the municipality, for example, awareness raising on solid waste management, promotion of sub-decree 113, and combating the illegal animal. However, they considered that it seems not effective. Some representatives from each Sangkat also shared some challenges they were facing.

Ms. Pheng Pisey, Deputy Sangkat Chief, Smach Meanchey

- Some infrastructures or road are flooded because it was completely blocked by solid waste or waste management
- Some families are living along the canals long time ago, and they still use the traditional method of waste usage and wastewater disposal that flow directly into the sea
- It found that it affects people's health who use this source of water
- They ask for rebuilding the drainage system in their community and replacing big size of the drainage

Representative of Sangkat Dang Tong

- There are around 2,000 families living in the floating village (Phum 4).
- Since there is no wastewater treatment, they use their wastewater for their daily usage even for drinking. It found that people are exposed to the disease and the village looks so messy.

Sangkat Steung Veng

- Steung Veng is exposed to storm events, drought, floods, and seawater intrusion.
- They suggested fixing five water gates for seawater prevention.

Mr. Hun Marady, Director of the Department of Environment, Koh Kong Province recommended the project team meet and discuss with the Provincial Department of land Management, Urban Planning and Construction for the solution for Phum 4 (floating house). It would be great if the project team has planned to re-organize or design this village to be a livable village with good sanitation and neatness. Local authorities could consult with residents for a short-time relocation to them while restoring the canal and cleaning off the accumulated solid waste in the water. He also requested the project to include the following areas that are under the protected area in the DPOE management.

- Koh Saloa Fishery community (there are freshwater sources but it needs to be taken into account because people use it in the traditional way that depends on the climate. So, they want to restore the freshwater sources over there.)
- Koh Kapi (Ramsar side) 30 minutes for taking on boat (frequency of storm, and there is no freshwater sources).
- Peam Krasoab wide life sanctuary where frequently suffer from flooding.

Participants list:

No.	Name	Gender	Position	Affiliation
1	Sok Vanna	M	Habitat Programme Manager	UN-Habitat
2	Brak Vichet	M	Governor	City Hall
3	Tuon Phearum	M	Deputy governor	City Hall
4	Din Phearun	F	Project Assistant	CCA4CS
5	Thanuja Dhamasena	F	GE Advisor	UN-Habitat
6	Vuth Chandaro	M	Officer	Provincial Department of Environment
7	Hun Marady	M	Director of the Department	Provincial Department of Environment
8	Long Sokheng	M	Head of office	Sangkat Planning and Support
9	Soy Soeun	M	Deputy Sangkat Chief	Sangkat Dang Tong
10	Pheng Pisey	F	Sangkat Chief	Sangkat Smach Meanchey
11	Suon Lifong	M	Head of office	City Hall
12	Kay Krong	M	Sangkat Chief	Sangkat Steung Veng

Photos of the Meeting





Sangkat Steung Veang



Sva Bridge, Prek Svay, Sangkat Steung Veng

Minutes of Meeting on the AF Full Proposal Development		
Date: 18 December 2022	Venue: Department of Climate Change, Ministry of Environment	Number of attendees: 9 Male – 4, Female – 5
Participants:		
<ul style="list-style-type: none"> - Director of the Department of Climate Change, General Department of Policy and Strategy - Representatives of Climate Change Adaptation through Small-scale and Protective Infrastructure Interventions in Coastal Settlements of Cambodia (CCA4CS) - Representatives of UN-Habitat - Project staff of the CCA4CS 		
Objective: Discussion on the proposed outputs/activities and project modality/ approaches in the AF Concept Note.		

Agenda:

Topics	Remarks
Introduction of the meeting	Mr. Vanna Sok, Habitat Programme Manager (HPM) of UN-Habitat
Sharing about the field mission and discussion points identified through the AF Concept Note development phase.	Ms.Thanuja Dharmasena International Consultant
Sharing of insights and feedback on the AF Concept Note development	Dr. Hak Mao, Director of the DCC, GDPS, MoE
Closing	

Proceeding:

At the beginning of the meeting, Mr. Vanna SOK, Habitat Programme Manager (HPM), UN-Habitat Cambodia introduced Dr. Hak Mao, Director of the DCC, to the participants.

Based on the field mission in Kampot and Koh Kong Provinces, Ms. Thanuja Dharmasena, International Consultant, shared the following key discussion points.

- Presentation of the result of the mission for both provinces, Kampot and Koh Kong, and also introduce the overall objectives of the project by each component.
- Brief on the proposed project outputs and the progress of the Concept Note preparation. Based on the field mission from 14th to 16th November 2022, 70% of the Concept Note contents, especially on background and implementation arrangement, were drafted. It is under the reviewing process aiming at its submission by the beginning of January 2023 for the concept note and then submission again after revising the comments on March 2023 then the full proposal will be submitted in August 2023.

The 1st Component is to implement concrete adaptation actions that support natural and physical drainage systems and waterways, and water bodies in Kampot and Koh Kong Provinces to adapt to current impacts of climate change, in particular extreme hydro-meteorological events.

- The project's plan, clear drainage systems, large canals, and waterways in OU Chreaneang Reservoir (Kampong Trach District, Kampot) to meet new adaptation requirements for inundation /flooding/saltwater intrusion and controlling vector-borne and water-borne diseases, and renovate waterways namely Sva Bridge, Prek Svay, Sangkat Steung Veng, Koh Kong for saltwater intrusion prevention (output 1.1).
- Establish/renovate four (4) medium/small-scale water purification plants (with two (2) each in Kampot and Koh Kong Provinces) (Output 1.2). We plan to re-organized the community to get more sanitation through providing the design of their house and clean toilets.
- Renovate (Kampong Trach Reservoir near the Kampong Trach Mountain, Kampot) waterbodies (minor irrigation tanks) in Lompu Reservoirs (Kampong Trach district, Kampot) to support agriculture and inland fishing to Increase the income of vulnerable households, in particular women and youth(output1.3).
- Establish an Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in rural and coastal areas in Koh Saloa and Koh Kapi (community in Ramsar site, Koh Kong Province) (output 1.4). However, this area is out of the project's target area so it is in consideration to include it but we can move to the target area and keep the same activities.
- Strengthening of waste collection and existing management systems, including plastic bags, in Phum 3 (Sangkat Smach Mean Chey, Koh Kong) and establishment of filter nets on the outlet of drainage pipes in Phum 4 (Sangkat Dang Tong, Koh Kong) (output 1.5).

For the 2nd Component

- Restoration of destroyed mangrove ecosystems in Peam Krasaob Community (Mondol Seima District, Koh Kong Province) (output 2.1).
- Elimination and/or control of invasive alien species in coastal wetlands to improve mangrove ecosystem resilience Peam Krasaob Community (Mondol Seima District, Koh Kong Province) (output 2.2).
- Build five (5) sluice gates to prevent saltwater intrusion (Mondol Seima District, Koh Kong Province) (output 2.3).

- Develop Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems, including prevention of waste/pollution in Phum 3 (Sangkat Smach Mean Chey, Koh Kong) and Phum 4 (Sangkat Dang Tong, Koh Kong) (output 2.4).

These proposed outputs will be included in the Concept Note and the project team will prepare the mission again once the Project Concept Note is approved by the donor.

Dr. Hak Hao, Director of the Department of Climate Change, Ministry of Environment, provided his insights as well as recommendations for the new AF Concept Note Development.

- He commented on the overall meaning of the Concept Note including each component.
- He suggests thinking about the project title and all activities in each component.
- He raised up the consistency of wording in the concept note.
- He commented on the 1st component should be focused on upgrading the system and infrastructure. The 2nd component should be focused on improving the mangrove plantation and livelihood in the community. The 3rd component focuses on capacity building.

Participants list:

No.	Name	Gender	Position	Affiliation
1	Sok Vanna	M	Habitat Programme Manager	UN-Habitat
2	Heng Sovanchandara	M	Team Leader	CCA4CS
3	Piseth Sensamras	F	Consultant	UN-Habitat
4	Thanuja Dhamasena	F	GE Advisor	UN-Habitat
5	Sum Cheat	M	Project Coordinator	CCA4CS
6	Khlok Vichet Ratha	F	Deputy Director	DCC, MoE
7	Dr. Hak Mao	M	Director	DCC, MoE
8	Din Phearun	F	Project Assistant	CCA4CS
9	Tin Sophors	F	Financial Assistant	CCA4CS

Photos of the meeting



Minutes of Meeting at Kampot PDoE for Outputs 1.2, 2.3, 3.1, 3.2, and 3.3**Date:** 26 June 2023**Venue:** Kampot Provincial
Department of Environment**Number of attendees:** 35
Male – 20, Female – 15**Participant:**

- Representatives of Provincial Department of Environment
- Representatives of Provincial Department of Water Resources and Meteorology
- Representatives of Provincial Department of Public Works and Transport
- Representatives of Provincial Department of Land Management, Urban Planning, and Construction
- Representatives of Provincial Department of Agriculture, Forestry, and Fishery
- Representatives of Kampot Municipality
- Representatives of Treuy Koah Sangkat
- Representatives of Andoung Khmer Sangkat
- Representatives of Kampong Bay Sangkat
- Representatives of Kampong Kandal Sangkat
- Representatives of Krang Ampil Sangkat

Objective: Consultation on related outputs in Kampot City including output 1.2, 2.3, 3.1, 3.2, and 3.3**Agenda:**

Topics	Remarks
Introduction of the team and the new AF proposal	Mr. Vanna Sok, Habitat Programme Manager (HPM)
Presentation about the outputs in Kampot City in the new AF proposal	Mr. Vanna Sok, Habitat Programme Manager (HPM)
Discussion on each output	All
Coffee Break	All
Group Discussion Group 1: Waste and Wastewater Group 2: Livelihood Improvement and Diversification Group 3: Institutional and Community Capacity Strengthening	All
Presentation of result from group discussions	Group Representatives

Proceeding:

The meeting was started by Mr. Vanna Sok, Habitat Programme Manager, UN-Habitat Cambodia with his introduction of the objectives of the meeting and overview of new AF proposal. Then, he briefly presented the defined outputs in Kampot City (outputs 1.2, 2.3, 3.1, 3.2, and 3.3) based on the approved concept note.

After that, the open discussion was started and was followed by group discussion. As the result, the key points are summarized as following:

Output 1.2: Establish/renovate four (4) medium/small-scale wastewater treatment plants (with two (2) each in Kampot and Koh Kong Provinces)

- The west side of the river covers two Sangkats including Andoung Khmer and Treuy Kaoh.
- It might be hard to find public land to allocate the wastewater treatment plants. Though, the participant from Provincial Department of Land Management, Urban Planning, and Construction added that once the proposal is awarded, the project implementation shall involve the provincial administration who could assist on this matter.
- Sewer network partially exists in Sangkat Andoung Khmer and the municipality estimates that there might be only 30% of households connecting to the sewer network. There were 3 main wastewater discharge outlets connected to the river.
- There is no sewer network in Sangkat Treuy Kaoh.
- It is noted that in the east side of the river, there was sewerage rehabilitation (combined rainwater and wastewater system) and construction of wastewater treatment under ADB project. This central wastewater treatment plant is located in the nearby district, Teuk Chhou, and is around 6 Km from the Kampot city center. The location on Google Map could be found [here](#).
- The land use master plan 2035 includes the proposed wastewater treatment plant locations, but no plan of the construction at the present time.
- The wastewater and rainwater discharge in Kampot City is a combined system and mainly relies on natural streams as the sewer network remains limited.
- Participants claim that the construction of the Hydro Power Plant on the upstream reduces the flooding in the city.
- Generally, by law, every construction needs to request a construction permit from the provincial department of land management, urban planning, and construction. One of the requirements is that every construction requires the safe wastewater discharge such as construction of septic tanks for an individual household or small wastewater treatment plant for businesses. Though, there is a gap on construction inspection.

Output 2.3: Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to increase income of vulnerable households (including women and youth) with initiation of these livelihoods.

- The fisheries are mainly settled in Sangkat Treuy Kaoh. In general, they do fishing and directly sell to retailers.

- In Sangkat Andoung Khmer, people used to earn income from making bamboo baskets, but they stopped it at the present time due to the fact that people prefer plastic baskets.
- The training on how to diversify their vegetable plantation and how to raise livestock to be resilient with climate change.

Output 3.1: Conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, including community-based in community/sub-national/district development plans and promote climate change/disaster resilience in local development plans.

- There was the climate change vulnerability assessment conducted by UNEP in 2015.

Output 3.2: Capacity building of provincial and sub-national level Government entities and communities on mainstreaming climate change adaptation

- The target stakeholders potentially include all provincial departments, provincial administration, municipality, Sangkats, and communities.

Output 3.3: Capacity building of sub-national level Government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems, in Phum 3 (Sangkat Smach Meanchey, Koh Kong)

- The awareness of plastic reduction should be stressed.
- This output might include the re-operation of the composting plant as the demo action of the training. In addition, the marketing of the compost made from municipal solid waste should be added to the training to ensure the demand.
- Waste segregation at sources should be promoted, but there is still limited existing recycling activities.
- The impacts from improper waste management to climate change.
- Some initiatives of plastic reduction should be implemented as the pilot at weekend markets and marts. For example, the sellers at the weekend market are required to use biodegradable packaging such as banana leaf, paper etc. At marts, the cashiers should always ask the customers to take plastic bags or not and/or the plastic bags could be charged.
- Household composting should be also piloted by using one or two households to start as role models in their community.
- The sewerage network maintenance such as regular cleaning should be a topic for capacity building.

Participants list:

No.	Name	Gender	Position	Affiliation
1	Pov Sinath	F	Commune Council	Kampong Kandal
2	Keo Sopheap	F	Commune Council	Kampong Kandal
3	Mey Touch	F	Vice Chief of Commune	Krang Ampil
4	Su Danavy	F	Commune Council	Krang Ampil
5	Dao Soth	M	Chief of Office	PDoE
6	Sany Sofy	M	Chief of Office	City Hall
7	Meas Monyta	F	Officer	City Hall
8	Nhit Savy	M	Vice Chief	PDoWRAM
9	Kong Bunthoeun	M	Deputy Governor	City Hall
10	Kheng Sokhorn	F	Vice Chief of Commune	Andoung Khmer
11	Leng Sophanna	F	Officer	PDoE
12	Eang Mao	M	Officer	PDoE
13	Oum Monyrath	F	Vice Chief	PDoPWT
14	Minh Chansoriya	F	Chief of Office	PDoE
15	Lim Dara	M	Chief of Office	PDoPWT
16	Piseth Sensamras	F	Programme Officer	UN-Habitat
17	Heng Long	M	Commune Council	Krouy Koh
18	On Channary	F	Commune Council	Kampong Bay
19	Din Phearun	F	Project Assistant	CCA4CS
20	Eng Senghak	M	Intern	DCC, MoE
21	Sok Vanna	M	Habitat Programme Manager	UN-Habitat
22	Mom Chhialeng	M	Project Staff	DCC, MoE
23	Sim Sokly	F	Officer	PDoE
24	Kim Sreynea	F	Officer	PDoE
25	Wang Qian	F	Consultant	Arcadis
26	Robinson Garo Fobediso	M	Consultant	Arcadis
27	Jun Fujulira	M	Programme Officer	UN-Habitat
28	Paolo Meotri	M	Consultant	Arcadis
29	Heng Sovanchandara	M	Team Leader	CCA4CS
30	Sim Sokchea	M	Deputy Director	PDoLM
31	Im Sanbol	M	Chief Office	PDoE
32	Pan Chettra	M	Vice Chief of Office	PDoE
33	Teng Vanthoeun	M	Chief Office	PDAFF/KAP
34	Hong Sambo	M	Chief Office	PDAFF/KAP
35	Binod Shrestha	M	Resource person	UN-Habitat

Photos of the Meeting



Participant' feedbacks on the existing sewer network



Discussion about the locations of wastewater discharge outlets (output 1.2)



Group1: Discussion on Solid Waste and Wastewater



Group2: Discussion on Livelihood Improvement and Diversification



Group 3: Discussion on Institutional Capacity Building



Presentation of the result of the group discussion

Photos of Sites Visit (25 June 2023)

1. Composting Plant ([Location](#))

- Composting plant become the temporarily settlement for waste collection workers live.



2. Pumping Station (ADB project) ([Location](#))

- The pumping station is under rehabilitation.
- It is located near the composting plant.



3. Wastewater network nearby roundabout ([Location](#))

- The size of the sewer is 1mx1.4m.
- Along the way connecting the canal and the river, it is hard to observe as there are buildings.



4. Settlement visit ([Location](#))

- There are around 20 households. They have been live there for years.
- The solid waste and wastewater are directly discharged to the river.



Photos of Sites Visit (26 June 2023)

1. BCE stream, Sangkat Andoung Khmer ([Location](#))

- There is direct wastewater discharge into the stream.
- There is some private construction built into this stream. It makes this stream is water pollution with bad smell.
- The water is salty when the dry season and it is less salty when the rainy season. It is just because of the mix up together with fresh water that flow from the upstream river.



2. Daun Teav Kroam village, Fishery Community, Sangkat Traeuy Kaoh ([Location](#))

- Daun Teav Kroam is a community cover around 500-600 families. Some are living on the river water and they directly discharge the wastewater.
- Most of them are Khmer Muslim and their main occupation is fishery.
- There is no land for the agriculture or aquaculture.
- There is no any sewer network in this village.
- Public water supply is accessible.
- This village could be flooded (around 20-30cm).





3. Wastewater Discharge Points ([Location](#))
- A man who is living there said the discharged wastewater is sometimes black.



4. Drainage system, National Highway 3 ([Location](#))
- The canal is collected from the upstream to the river, but it seems the water doesn't flow due to plastic waste clog.



Minutes of Meeting at Kampong Trach District Hall for Outputs 1.1, 1.4, 1.5, 2.3, 3.1, 3.4,3.5		
Date: 27 June 2023	Venue: Kampong Trach District Meeting Hall	Number of attendees: 34 Male –29, Female – 5
Participant:		
<ul style="list-style-type: none"> - Representative of Kampong Trach District - Representative of communes in Kampong Trach District 		
Objective: Consultation on related outputs in Kampong Trach District including output 1.1, 1.4, 1.5, 2.3, 3.1, 3.4, 3.5		

Agenda:

Topics	Remarks
Introduction of the team and the new AF proposal	Mr. Vanna Sok, Habitat Programme Manager (HPM)
Welcome remarks	Deputy Governor of Kampong Trach District
Coffee Break	All
Discussion on each output	All

Proceeding:

The meeting was started by Mr. Vanna Sok, Habitat Programme Manager, UN-Habitat Cambodia with his introduction of the objectives of the meeting and overview of new AF proposal. Then, he briefly presented the defined outputs in Kampong Trach District (outputs 1.1, 1.4, 1.5, 2.3, 3.1, 3.4, and 3.5) based on the approved concept note. In his welcome remarks, the deputy governor of Kampong Trach District thanked the team for considering his district as the target area in new AF proposal and then briefly presented the potential economic activities and livelihood. After that, the open discussion started. As the result, the key points are summarized as following:

Output 1.1: Clear drainage systems, large canals, and waterways in Ou Chreaneang Reservoir (Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/flooding/saltwater intrusion and controlling vector-borne and water-borne diseases, and renovate waterways namely Sva Bridge, Prek Svay, Sangkat Steung Veng, Koh Kong for saltwater intrusion prevention.

- Ou Chreaneang reservoir is in Kampong Trach Lech commune which has around 7,000 population.
- The reservoir size is around 20-30 ha and 5 ha of the reservoir used to be rehabilitated. During the rehabilitation, the excavated soil was used to the embankment which also plays the role as accessible roads.
- There is a water user group community who does the maintenance of the gates.
- The water from the reservoir could be served for agricultural purposes, daily consumption, and fishing.
- The district commits to plant the trees in this reservoir to make it more greenery.
- The deputy governor added that as climate change has occurred, the rehabilitated reservoir would be the reserved water for birds in the protected areas. Though, at the present time, the water is sufficient.

Output 1.4: Renovate water bodies (minor irrigation tanks and embankments), namely, Kampong Trach Reservoir near the Kampong Trach Mountain in Kampot, Lompu Reservoir in Kampong Trach district of Kampot province.

- The Lompu Reservoir used to be filled by water in the 1950s and there were a lot of fishes and other river-based biodiversity which could be a part of villagers' livelihood.
- The Lompu and Kampong Trach reservoirs are connected.
- There are two water gates and one spillway at the west side of the Lompu reservoir to discharge the water during the rainy season.
- These two reservoirs are in four communes including Prasat Phnom Khyang, Damnak Kantuot Khang Cherng, Damnak Kantuot Khang Tboung, and Ang Sophy.

Output 1.5: Resilient housing and toilet designs developed, and demonstration housing units constructed and Output 3.4: Training communities in target locations on resilient housing/latrines construction technique [Linked to Output 1.5]

- The poor who normally build their houses from metal sheets are easily affected by strong wind.
- There were three communes where people experienced strong wind. Those include Ang Sophy, Svay Tong Khang Tboung, and Svay Tong Khang Cheurng.
- Most people don't construct homes themselves but they hire carpenters.
- It is common that people don't construct the proper septic tank and they only have the pit connected to the latrine and discharges to the ground.

Output 2.3: Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to increase income of vulnerable households (including women and youth) with initiation of these livelihoods.

- There were eco-tourism packages in the districts which might include the visit at Kampong Trach Mountain, the horse riding, the visit to the pepper farm, the visit at the protected area for birds.
- There are two international passes to Vietnam. The government plans to create the market at the boundary of Vietnam and Cambodia at those passes.
- The protected area, Boeng Anlong Pring, is around 217 ha and has hundreds of birds.

- The deputy governor suggested ways to attract more tourists to his districts while the eco-tourism package is available.

Output 3.1: Conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, including community-based in community/sub-national/district development plans and promote climate change/disaster resilience in local development plans.

- There was not any assessment before.

Output 3.5: Organising communities to manage, monitor and maintain infrastructure investments to ensure sustainability. [Linked to Outputs 1.1, 1.4 and 1.6].

- Those might include water user groups, five communes located nearby the reservoirs such as Kampong Trach Khang Lech, Prasat Phnom Khyang, Damnak Kantuot Khang Cherng, Damnak Kantuot Khang Tboung, and Ang Sophy communes.

Participants list:

No.	Name	Gender	Position	Affiliation
1	Thorm Sovorn	M	Officer	Commune Support Planning
2	Meng Sothany	F	Officer	Commune Support Planning
3	Chhay Sophon	M	Officer	Agriculture Natural Resources and Environment
4	Khim Sami	M	Deputy District Governor	Kampong Trach District
5	Yin Sorine	M	Deputy District Director	Kampong Trach District
6	Kao Chanphannarith	M	Chief of Office	Land Management Office
7	Rath Soheoung	F	Officer	Agriculture Natural Resources and Environment
8	Van Chanmakara	M	Officer	Land Management Office
9	Mom Chhaileng	M	Project Staff	DCC/MoE
10	Ou Thy	M	Officer	District Hall
11	Oev Samououn	M	Village chief	Phnom Khchong
12	Tes Sari	M	Village representative	Khang Lech
13	Meas Oeun	M	Village vice chief	
14	Chheng Choeun	M	Village chief	Derm Pour
15	Sum Channy	M	Village vice chief	Chrous Tasoum
16	Net Sann	M	Village representative	
17	Keo Ly	M	Village chief	Puoy Tong Khang Cherng
18	Hun Teng	M	Commune chief	Prasat Phnom Doung
19	Heng Sokha	M	Commune chief	Angsophy
20	Binod Shrestha	M	Resource person	UN-Habitat
21	Jun Fujihira	M	Programme Officer	UN-Habitat
22	Sok Vanna	M	Habitat Programme Manager	UN-Habitat
23	Heng Sovanchandara	M	Team Leader	CCA4CS
24	Wang Qian	F	Consultant	Arcadis
25	Robinson Garo Fobediso	M	Consultant	Arcadis
26	Paolo Meotri	M	Consultant	Arcadis
27	Eng Senghak	M	Intern	DCC, MoE
28	Chea Vann	M	Village chief	Bay Tea
29	Lou Pouch	M	Villager representative	Bay Tea
30	Din Phearun	F	Project Assistant	CCA4CS
31	Nhaem Sam Ol	M	Commune Council	Kampong Trach Khang Kert
32	Doung Hann	M	Village chief	Kampong Trach Ti Muy
33	Prom Kimcheur	M	Commune chief	Kampong Trach Khang Lech
34	Piseth Sensamras	F	Programme Officer	UN-Habitat

Photos of the Meeting



Photos of Sites Visit

1. **Ou Chraneang reservoir** [\(location\)](#)

- Ou Chraneang reservoir is very important for people around here as well as for the fire protected because there is a market just next to it.
- Many people rely on it for agriculture purposes and for daily lives.
- The reservoir is mainly potential for tourism because this is a place where the people can come to relax during their trip.





2. The Lompu Reservoir (location)

- Lompu Reservoir is around 6-7 km, it was dug by King Sihaknouk regime in 1952. It is to prevent the saltwater and freshwater mix up together.
- The water flows from Vor mountain into Phnom Domrey then flows into Kampong Trach and finally it discharges to the sea.
- The local authority said there is a lot of grass which is composed in the reservoir every year around 10cm, so that makes the reservoir become shallow year by year.



3. Kampong Trach Reservoir (location)



Minutes of Meeting at Koh Kong Provincial Department of Environment (pDoE) for Outputs 1.2, 1.3, 1.5, 1.6, 2.2, 2.3, 3.1, 3.3, and 3.4**Date:** 28 June 2023**Venue:** Koh Kong Provincial Department of Environment**Number of attendees:** 30
Male – 21, Female – 9**Participant:**

- Representative of Provincial Department of Environment
- Representative of Provincial Department of Water Resource Management and Meteorology
- Representative of Provincial Department of Land Management Urban Planning, and Construction
- Representative of Khmerak Phoumin City
- Representative of Sangkat Dang Tong
- Representative of Sangkat Smach Mean Chey
- Representative of Sangkat Steung Veng

Objective: Consultation on related outputs in Khmerak Phoumin City including output 1.2, 1.3, 1.5, 1.6, 2.2, 2.3, 3.1, 3.3, and 3.4**Agenda:**

Topics	Remarks
Introduction of the meeting	Mr. Veth Sonin, Deputy Director of PDoE
Welcome remarks	Mr. Seng Dara, Deputy Director of Provincial Administration Unit
Introduction of the team and the new AF proposal	Mr. Vanna Sok, Habitat Programme Manager (HPM)
Presentation about the outputs in Kampot City in the new AF proposal	(HPM)
Coffee Break	All
Group Discussion	All
Group 1: Waste and Wastewater	
Group 2: Livelihood Improvement and Diversification	
Group 3: Institutional and Community Capacity Strengthening	
Results from the group discussion on related outputs	Group Representative
Wrap up and summary	Seng Dara, Deputy Director of Provincial Administration

Proceeding:

The meeting was started by Mr. Veth Sonin, Deputy Director of pDoE and followed by Mr. Seng Dara, Deputy Director of Provincial Administration Unit. Then, Mr. Vanna Sok, Habitat Programme Manager, UN-Habitat Cambodia emphasizes again the objectives of the meeting and overview of new AF proposal. Then, he briefly presented the defined outputs in Khmerak Phoumin City (outputs 1.2, 1.3, 1.5, 1.6, 2.2, 2.3, 3.1, 3.3, and 3.4) based on the approved concept note. Both Deputy Director of pDoE and Deputy Director of Provincial Administration Unit thanked the team for considering Koh Kong Province as the target area in new AF proposal and encouraged all participants to actively engage in the discussion. As the result, the key points are summarized as following:

Output 1.2: Establish/renovate four (4) medium/small-scale wastewater treatment plants (with two (2) each in Kampot and Koh Kong Provinces).

- Two locations nearby the streams shall be considered.
- Based on Landuse Master Plan, the government has reserved 3 ha of land for wastewater treatment. Though, there is no any plan for construction yet.
- Only around 10% of population are accessible to sewer networks. Generally, households manage black water by collecting to the pit and discharging to the ground.
- Most of businesses directly discharge wastewater to the streams which are then connected to the sea.
- The two streams in the city mainly receive the wastewater water and it has been black and dirty.
- Before, Dang Tong Market was always flooded (flash flood), but after the installation of sewer networks around the market, the area wasn't flooded any more. There are two areas being flooded most of the time. One is in Phum 3, Sangkat Smach Mean Chey.

Output 1.3: Establish of filter nets on the outlet of drainage pipes in Phum 4 (Sangkat Dang Tong, Koh Kong) to capture waste.

- The participants strongly support this output and suggested if the project could consider the provision of the incinerator to safely burn the waste as the current landfill is not technically designed and more likely like open dumping.

Output 1.5: Resilient housing and toilet designs developed, and demonstration housing units constructed and Output 3.4: Training communities in target locations on resilient housing/latrines construction technique [Linked to Output 1.5]

- The poor who normally build their houses from metal from sheets are easily affected by strong wind.
- Most people don't construct home themselves, but they hire the carpenters.

- It is common that people don't construct the proper septic tank and they only have the pit connected to the latrine and discharges to the ground.
- Sangkat Dang Tong and Sangkat Smach Mean Chey, some houses are damaged by wind and some are like floating houses. Their house is commonly 5m x 6m or 7m x 8m. The cost is around \$ 2,000 - \$5,000. For floating house, the pillar is 6m from the ground to protect from flooding.

Output 1.6. Build five (5) sluice-gates and embankments to prevent saltwater intrusion (Mondul Seyma District, Koh Kong Province).

- Two locations are in Phum 1, Sangkat Smach Mean Chey.
- Prek Svay Village, Sangkat Steung Veng- The saltwater penetrates to rice field.
- At a bridge at the boundary of Sangkat Steung Veng and Sangkat Dang Tong
- Khing Khoung Point in Phum Steung Veng, Sangkat Steung Veng

Output 2.2: Develop Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems, including prevention of waste/pollution in Phum 3 (Sangkat Smach Meanchey, Koh Kong) and Phum 4 (Sangkat Dang Tong, Koh Kong).

- This output is moved to Mondol district.

Output 2.3: Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to increase income of vulnerable households (including women and youth) with initiation of these livelihoods.

- Most of the people (around 75.1%) have main occupation in service provision. Other two main sectors are agriculture (24.5%) and handicraft (0.4%).

Output 3.1. Conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, including community-based in community/sub-national/district development plans and promote climate change/disaster resilience in local development plans

- The participants haven't known if there are any existing assessment.

Output 3.3: Capacity building of sub-national level Government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems, in Phum 3 (Sangkat Smach Meanchey, Koh Kong)

- There is limited public participation in waste management. Especially, the willingness to pay for waste collection service remains low (only around 10% are willing to pay).

Output 3.4. Training communities in target locations on resilient housing/latrines construction technique [Linked to Output 1.5]

- The training should engage local authority, carpenters and provincial departments of land management, urban planning, and construction.

Participants list:

No	Name	Gender	Position	Affiliation
1	Seng Dara	M	Deputy Director of Administration	Provincial Hall
2	Tina Rady	F	Vice chief of office	PDoWRAM
3	Nhaem Daravuth	M	Officer	PDoWRAM
4	Mean Moun	M	Village Member	Prek Svay village
5	Chhong Thavorn	M	Commune Council	Steung Veng
6	Teup Pov	F	Village Member	Dang Tong
7	Sok Sophors	M	Officer	Fauna and Flora
8	Pen Noeun	F	Team leader	Fauna and Flora
9	Prak Mali	F	Team leader	Smach Meanchey
10	Nhet Sopheak	M	Commune council	Smach Meanchey
11	Vet Sonim	M	Deputy Director	PDoE
12	Ban Leakena	F	Team Leader	Fauna and Flora
13	Jun Fujihira	M	Programme Officer	UN-Habitat
14	Thiv Theanthav	M	Deputy Director	City Hall
15	Sos Sun	M	Village Member	Dang Tong
16	Oi Vann	M	Chief of Office	PDoE
17	Mith Banbora	M	Chief of Office	PDoLMUPC
18	Kang Thorn	M	Chief of Office	PDoE
19	Pech Pak	M	Village Member	Dang Tong
20	Vuth Chandaro	M	Officer	PDoE

21	Pheong Pisey	F	Commune Chief	Smach Meanchey
22	Binod Shrestha	M	Resource person	UN-Habitat
23	Jun Fujihira	M	Programme Officer	UN-Habitat
24	Sok Vanna	M	Habitat Programme Manager	UN-Habitat
25	Wang Qian	F	Consultant	Arcadis
26	Robinson Garo Fobediso	M	Consultant	Arcadis
27	Paolo Meotri	M	Consultant	Arcadis
28	Eng Senghak	M	Intern	DCC, MoE
29	Din Phearun	F	Project Assistant	CCA4CS
30	Piseth Sensamras	F	Programme Officer	UN-Habitat

Photos of the Meeting



Welcome remarks by Deputy Director of Provincial Administration Unit



Participant asking about the demo resilient house



Group1: Discussion on Solid Waste and Wastewater



Group2: Discussion on Livelihood Improvement and Diversification



Group 3: Discussion on Institutional Capacity Building



Presentation of the result of the group discussion

Photos of Site Visit

1. Smach Meanchey Village, Sangkat Smach Meanchey ([location](#))



2. Informal settlement houses in Smach Meanchey Village, Sangkat Smach Meanchey ([location](#))

- It is an informal settlement community is next to the private guesthouse
- There are very crowded, around 107 families living here with poor waste management
- Most of them are fisherman and some of them are khmer-muslim who living here many long year
- The team just looking for place to install the water treatment plant but the issues there is no place to build it
- The local authorities request to provide clean toilets over here to the people.



3. Koh Pour Bright, Phum 1, Sangkat Smach Meanchey ([location](#))

- There is no public land for installing the water treatment plant so it could be put the net to prevent the household waste get into the sea
- The area is located in Phum1, Sangkat Smach Meanchey, is along the national road
- Another area for putting the net could be found here.



4. Sangkat Steung Veng, 3 hectares of reservation for water treatment plant ([location](#))
- There are 3 hectares of public land that the government plan to install water treatment plant here
 - There is less people around this area so it is not suitable for building the water treatment plant because there is less of waste water from the household
 - It may destroy the natural ecosystem over here to get the construction
 - In the area's condition is a wetland so it is able to flow the water by nature already.



5. Sva Bridge, Sangkat Dang Tong and Sangkat Smach Meanchey ([location](#))



6. Watergate, Snagkat Steung Veng and Dang Tong ([location](#))



7. Phum 4, Sangkat Dang Tong ([location](#))

- The place near the market and ...primary school
- Clean the waste from the water and put the net



Minutes of Meeting at Peam Krasoab Commune Hall for Outputs 1.5, 1.7, 2.1, 2.3, 3.1, and 3.4		
Date: 29 June 2023	Venue: Peam Krasoab Commune Hall	Number of attendees: 32 Male – 22, Female – 10
Participants: <ul style="list-style-type: none"> - Representatives of Mondol Seima District - Representatives of Peam Krasoab Commune - Representatives of Tuol Korki Commune - Representatives of Bak Khlomng Commune - Representatives of Peam Krasoab Community - Representatives of Beoung Kachhang 		
Objective: Consultation on related outputs in Mondol Seima including output 1.5, 1.7, 2.1, 2.3, 3.1, and 3.4		

Agenda:

Topics	Remarks
Introduction of the meeting	Mr. Than Vinai, Deputy Director of Administration Unit
Introduction of the team and the new AF proposal	Mr. Vanna Sok, Habitat Programme Manager (HPM)
Presentation about the outputs in Mondol Seima District in the new AF proposal	Mr. Vanna Sok, Habitat Programme Manager (HPM)
Coffee Break	All
Open Discussion on each output	All
Field visits to the locations of related outputs	All

Proceeding:

The meeting was started by Mr. Than Vinai, Deputy Director of Administration Unit and followed by Mr. Vanna Sok, Habitat Programme Manager, UN-Habitat Cambodia who presented the defined outputs in Mondol Seima District (outputs 1.5, 1.7, 2.1, 2.3, 3.1, and 3.4) based on the approved concept note. As the result, the key points are summarized as following:

Output 1.5: Resilient housing and toilet designs developed, and demonstration housing units constructed.

- Every year, some houses in Peam Krasoab Community are affected by strong wind.
- Every year, 10-15 houses in Beong KaChhang Community is affected by strong wind, sea level rise, and coastal erosion. This community is on island around 3km from the mainland. Those affected houses are mostly built by house owners.
- In general, the poor face this challenge as they spend limited budget for construction materials and mostly build by themselves.
- There are 37 vulnerable families in Beong KaChhang Community.
- When sea level rises, some houses are flooded for 2-3 hours in the two communities.
- In Beong KaChhang Community, people face challenge with water supply. They connect the pipe network from the mainland, but the water is not sufficient. The community leader suggests if the project could consider enlarging the main pipe and if the water treatment system for drinking water could be built there to reduce the use of plastic bottle. The cost of pipe water is 4,000 Riels (1USD)/m3.
- Koh Chak Village, Tuol Koki Commune faces the challenge of strong wind.

Output 1.7: Establish Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Koh Saloa and Koh Kapi (community in Ramsar site, Koh Kong Province).

- The location shall be changed to Boeung Kachhang Community.
- In both communities, most people are fisher mans. The early warning system is important.

Output 2.1: Restoration of destroyed mangrove ecosystems in Peam Krasoub Community (Mondol Seima District, Koh Kong Province), including elimination and/or control of invasive alien species in coastal wetlands to improve mangrove ecosystem resilience.

- In overall, Peam Krasoub Community has 1,326 ha of mangrove forest. The community has rehabilitated 333 ha. They estimated that there are around 15% of mangrove forest (150 ha) need restoration.
- Beong KaChhang Community has 728 ha. It is not required to restore the mangrove in this community, but the community leader stressed that it is required the support to monitor and conserve the mangrove forest.

Output 2.3: Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation, mat making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to increase income of vulnerable households (including women and youth) with initiation of these livelihoods.

- Most people are fisher man in the two communities.
- Peam Krasoub Community has 400 families and Beong KaChhang Community has 157 families.
- In Peam Krasoub Community, there 125 families raise green clam. The green clam market relies on Thailand. There is no branding or quality control yet. The community stressed that it would be good if the project would support the training on green clam processing, quality control, and the registration to Ministry of Commerce.

- In Boeng KaChhang Community, the leader said there is no tourist there yet. He suggested if the project would support to training about how to create the attractive eco-tourism packages on the island.

Output 3.1. Conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, including community-based in community/sub-national/district development plans and promote climate change/disaster resilience in local development plans.

- The participants haven't known if there are any existing assessment.

Output 3.4. Training communities in target locations on resilient housing/latrines construction technique [Linked to Output 1.5]

- There are local carpenters, but the owners of the houses also join in the construction.

Participants list:

No.	Name	Gender	Position	Affiliation
1	Robinson Garo Fobediso	M	Consultant	Arcadis
2	Eng Senghak	M	Intern	DCC, MoE
3	Hong Pengsan	M	Officer	PDoLMUPC
4	Lon Piseth	M	Officer	
5	Tep Sokha	M	Programme Manager	Mordok
6	Chim Nin	M	Officer	
7	Yeom Panha	M	Financial Assistant	Tuol Korki
8	Tit Chhuochhip	F	Commune Assistant	Peam Krasoup
9	In Vichea	M	Officer	Mondol Seima District
10	Sok Vanna	M	Habitat Programme Manager	UN-Habitat
11	Heang Sopheak	F	Commune Assistant	Peam Krasoup
12	Thann Nai	M	Deputy of Administration	District Hall
13	Kuy Sunheng	M	Commune Council	Bak Krong
14	Sarin Chanponler	M	Financial Assistant	Bak Krong
15	Khim Sanith	M	Vice Chief of Commune	Tuol Korki
16	Song Romdeng	F	Chief of Office	Mondol Seima District
17	Piseth Sensamras	F	Officer	UN_Habitat
18	Wang Qian	F	Consultant	Arcadis
19	Paolo Meotri	M	Consultant	Arcadis
20	Sum Sokhen	F	Committee	Beung Kachhang community
21	Soum Yi	M	Committee	Beung Kachhang community
22	Din Phearun	F	Project Assistant	CCA4CS
23	Lorn Rith	M	Director	Beung Kachhang community
24	Born Sopheak	F	Deputy Director	Beung Kachhang community
25	Oum Rino	F	Committee	Beung Kachhang community
26	Khut Manyvann	F	Community Representative	Tuol Korki
27	Tith Choeun	M	Vice Chief of Commune	Peam Krasoup
28	Sao Samnang	M	Committee	Peam Krasoup
29	Siv Bunthoeun	M	Vice Chief of Office	PDoLM
30	Phann Savoeun	M	Commune Council	Peam Krasoup
31	Seak Sabun	M	Director	Peam Krasoup
32	Jun Fujihira	M	Programme Officer	UN-Habitat

Photos of the Meeting



Opening session



Peam Krasoab community representative's feedbacks

Photos of Site Visit

1. Damaged house in Peam Karasoub commune, Mondul Seima district ([location](#))
 - This community is a small village and most of them are fisherman
 - The house is impacted by strong wind in 2022



2. Mangrove Forest in Peam Karasob Mangrove Ecotourism, Mondul Seima district ([location](#))
 - This place is a potential for ecotourism; mangroves are anchored in the bays and channels that weave among the many islands, protecting the coastline from erosion, providing vital habitat for marine species, and sheltering migratory bird species
 - The distinctive Irrawady dolphin and finless porpoise can be found swimming in the waterways of the sanctuary, a worthy attraction for both local and international tourists.





Minutes of Meeting on the AF Full Proposal Development**Date:** 04 July 2023**Venue:** Ministry of Environment**Number of attendees:** 6

Male – 6, Female – 0

Participants:

- Secretary of State, Ministry of Environment and 2nd Vice Chair of the National Council for Sustainable Development (NCSD)
- Director of the Department of Climate Change, General Department of Policy and Strategy
- Representatives of Climate Change Adaptation through Small-scale and Protective Infrastructure Interventions in Coastal Settlements of Cambodia (CCA4CS)
- Representatives of UN-Habitat

Objective: Discussion on the proposed outputs/activities and project modality/ approaches in the AF Full Proposal.**Agenda:**

Topics	Remarks
Introduction of the meeting	Mr. Vanna Sok, Habitat Programme Manager (HPM) of UN-Habitat
Sharing about the field mission and discussion points identified through the AF Full Proposal development phase.	Mr. Binod Shrestha, resource person of UN-Habitat
Sharing of insights and feedback on the AF Full Proposal development	Dr. Tin Ponlok, Secretary of State, Ministry of Environment (MoE), and 2 nd Vice Chair of the NCSD
Closing	

Proceeding:

At the beginning of the meeting, Mr. Vanna SOK, Habitat Programme Manager (HPM), UN-Habitat Cambodia introduced Dr. Tin Ponlok, Secretary of State, to the participants.

Based on the field mission in Kampot and Koh Kong Provinces last week, Mr. Binod Shrestha, a resource person of UN-Habitat, shared the following key discussion points.

- Brief on the proposed project outputs and the progress of the proposal preparation. Based on the field mission from 24th to 30th June, 70% of the proposal contents, especially on background and implementation arrangement, were drafted. It is under the reviewing process aiming at its submission by the beginning of August.
- To promote the participation of local authorities and communities, the project plans to improve the reservoir (Output 1.1) but also would like to request local stakeholders to take the initiative of tree planting and beautification of the site. The project is considering the possibility of the community-based eco-business model. For instance, the communities will promote eco-tourism around the reservoir and divide the revenue among involved community members and relevant local institutions and authorities.
- The project team is still considering an appropriate location for the wastewater treatment plants (output 1.2) but possible locations and ideas were already discussed with the Arcadis experts during the field mission. The project carefully considers not only the construction of infrastructure but also the future maintenance and operation of the infrastructure.
- The project also plans to construct resilient housing (Output 1.5) in the same area rather than constructing a demo house in each target commune. As land tenure could be an issue, the project will carefully collect data and identify suitable locations and beneficiary households. The project also considers the importance of reflection of culture and expandable design.
- To maximize the impact of the intervention to avoid the clogging of solid waste and accumulation in waterbodies, the project plans to establish filter nets in all four outlets of drainage pipes in Koh Kong Province in addition to subsidiary canals (Output 1.3). Support and involvement of the city and communities are required to maintain the effectiveness of established filter nets in the area.
- The field mission identified a community where people install waste collection boxes in front of houses and collect aluminum cans. However, they dispose of plastic bottles into the waterbodies. Therefore, the project is considering building the capacity of communities to collect and manage plastic bottles properly (i.e., sell to recyclers and gain additional income).
- The project will mainstream the People's Process to promote people's participation in most of the outputs and activities.

Dr. Tin Ponlok, Secretary of State (Ministry of Environment) provided his insights as well as recommendations for the new AF Full Proposal Development.

- Dr. Tin Ponlok suggested using relevant climate change projections data so that appropriate infrastructure could be identified in the future. He further suggested looking for a financial scheme to ensure the sustainable maintenance and operations of the infrastructure.
- For the idea of the community-based eco-business model, He recommended reviewing existing cases (i.e. Kirirom National Park) and lessons learned from other projects. He also recommended to review the Payment for Ecosystem Service Scheme (As of now, Cambodia has 2 pilot projects and one of them is in Siem Reap Province and another is in Kbal Chhay, Preah Sihanouk Province).
- Referring to the project activity to clean solid waste especially plastic waste from canals, He suggested to coordinate with the UNDP project team because they are implementing the marine-plastic project and they have a component on waste

management (Funded by the Government of Japan). The keys to encouraging plastic use reduction are capacity building, economic incentives, and policy and regulations.

- The resilient housing to be built for the most vulnerable households should be resilient, durable, and livable but also low-cost for construction and maintenance, and replicable in other locations. Reflection of cultural aspects and expandable design are also important. The project needs to prepare guidelines to define suitable resilient housing for the coastal provinces of Cambodia. Before requesting cost sharing (cash or in-kind contribution) from the beneficiary households, the project should construct a model house and show it to the beneficiaries.
- He recommended to organize a few consultation meetings with international and national stakeholders from relevant ministries after listing all concerns or discussion points identified through the AF full proposal development process.
- He concluded that MoE's partnership with UN-Habitat is critical to contribute the climate change adaption and resilience in Cambodia. He strongly believed that this new proposal will be successful.

Participants list

No	Name	Gender	Position	Affiliation
1	Dr. Tin Ponlok	M	Secretary of State, Ministry of Environment/ 2nd Vice Chair of the National Council for Sustainable Development (NCSD)	Ministry of Environment/ NCSD
2	Dr. Hak Mao	M	Director of the Department of Climate Change, General Department of Policy and Strategy	Ministry of Environment
3	Vanna Sok	M	Habitat Programme Manager	UN-Habitat
4	Binod Shrestha	M	Resource Person	UN-Habitat
5	Sovanchandara Heng	M	National Team Leader	CCA4CS
6	Jun Fujihira	M	Programme Officer	UN-Habitat



Annex B Summary of Proposed Physical Construction Activities (See [link for detailed sheet](#))

Output 1.1. Rehabilitate and improve embankment in Ou Chraneang Reservoir (Kampong Trach Khang Lech commune, Kampong Trach District, Kampot)

INTRODUCTION

Deliverables	<ul style="list-style-type: none"> • Site investigation and design • Increase capacity of the reservoir and widen existing embankment • Landscaping • Modifying outfall and gauging station • Improving friendly environment
Beneficiaries	27,264 people
Budget	US\$811,600.00
Location	Kampong Trach Khang Lech commune, Kampong Trach District



Problem statement

Ou Chranenag Reservoir, constructed during the Khmer Rouge regime (1975-1979), currently faces limitations in providing water, which is mainly available during the wet season, resulting in drying out at the onset of the dry season. The local community aims to extend the availability of water throughout the year for various purposes, such as agriculture, livestock, amenities, and biodiversity conservation, which could contribute to the development of ecotourism. Additionally, there have been instances of minor flooding in some properties located north of the reservoir. Therefore, the project should focus on preventing increase in flood risks. Furthermore, considering the anticipated impact of climate change, it is crucial to explore options that can prolong the duration of water availability in the reservoir.

Location

The reservoir located in Kampong Trach Khang Lech commune, Kampong Trach District at the North of the provincial road No. 33 (Figure 1). Based on the local authority, the reservoir is recognized as public land and the extension of the reservoir is shown in Figure 2 and Figure 3 in reference to existing maps provided by Kampong Trach district and Kampot Provincial Department of Water Resources and Meteorology.

Beneficiaries

Ou Chraneang Reservoir provides a water supply for at least 4 communes in Kampong Trach district including Kampong Trach Khang Lech, Svay Tong Khang Cheung, Damnak Kantuot Khang Tboung, and Kampong Trach Khang Kaeut. This benefits to 6,299 households equal to 27,264 population in which 14,000 are female. While Ou Chraneang Reservoir would provide additional water security and improve the prospects for double or even triple cropping and vegetable plantation. It would also improve

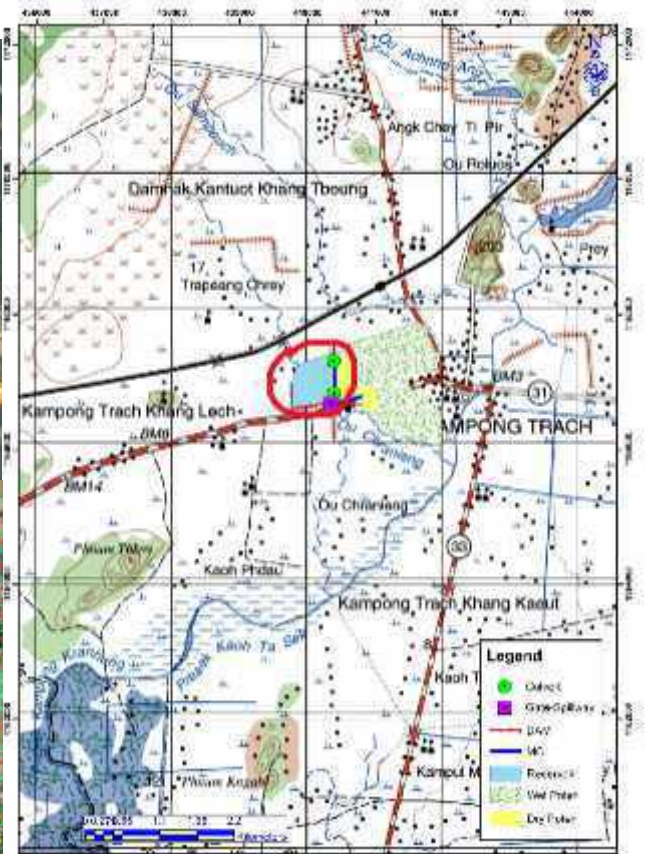
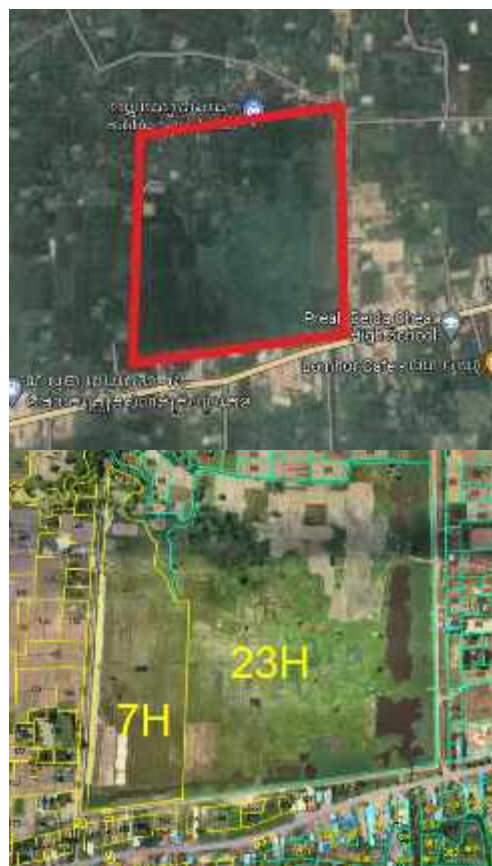


Figure 3 Area of the reservoir as circled in RED

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the prospects for increased local tourism, both through improved water supply and through the potential for recreational activity such as boating, water sports and freshwater fishing.

DATA COLLECTION

Inputs

No data are available. The assessment is based on information provided by the stakeholders and observations recorded during the field trip carried out on the 27/06/23. Extensive site investigation will need to be included in the following stage of the project.

Consultations

A meeting was held on the 27/06/23 at the Kampong Trach district meeting hall and the minutes are included in Annex 1.

Site Records

During the field trip the south and east embankment and the outlet were visited, but the west embankment and the inlet were not. The local people confirmed the source of water is mainly provided by a stream on the northwest corner and from rainwater directly collected into the reservoir along the north site.

As shown in figure 2, the reservoir covers an area of about 23 ha. So far, with the limited budget, the district has rehabilitated 5 ha of the reservoir by digging around 1.5m. The excavated soil was used to build the embankment. The existing embankment has approximately 1:2 side slope and a crest width of around 4.5 m. The high of the embankment varies but the south embankment is estimated to be 3.5 - 4 m (Figure 4).

There are a few trees along the embankment and minor defects such as holes and bank erosion were identified. It is not possible to confirm the material used to build the embankment, but it is likely to be soil sourced on site, and it appears to be mainly cohesive. The top of the embankments is used as a road, and vehicles were observed driving over it during the site visit.

The outlet consists of a substantial concrete structure, which appears to be in good condition, and includes two tilting gates at 2-meter wide which automatically lowers under the weight of the water (Figure 5). The local community confirmed that they don't operate the gates manually. At the time of the site visit, the reservoir was empty and the gates were able to impound around 1.5 m of water. However, the dependence between the water level in the reservoir and the spill level of the gates is known.

The cross section of the bridge downstream the outlet structure is significantly bigger than the one of the two gates, however the capacity of the downstream river is unknown. Any modification of the existing outlet structure will need to be carefully assessed, to make sure that flood risk is not increased anywhere.

Two manual sluice water gates are present along the east embankment and are used to regulate water abstraction from the reservoir.

Regarding the current ecosystem, the site showcases characteristic wetland vegetation, such as lotus plants, especially during the initial phases of the wet season, which is when the field work was conducted.

OPTION DESCRIPTION

In order to increase the capacity of the reservoir there, the preferred option identified in agreement with the local community is to increase the volume that can be stored by excavating the ground level of the reservoir and using the soil to build and enlarge the embankments. A schematic general arrangement plan is shown in figure 6. This is only illustrative; the general arrangement plan and sections will be developed during the design stage.



Figure 4 Embankment



Figure 5 Outlet structure

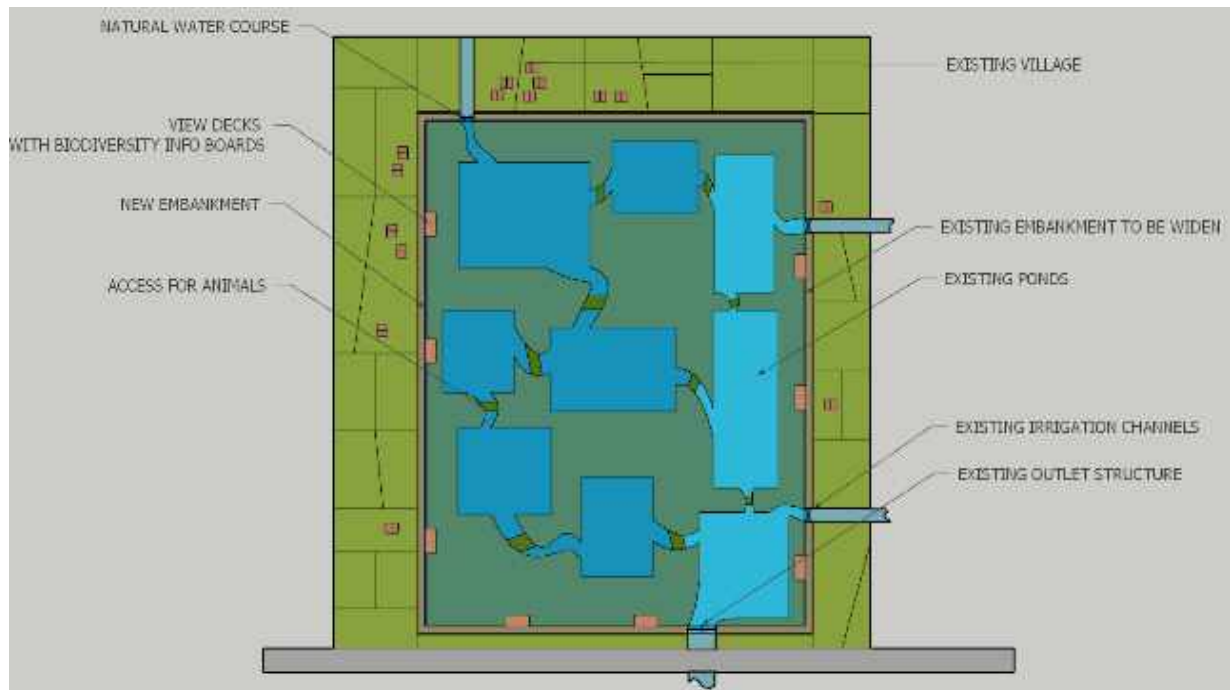


Figure 6 Schematic general arrangement plan (illustrative only)

We have been informed that approximately 5 ha had been already excavated to a maximum depth of 1.5-2 m, and the material re-used to strengthen the embankment, which confirms the viability of the options. These ponds can be seen along the east embankment in figure 2.

The reservoir should be landscaped to consider the factors highlighted in table 1, maximise the benefits, minimizing the impacts. Particular attention should be given to:

- Environmental enhancement
- Human and livestock accessibility and public H&S especially
- Maximise the volume of water that can be abstracted by gravity.
- Allow for flexibility to be delivered in phases to mitigate risk of overspending or opportunity to utilise further contribution made available.

Therefore, the main activities are:

- Excavation to increase volume of water that can be stored and reuse the soil on site to widen the existing south (around 630 m long) and east (around 650 m long) embankments by about 2 m embankments and build a new embankment, with crest level with of 6 m, along the west side (around 500 m). Considering an average high of 3 m, the total estimated volume that (to be confirmed during the following stage) that can be reused onsite is about 50,000 m³. Considering an average of about 1 m depth and that excavated material contains water and as such the volume is higher, it means that about 5 to 10 ha can be landscaped. If more volume is to be provided, the soil will have to be transported of site, which will likely be more expensive. There is also potential to use some of the soil to build an embankment along the north side, however this will need to be carefully design and should include a drain along the north side to collect rainwater and protect from scour erosion.
- Landscaping to maximise the benefits. This may include viewing platforms with illustration boards which may contain topics such as biodiversity and climate change adaptation.
- Environmental enhancement though replanting local species.
- Outfall modification to maximise the use of water and gauging station.
- Canal dredging to improve the water convey capacity.

A detailed topographical survey and hydrological/hydraulic study to include a flood risk assessment should be carried out before.

To maximise the flexibility the existing gates could be substituted with for example a double gate (Figure 7). This will however require manual operation and as such a clear procedure should be in place to operate them. If more passive safety is requested, a spillway may need to be added. This will need to be checked and confirmed as part of the following study.

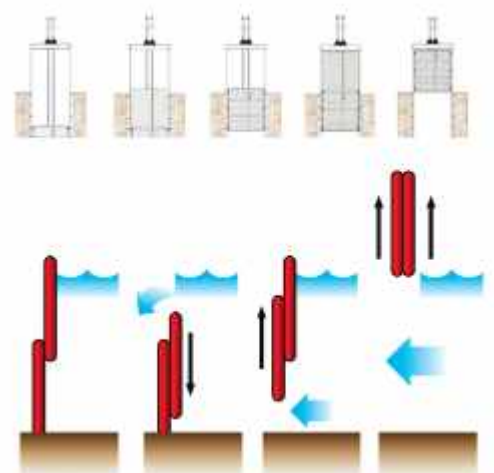


Figure7 Schematic representation of double gates

BUDGET

Investigation, development of design and estimate of the construction.

DESCRIPTION	QUANTITY	UNIT PRICE (US\$)	COST (US\$)
Site investigation and inspections to include: ground investigation, topographical survey, asset condition of the existing embankment, environmental survey and monitoring during the implementation	1	30,000	30,000
Consultancy services to include: outline design, detailed design, design for construction, support during construction, geological investigation, geotechnical report, hydrology and hydraulic studies, flood risk assessment, environmental assessment and tree plantation.	1	50,000	50,000
Excavation and embankment			
Labour (skilled) (5 skilled operatives for 12 months) - day	1,800	25	45,000
Labour (unskilled) (workforce of 8 working 8 hour days for 12 months + Gas) Truck Operator - day	2,880	15	43,200
Excavator (Rental of 5 excavators for approx 12 months + Gas) - day	1,715	110	188,000
Compactor roller (rental of 3 rollers for 12 months + Gas) - day	1,080	75	81,000
Dumper (rental of 10 dumpers for approx for 12 months + Gas) - day	3,460	70	242,000
Canal dredging			
Labour (skilled) (1 skilled operatives for 2 months + Gas) - day	60	25	1,500
Labour (unskilled) (workforce of 2 working 8 hour days for 2 months + Gas) Truck Operator - day	120	15	1,800
Excavator (Rental of 1 excavators for 2 months + Gas) - day	60	220	13,100
Water Gate	3	5,333	16,000
Installation of Early Warning System	1		10,000
Landscape		20,000	20,000
Environmental enhancement		40,000	40,000
Outlet structure modification and gauging station		30,000	30,000
		TOTAL	811,600

Output 1.2. Establish/renovate five medium/small-scale wastewater treatment plants (with two each in Kampot City and three in Koh Kong Province)

INTRODUCTION

Deliverables	<ul style="list-style-type: none">• Washland in fishermen village in Kampot city• Rehabilitation of waterbody in Kampot City• Water treatment for the resilient housing in Koh Kong (Output 1.5)
Beneficiaries	75,930 people
Budget (US\$)	920,000
Location	Kampot city and Koh Kong Province



Problem statement

'Southeast Asia has emerged as a hot spot for plastic pollution, with its rapid urbanization, rising middle class and inadequate infrastructure for waste management'¹⁵². Kampot and Koh Kong Provinces are no different and here the level of pollution due to wastewater and solid waste is extremely high and generalised. The quality of the water of all the waterbodies, the issue of flooding, further exacerbated by blockages, the general impact on the environment, and ultimately the livelihood and health and safety condition of the local communities, are of great concern. The impacts can only be further worsened by climate change and as such the two provinces urgently need a pan-wide approach to tackle solid waste and wastewater.

This output focuses on wastewater in five different locations in Kampot City and Koh Kong Province. These interventions will provide local benefits and can be a pilot to identify options for small/medium scale interventions. The output has been developed in conjunction with outputs 1.3, 1.5, and 3.3. Furthermore, it will be crucial that organisations at all levels and the local communities are involved and work together, and this has been captured in Component 3. The issues should be tackled at the source. 'If no action is taken, greenhouse gas emissions from the production, recycling and incineration of plastics could account for 19 percents of the total allowable emissions under the Paris Agreement, which seeks to limit warming by 2040 to 1.5 Celsius degrees. Reducing plastics thus has a critical climate co-benefit'¹⁵³.

Wastewater in Kampot City and Koh Kong Province is mostly not managed. Based on the information received during the consultations, few properties have septic tanks, some discharge the wastewater directly into pits and many directly into waterbodies such as drains, irrigation canals, rivers, sea.

Some data were collected for Kampot City, as part of the Second Greater Mekong Subregion Corridor Towns Development Project (GMS 2)¹⁵⁴ and the Livable Cities Investment Project (LCIP)¹⁵⁵ reports, both delivered by the Asia Development Bank (ADB) (see 'Data collection' section). According to these reports, while a large majority of the population are serviced by flush/pour flush toilets (93%), approximately 23% of wastewater is deemed to be safely managed, with 77% discharged to open source without any form of treatment (unsafely managed). Based on the consultation, the situation in Koh Kong is similar if not worse.

During the consultations, the stakeholders showed more concern about wastewater management, as they seem to be more aware and prepared to deal with flooding. However, the towns are already experiencing flooding and according to the prediction this will get worse. As such, it is important to raise awareness around flooding and the increased risk associated to climate change, and to consider it in terms of general planning and while designing infrastructures. In fact, there seems to be little knowledge and understanding of the impact of climate change on flooding and as such, component 3 will also focus on capability building for climate change adaptation related to flooding.

This consideration is shared in the LCIP report, which confirms that because of past experience with flooding, tKampot city has the experience to respond to extreme events. However, there appears to be a limited understanding of the potential increase in the extent of flooding across the city due to climate change.

¹⁵² World Bank Blogs, July, 2022. <https://blogs.worldbank.org/eastasiapacific/turning-tide-plastic-pollution-through-regional-collaboration-southeast-asia>

¹⁵³ World Bank Blogs, July, 2022. <https://blogs.worldbank.org/eastasiapacific/turning-tide-plastic-pollution-through-regional-collaboration-southeast-asia>

¹⁵⁴ Second Greater Mekong Subregion Corridor Towns Development Project (ADB)– GROUPE HUIT - SCE - CADTIS - LCG - SCC, 2015

¹⁵⁵ Feasibility Study for Cambodia: Livable Cities Investment Project (Kampot) (ADB) – Egis, 2022

Sea level is expected to rise due to climate changes (see Figure 1), and as such the Teuk Chhou River water level in Kampot City will rise, and so will the likelihood of flooding during high tide events. The map was constructed from projections of sea level rise plus the added height of a local moderate flood, defined as flood level that has a 10% annual chance of being exceeded, forecast that there will be an increased risk of flooding in the area. An additional hazard is a storm surge from a typhoon in the Gulf of Thailand extending up the river. Since typhoons produce heavy rainfall, storm surge will further increase the risk of flooding. Higher water levels in the river will also potentially impact the capability of the existing drainage system to drain. A similar outcome is expected in Koh Kong.

Location

Figure 2 and figure 3 show the location of the interventions respectively for Kampot City and Koh Kong Province. At Kampot City, the focus of the Project is in two Sangkats on the West side of the river, as wider projects are undergone in East side (GMS 2 and LCIP). In Koh Kong Province, the three small scale wastewater treatment systems are connected to output 1.5 on resilient housing with the attention to improve the wastewater management in the three vulnerable communities where the project aims to improve their resilience to climate change and reduce health risks to pollution.

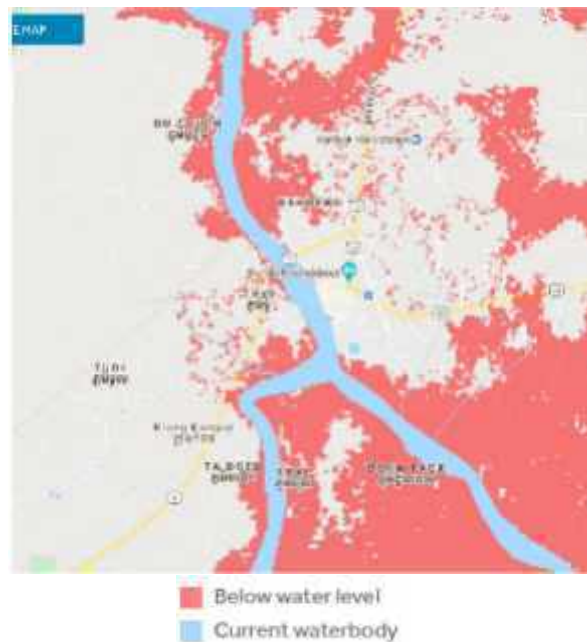


Figure 1 Projected to Sea Level for 2040 under RCP8.5 (Figure 12 of LCIP report)



Figure 2 Wastewater management interventions in Kampot City



Figure 3 – Wastewater management interventions in Koh Kong Province

Beneficiaries

The improvement of wastewater management on the west side of river in Kampot city reduces the possibility of pollution discharge to the river which provide benefits to the whole city with 32,053 population (16,602 female) through tourism service provision such as boating and resorts and fishing. Similarly, the proper sewage treatment and management in Koh Kong Province in the vulnerable communities preventing the degradation of related sea biodiversity which is the main source of income for people in both Khemerak Phoumin city with 28,836 population (13,298 female) and Mondol Seima district with 15,041 population (7,520 female). To sum up, this output would benefit 75,930 population (37,420 female).

DATA COLLECTION

Site Records

Kampot City – Fisherman community

In Kampot, there are floating communities along the Kampot River and nearby estuaries. They are characterized by houses built on platforms or rafts, which are designed to adapt to the river's water levels. Metal sheets, bamboo and wood are commonly used materials for construction. The main occupation in these floating communities is often centred around fishing, with the villagers utilizing nets, traps, and small boats to catch fish from the river.

While two communities were visited, the area of intervention focuses on the one identified with 1 on the map in Figure 6.

While floating communities in Cambodia possess a certain charm and cultural significance, they do face several environmental challenges. These challenges include waste management, wastewater disposal, and vulnerability to natural disasters. One of the primary environmental concerns is waste management. The floating communities often lack proper waste disposal infrastructure, leading to the accumulation of solid waste in the water. Without effective waste management systems in place, the water bodies can become polluted, affecting the overall ecosystem health and water quality. Similarly, wastewater disposal can be a significant issue in floating villages. Inadequate sanitation facilities and limited access to proper sewage systems can result in the direct discharge of untreated wastewater into the surrounding water bodies. This can lead to water pollution, posing risks to both human health and the aquatic environment.



Figure 6 – Fisherman communities visited (Google map)

Furthermore, the resilience of these communities in the face of natural disasters, such as floods and storms, can be a concern. Both floating and onland structures may be more vulnerable to the impacts of extreme weather events, potentially leading to property damage and displacement of communities.



Figure 7 – Selected fisherman community in Kampot City

Kampot City – West side of the river

We have not been provided with plans showing the drainage system in the west side of the river in Kampot City. While visiting this area, it was clear evidence of drains along various road, especially the new ones. The design seems to be standard which chambers of 1.2m x 1.4 m and rainwater interceptors built every around 25 m, on both side of the road. We were not able to confirm it, but it looks likely that a concrete pipe of 800 mm diameter is normally used (Figure 8). It is unclear if the drainage system has been properly designed and if drawings are available.



Figure 8 – Drainage system

During the site visit, we observed only a couple of outfalls, one directly in the river and a second one, into the watercourse by the bridge (see figure 9).

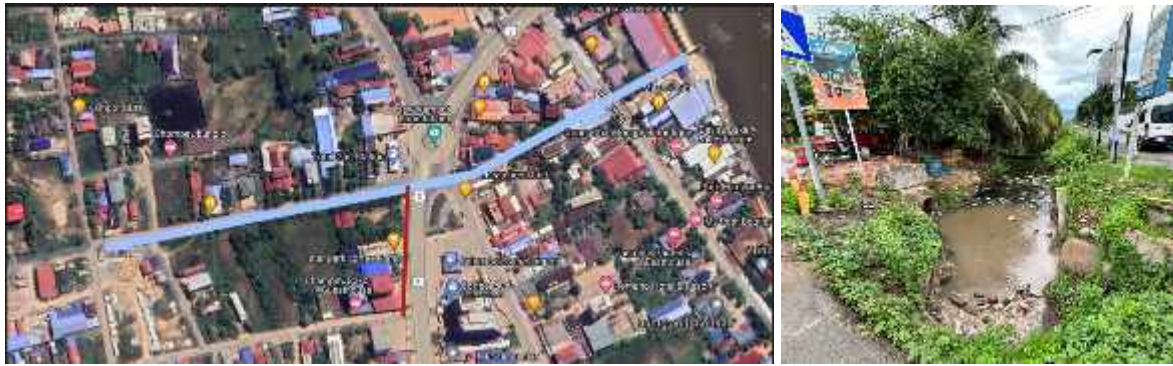


Figure 9 – Outfalls

IDENTIFIED INTERENTIONS

Output 1.2a – Kampot City- Fisherman community floating wetland

Utilizing floating wetlands for wastewater disposal in floating villages in Kampot presents a robust and technically sound solution. Floating wetlands offer a natural and environmentally friendly approach to treating wastewater through a combination of physical, chemical, and biological processes.

The design of floating wetlands should involve the creation of floating platforms made from buoyant materials such as recycled plastic or foam. These platforms are filled with a specially selected substrate that provides a suitable habitat for wetland plants, such as cattails, reeds, and water hyacinths. The roots of these plants act as biofilters, absorbing and metabolizing contaminants present in the wastewater.

As wastewater flows through the floating wetland, it undergoes a series of treatment processes. Physical mechanisms, such as sedimentation and filtration, remove suspended solids and particulate matter. Chemical reactions occur as the wastewater comes into contact with the root zone, where various microorganisms and biofilms break down organic pollutants and convert nutrients, such as nitrogen and phosphorus, into less harmful forms.

The floating wetland system can be customized and scaled according to the wastewater volume and the specific needs of each floating village. Proper hydraulic design ensures efficient flow patterns and adequate contact time between the wastewater and the wetland plants, optimizing the treatment efficiency.

In addition to wastewater treatment, floating wetlands offer numerous ecological advantages. The plant roots provide habitat and shelter for a variety of microorganisms, insects, and small aquatic organisms, fostering biodiversity and promoting ecological balance within the surrounding water bodies. The wetland vegetation also helps to stabilize the floating structure, reducing erosion and enhancing the resilience of the system against water currents and wave action.

Furthermore, involving the local community in the implementation and maintenance of floating wetlands encourages active participation and ownership. Community members can be trained in monitoring water quality, maintaining the wetland plants, and ensuring the proper functioning of the system. This engagement not only empowers the community but also enhances the long-term sustainability of the wastewater disposal solution. An alternative option could be investigating the use of floating septic tanks, which have a similar cost.

Output 1.2b - Kampot City - Conversion of a drainage canal into a subsurface flow constructed wetland:

This approach involves converting the canal identified in figure 8 into a subsurface flow-constructed wetland, where wastewater is treated as it percolates through a bed of porous media. The wetland can be designed to accommodate tidal movements, allowing for limited efficient treatment.

The benefits of this solution are that it is an effective way to remove pollutants, it utilizes existing infrastructure, and provide an opportunity to create habitat.

There are, however, potential space constraints, especially if land on the sides of the canal can't be used.

During the early stage of the design development, the suitability of existing canals to be converted should be assessed. A road run along the left bank. The stability of the bank should be assessed and potentially strengthened using other soft engineering techniques such as vegetated walls. Hydraulic modelling and engineering studies to optimize the design and ensure proper functioning. This should consider flood risk issues, which are known to be present in the area.

In additional to potential space constraints, maintenance regime and cost associated with it should be further investigated in consultation with the local authorities.

The estimate will depend on site-specific conditions and the scale of the wetland. The approximate range \$10,000 - \$50,000 for 100 m² wetland.

The following elements are also to be included:

- Intercept discharges into the canal and utilise vertical flow constructed wetlands to reduce pollutants (estimate 20 households). Alternatives such as septic tanks or Vermifilters to be considered during the design stage.
- Clear culverts under the road and remove solid waste up to the riverfront, as far as reasonably possible. Riparian owners should be engaged and should be trained to contribute to the long-term maintenance of the canal.



Figure 10 – Outfalls Conversion of a drainage canal into a subsurface flow constructed wetland

Output 1.2c - Water treatment for the resilient housing in Koh Kong Province (Output 1.5)

Three locations have been identified in Koh Kong Province to provide resilient housing intervention (output 1.5 and associated wastewater management systems) for the local and vulnerable communities:

- A community in Sangkat Smach Mean Chey, Khemarak Phoumin City, and
- A community in Peam Krasoub commune, Mondol Seima District, and
- A community on island in Bak Khlang commune, Mondol Seima District.

It is expected that approximately 200 properties will be provided. This output focuses on providing wastewater treatment to these properties, and potentially other properties in the same location (total 150 householders).

The following stage of the design will have to assess the various options previously identified such as septic tanks, vertical flow constructed wetlands, the vermifilters, and the floating septic tanks made with plastic drums, and further alternative option. The preferred option will be selected case by case, based on local constraints and the stakeholders need.

The community in Peam Krasoub (see map in figure 12) is developed around mangroves and coastal wetlands. Utilizing natural wetlands for wastewater disposal presents an environmentally friendly and effective solution. These ecosystems possess innate water purification capabilities, allowing them to naturally treat wastewater through physical, chemical, and biological processes. It is as such important to protect this habitat.

For this community, and potentially for the one in Sangkat Smach, additional floating septic tanks made with plastic drums from Wetlands Works, could also be provided.



Figure 12 – Resilient housing locations in Koh Kong



Figure 13 Land Use Plan of Khemarak Phoumin City – Critical area

Khmerak Phoumin City – Natural Catchment Improvements

In addition to the above measure treatment systems should be prioritised to intercept discharges into the waterbodies shown in figure 13, starting from the upper catchments.

Budget

DESCRIPTION	QUANTITY	UNIT PRICE (US\$)	COST (US\$)
Site investigation and inspections	1	60,000	60,000
Consultancy services to include: outline design, detailed design, design for construction, support during construction,	1	60,000	60,000
1.2 a Kampot City - Fisherman Community			
Floating wetlands (\$500 estimated average cost per unit)	500	500	250,000
1.2 b Kampot City - Canal restoration			
subsurface flow constructed wetland	1	200,000	200,000
Clear canal and culvert	1	50,000	50,000
Single household treatment system (\$750 estimated average cost per unit)	20	750	15,000
1.2 c Koh Kong resilient housing			
Single household treatment system (\$750 estimated average cost per unit)	200	750	150,000
Koh Kong – Natural Catchment improvements			
Single household treatment system	50	1,000	50,000
Ancillaries	1	40,000	40,000
		TOTAL	920,000

Output 1.3. Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste from discharging to the sea in Khmerak Phoumin City, Koh Kong Province

Introduction

Deliverables	<ul style="list-style-type: none">• Clear drainage systems• Renovate waterways• Install trash booms along watercourses in the centre of Koh Kong
Beneficiaries	28,836
Budget (US\$)	765,659
Location	Khmerak Phoumin City, Koh Kong Province



Problem statement

'Southeast Asia has emerged as a hot spot for plastic pollution, with its rapid urbanization, rising middle class and inadequate infrastructure for waste management'¹⁵⁶. Khmerak Phoumin City is no different and here the level of pollution due to wastewater and solid waste is extremely high and generalised. The quality of the water of all the waterbodies, the issue of flooding, further exacerbated by blockages, the general impact on the environment, and ultimately the livelihood and health and safety condition of the local communities, are of great concern. The impacts can only be further worsened by climate change and as such Khmerak Phoumin urgently needs a pan-wide approach to tackle solid waste and wastewater.

As shown in figures 1 and 2, there are three watercourses that, while crossing Koh Kong town centre, collect a huge amount of solid waste and especially plastic, before discharging into the sea.

This output focuses on clearing the watercourses and capturing solid waste to reduce the amount of it that goes into the sea. It will be crucial that organisations at all levels and the local communities are involved and work together to address the situation (component 3). The issues should be tackled at the source. 'If no action is taken, greenhouse gas emissions from the production, recycling and incineration of plastics could account for 19 per cent of the total allowable emissions under the Paris Agreement, which seeks to limit warming by 2040 to 1.5 Celsius degrees. Reducing plastics thus has a critical climate co-benefit'¹⁵⁷.



Figure 1 – Location plan



Figure 2 – Land use Plan of Khmerak Phoumin City

Location

The area of interest is located in the town centre, along the three watercourses.

Beneficiaries

With limited sewer systems, rainwater drains, and waste collection services, it leads to improper wastewater discharge and solid waste littering in water bodies, which negatively affects human health, aquatic life, recreational activities, and water quality. The improvement of waterbodies and the installation of trash booms to prevent the solid waste especially plastics in the sea and improve rainwater collection to avoid flooding, it benefits the whole city with 28,836 population (13,298 female).

¹⁵⁶ World Bank Blogs, July, 2022. <https://blogs.worldbank.org/eastasiapacific/turning-tide-plastic-pollution-through-regional-collaboration-southeast-asia>

¹⁵⁷ World Bank Blogs, July, 2022. <https://blogs.worldbank.org/eastasiapacific/turning-tide-plastic-pollution-through-regional-collaboration-southeast-asia>

DATA COLLECTION

Consultations

A meeting was held on the 28/06/23 at meeting hall of Provincial Department of Environment, Khmerak Phoumin City, Koh Kong province and the minutes are included in Annex 1.

Site Records

Photos were taken during the site visit and are included in the section 'Photos'. It is clear that there is a consistent amount of plastic and other waste in the watercourses and the outlets of canals are connected to the sea. These are tidal and as such, the plastic can fluctuate in both directions. Boats and houses were observed in some locations and see will need to be considered before confirming the solution.

OPTION DESCRIPTION

To ensure sustainability of the investment, this output must be implemented together with output 3.3 on capacity building of sub-national level Government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems and Output 3.5. Organizing communities and local authority to manage, monitor and maintain infrastructure investments to ensure sustainability.

Basically, there are two key activities to be carried out:

- a) Remove solid waste from the watercourses as much as reasonably possible.
- b) Install some barrier to capture solid waste (especially plastic) and facilitate regular maintenance.

The activities should be delivered in the following order:

1. Output 3.3: Capacity building of sub-national level Government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems.
2. Output 1.3 a: Removing solid waste from watercourses.
3. Output 1.3 b: Installing barriers to capture solid waste from discharging to the sea.
4. Output 3.5: Organizing communities to manage, monitor and maintain infrastructure investments to ensure sustainability.

To maximise the impact and the effectiveness of the measures, the tasks included in this output should be implemented only after the local community has been educated and the government officials have enabled legislative compliance.

Raising awareness on wastewater disposal and management and solid waste management, social mobilization and public participation will be key for the project to succeed and for the long-term sustainability. This could include training and mobilization of residents who could participate to volunteering activities to clean up the river and actively campaigned to promote behaviour change.

Clearing the watercourses

At least three (about 1-2km length each) of the main constraints to be considered while planning this activity are:

- Structure such as bridges and properties
- Water level and tidal influence
- Depth of mud
- Environmental management
- Public and workforce H&S
- Waste management consideration such as where can it be disposed? How far is it? Which type of waste can be disposed? How much would it cost?
- a mixed of activities may be needed to include in water and out of water machinery, manual removal.



Figure 3 Trashboom from Danish company DESMI in India

Various machinery can potentially be operated. Contractors and waste management companies will be engaged at an early stage to identify the most effective way to reach the goal, in a safe and sustainable way. Furthermore, there is an opportunity to look for collaboration with [The Ocean Cleanup](#), which is a non-profit organization developing and scaling technologies to rid the oceans of plastic.

Barriers to solid waste

Based on the limited available information, the preferred option is to install trashbooms. An example is shown in figure 3.

Trashbooms are floating barriers installed across rivers to capture and collect floating solid waste. Potential sites have been identified in figure 4, however suitable locations for trashboom installation should be confirmed during the design stage, based on the constraints highlighted earlier. Trashbooms are efficient solid waste interception, which require relatively low maintenance, and are adaptable to tidal movements. However, the waste would need to be regularly removed and disposed, there is potential for clogging during heavy rainfall, and more over they interfere with water traffic. As such, the trashbooms may need to be installed in different locations from where suggested in figure 4, or may need to be installed only temporarily. When possible, the trashbooms are to be located near the road to facilitate operation and maintenance. The trashbooms that more likely are going to interfere with water traffic have been identified in yellow in figure 4.

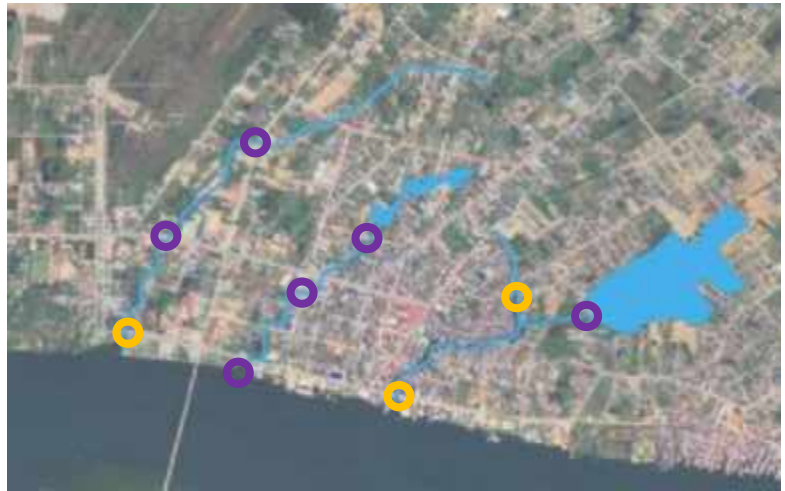


Figure 4 Initial suggestion of trashbooms location (Google map)

BUDGET

DESCRIPTION	QUANTITY	UNIT PRICE (US\$)	COST (US\$)
Investigation and research	1	20,000	20,000
Consultation and Design	1	40,000	40,000
Clearing of the watercourses	3	150,000	450,000
Supply and Installation of Trash booms (Average cost)	9	25,000	225,000
Monitoring progress and community participation	1	30,659	30,659
TOTAL			765,659

PHOTOS



Output 1.4. Renovate waterbodies (irrigation tanks and embankments) in Lompu and rehabilitate Kampong Trach canal in Kampong Trach District

INTRODUCTION

Deliverables	<ul style="list-style-type: none"> • Site investigation and design • Increase capacity to store water • Landscaping • Gauging station
Beneficiaries	86,444
Budget (US\$)	1,164,100
Location	Kampong Trach District



Problem statement

At Kampong Trach (Figure 1 – location plan) the upper catchment of the river is constraint by manmade embankments/roads and the flood plain is used to store water. As showed in figure 2, the local community identifies three areas, known as Kampong Trach canal (1) and Lompu reservoir (2). The local community believes that in the last decades siltation and overgrown vegetation have significantly compromised the capability of the system to store water. As such, the aim of the project is to restore this capability to enhance agriculture, livestock, amenities, and biodiversity conservation, which could contribute to the development of ecotourism, throughout the year. Furthermore, considering the anticipated impact of climate change, it is crucial to explore options that can prolong the duration of water availability in the reservoir.

Location

The area is located in five communes of Kampong Trach district including Boeng Sala Khang Cheung, Damnak Kantuot Khang Cheung, Damnak Kantuot Khang Tboung, Prasat Phnom Khyang, and Angk Sophy and is close to the provincial road n. 33 (Figure 2). The extension of the reservoir is shown in Figure 2.

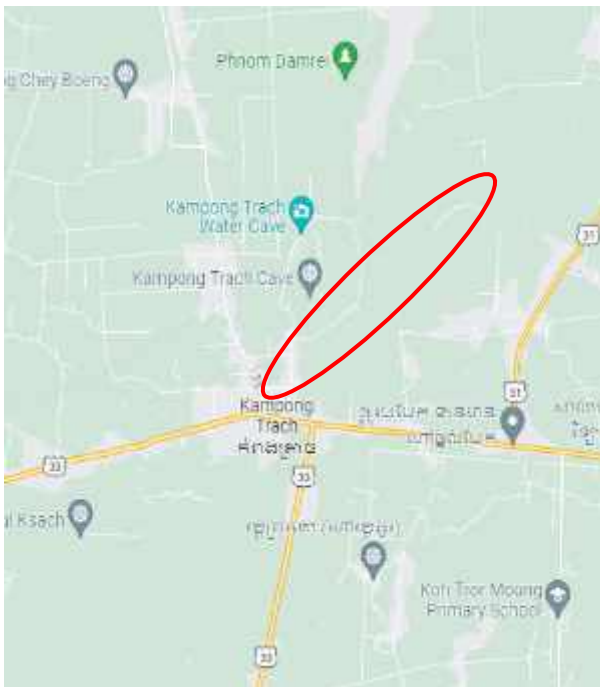


Figure 1 Location Plan

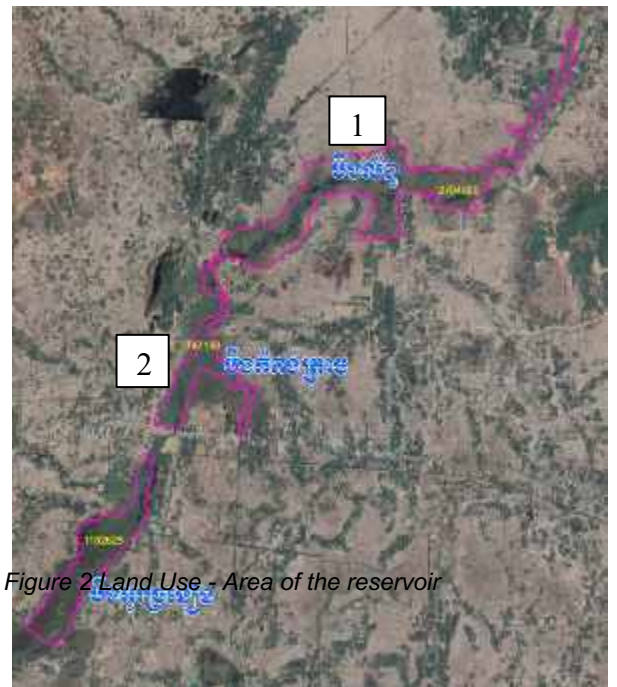


Figure 2 Land Use - Area of the reservoir

Beneficiaries

Contributing to substantial advantages including water supply, irrigation, and recreation, Lompu reservoir and Kampong Trach canal provide benefit to 86,444 (44,419 female) in the whole Kampong Trach district. Mainly, the group benefiting from these infrastructures is combined farmers and villagers who depend on the water as a source and people who provide tourism related services.

DATA COLLECTION

Consultations

A meeting was held on the 27/06/23 (See Annex 1).

Site Records

The two most upstream reservoirs are separated by an embankment, used as a road, which works as a dam and impound water upstream of it. As identified in figure 3, there are three gates used to regulate the flow between the two upper reservoirs. The site visit was carried around this area (Figures 3). The 60-70 m long spillway was built along the norther side of the road embankment to allow excessive water to be discharged from the upstream reservoir.

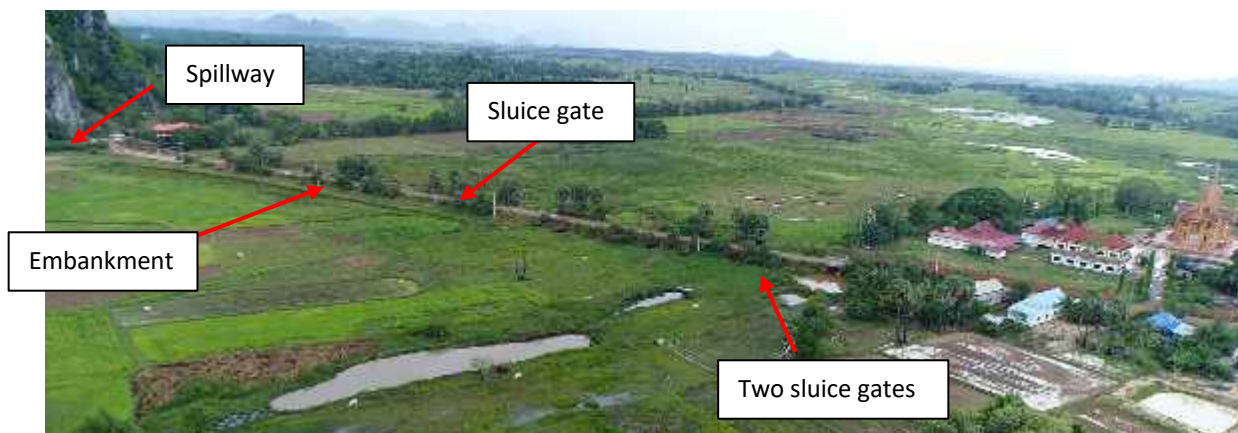


Figure 3 Location Plan

The area is heavily vegetated and this, together with deposits, has contributed to reducing the water storage capacity of the site. This has, however, contributed to generate the current ecosystem, characterised by wetland vegetation, such as lotus plants, especially during the initial phases of the wet season, which is when the field work was conducted., which will need to be carefully considered.

IDENTIFIED OPTIONS

The main activities involved in the project are as follows:

1. Vegetation cutting and dredging: Vegetation will be selectively removed, while dredging will be carried out within the predetermined range. To minimize waste and promote sustainability, we will implement a composting strategy for the dredged material. The vegetation and organic matter will be carefully separated and composted to create nutrient-rich soil amendments. This compost can then be locally reused to enhance the quality of agricultural soil in the surrounding areas. By utilizing composting techniques, we not only reduce waste but also contribute to the improvement of soil fertility and long-term environmental sustainability.
2. Restore and build deeper canal and ponds to maximise the ability of the system to store and convey water. Some of the cohesive soil could be used to build a bund and create a physical boundary along the public area.
3. Landscaping for maximum benefits: The project will incorporate landscaping techniques aimed at optimizing the benefits of the reservoir. This may include the creation of viewing platforms with illustration boards, which can provide educational information on topics such as biodiversity and climate change adaptation.
4. Environmental enhancement through replanting: To promote the restoration of the ecosystem, we will undertake replanting efforts using local species. By reintroducing native vegetation, we can enhance the ecological value of the reservoir and support the recovery of indigenous flora and fauna.
5. By implementing these measures, we aim to ensure that the dredging and transformation of the wetland into a reservoir is conducted in a manner that minimizes environmental impact while maximizing the water storage capacity.
6. landscaping to include features for recreational purposes such as viewing platforms.
7. Gauging station

As part of the outline design a general arrangement drawing should be produced to cover all three areas, however, due to the dimension of the area, is likely that the budget will be available to be enhanced only part of Area 1. During the design, and in consultation with the stakeholders, it may be possible however to identify some locations in Area 2 and Area 3 that can be prioritised to maximise the impact.

Dredging on average 300 mm will generate 3000 m³ of excavation soil per hectare and potential useful volume to store water.

BUDGET

Investigation, development of design and estimate of construction

DESCRIPTION	QUANTITY	UNIT PRICE (US\$)	COST (US\$)
Site investigation and inspections to include: ground investigation, topographical survey, asset condition of the existing embankment, environmental survey	1	53,000	53,000

Consultancy services to include: outline design, detailed design, design for construction, support during construction, geological investigation, geotechnical report, hydrology and hydraulic studies, flood risk assessment, environmental assessment.	1	60,000	60,000
Dredging and on-site composting organic top-soil and vegetation			
Labour (skilled) (10 skilled operatives for 6 months)	1,800 individual workdays	25	45,000
Labour (unskilled) (workforce of 20 working 8 hour days for 6months)	3,600 individual workdays	15	54,000
Excavator (Rental of 2 excavators for 6 months + Gasoline)	360 excavating workdays	110	39,600
Reservoir excavation and embankment			
Labour (skilled) (10 skilled operatives for 12 months)	3,600 individual workdays	25	90,000
Labour (unskilled) (workforce of 20 working 8 hour days for 12 months)	7,200 individual workdays	15	108,000
74100	2,737 dumping days	70	191,600
Excavator (Rental of 4 excavators for approx. 11 months + Gasoline)	1,350 dumping days	110	148,400
Compactor roller (rental of 4 rollers for 12 months + Gas)	1,440 compacting days	75	108,000
Canal Dredging			
Labour (skilled) (10 skilled operatives for 6 months)	1,800 individual workdays	25	45,000
Labour (unskilled) (workforce of 20 working 8 hour days for 6months)	3,600 individual workdays	15	54,000
Excavator (Rental of 2 excavators for 6 months + Gasoline)	360 excavating workdays	110	39,600
Dumper (rental of 4 dumpers for 6 months + Gasoline)	720 dumping work days	70	50,400
Water Gate	3	2,500	7,500
Installation of Early Warning System	1		10,000
Landscape	1	30,000	30,000
Environmental enhancement	1	30,000	30,000
		TOTAL	1,164,100

Output 1.5. Resilient housing and toilet designs developed, and demonstration housing units constructed in three vulnerable communities in Koh Kong Province

INTRODUCTION

Deliverables	<ul style="list-style-type: none">• Resilient Housing and Toilet Design• Community on-site Upgrading• Community empowerments
Beneficiaries	12,000
Budget (US\$)	1,110,000
Location	Koh Kong Province



Problem statement

People who have no access to resilient or secured housing are more likely to be more vulnerable to flooding, hurricanes, storm surges, mudslides, earthquakes, and tsunamis. These disasters brought about by climate is the primary reason for the displacement from their homes (UN OHCHR, 2023). When these disasters come, they pose great threats to property, finances, and to the lives of the poor and marginalized.

Cambodia is no stranger to some of these climate-driven threats. The country is one of most climate-vulnerable countries in the Southeast Asia Region. They also have a relatively low adaptive-capacity amplitude. (Yusuf, Francisco, 2009). Based on consultations with the local communities, housing in these target areas is more susceptible to strong winds, heavy rainfall, and flooding. There are also threats from storm surge on communities located along coastal areas. Resilience to natural hazards refers to the ability to protect lives, livelihood and infrastructure from destruction and damage, and to the capability of communities to rebuild following a natural disaster.

In these communes, majority of the houses incurs damages on the roofs, walls, and foundations brought about by strong winds. In an island community in Koh Kong province, 10-15 houses get destroyed completely when these threats hit the community. An on-site upgrading of a floating village in the northern side of Koh-Kong city where houses built on stilts also suffers from same damages. Improvement of the public space particularly on existing raised pathways should be addressed. Wood planks used for the current condition are decaying and brittle, posing great safety threat to the people in the community.

The challenge to keep with the changing needs of the community should also be considered. Consultations with the local communities called not only for resilient housing that can adapt to the climate change threats, but also for a housing that is adaptable to the growing family size of the household – a housing unit where in the future can be expanded to a larger size and accommodate their changing requirements.

The majority of these communes have poor solid waste and wastewater management. Almost 80% of these houses discharges directly to a nearby creek or river. Only 41% Cambodian has access to sanitation facilities and is the lowest in the region (Nich, 2019). More than 80% of sewage generated by human activities is discharged into rivers and oceans without any treatment, which results in environmental pollution and more than 50 diseases. 80% of diseases and 50% of child deaths worldwide are related to poor water quality (Lin, Yang, Su, 2022). Wastewater strategies for this project should work together and be linked to resilient housing project.

This project aims to improve the resilience of the affected communes and reduce their risk to environmental hazards through the provision of education and training for local people to create local capacity to facilitate the construction of safe, adaptable, and resilient housing and toilets, provide new economic and livelihood options.

The poor are already resilient, by both nature as well as necessity. However, further funding, information, and support are needed to empower them to escape poverty traps and better cope with climate change-related disasters.



Figure 1 Location of communities within Koh-Kong Province shaded in red where on-site upgrading and housing resilience program is to be implemented.

Location

The housing resilience program will be focused on communities identified to be susceptible to weather related disasters in the province of Koh-Kong as shown in Figure 1. The investment will focus on the following areas (being those that were deemed susceptible to strong winds and flooding following consultation with the local community and associated site visits):

- Informal Settlement (about 100 households) at Village 1, Sangkat Smach Mean Chey, Khemarak Phoumin City– on-site upgrading of the community in an Urban Planning Concept. Capacity Building and Trainings on resilient housing construction, and proper wastewater management.
- Community (about 200 households) in Peam Krasoub commune, Mondol Seima District
- Community on island (about 150 households) in Bak Khlang commune, Mondol Seima District

Beneficiaries

	BENEFICIARIES	QUANTITY	COST PER PRIMARY BENEFICIARY
Housing Resilience	Training workshop attendees	2,000 families (or 10,000 People Approx., with 50% representation of women.)	US\$171,800/ 12,000 = US\$14.31 per beneficiary
On-site Upgrading	Households in the informal settlement	About 450 families or 2,000 people in the three selected communities	

BUDGET

Budget for Resilient Housing, Condominial Wastewater treatment System, and On-site Upgrading

DESCRIPTION	QUANTIT Y	UNIT PRICE (US\$)	COST (US\$)
Project Preparation Phases			
Consultancy, detail design, community mobilization and monitoring the construction	1	60,000	60,000
Youth participation in housing design and construction (10 young graduated architect students will be recruited for supporting the housing design, material survey, community empowerments and monitor the house construction	1	40,000	40,000
Development of building manuals and guideline with the support from Ministry of Land Management, Urban Planning and Construction	1	70,000	70,000
Construction of Demo Houses (In Koh-Kong Province)			
3 Community Contracts for housing construction and construction of Elevated Pathways (In Koh-Kong City's Floating Village)	3	300,000	900,000
Construction of Condominial Septic Tank and Connections for Demo Houses Community	Cost estimation for this activity is under the Output 1.2		
Training Seminars and monitoring			

Training Materials development, training and seminars conducted in relation to resilient housing guideline formulation and people process	1	20,000	20,000
Monitoring progress	1	10,000	10,000
		TOTAL	1,100,000

Note: Housing construction costs are 2,000-3,000 USD for houses built on land, and 20,000 USD for houses built with stilts on a wetland as reported by the commune leader for Koh-Kong City on 28 July 2023.

DATA COLLECTION

Inputs

The following inputs were used for the development of this investment:

- Community Consultations
- Site Records and Observations
- Related literatures.

Consultations

Consultation with communes were undertaken to understand the impact of strong winds and flooding on the specific communes. The relevant dates of consultation sessions wherein the vulnerability to strong winds and flooding hazards were identified are as follows:

- 25 June 2023 – Site visit at fishing village/informal settlement in Kampot – Traeuy Kaoh
- 26 June 2023 – Meeting with Kampot-Kampong Kandal Officers
- 26 June 2023 – Site visit at muslim village in Kampot – Traeuy Kaoh
- 28 June 2023 – Site visit at floating village in Khemarak Phoumin – Dang Tong
- 28 June 2023 - Consultation with officials at Khemarak Phoumin – Steung Veang
- 29 June 2023 – Site visit at informal settlement in Khemarak Phoumin – Smach Mean Chey.
- 29 June 2023 – Consultation with officials and community at Khemarak Phoumin – Stueng Veang
- 29 June 2023 – Site Visit at fishing village in Khemarak Phoumin – Stueng Veang

Key takeaways from these consultation sessions are as follows:

- No apparent issues raised by the locals on the houses and communities in Kampot City, but upon site visit and investigation, houses are poorly constructed and can be susceptible to strong winds and flooding. They may benefit from capacity building and trainings about resilient housing construction, proper solid waste, and wastewater management.
- There are two types of houses built in the communes at Koh-Kong Province, one, the floating houses built on stilts and the other one is the house built on land.
- Houses built on ground are affected by flooding only.
- Floating houses are more susceptible to strong winds, heavy rain, and flooding.
- Both masonry and wooden houses are susceptible to wind damage.
- Flooding is prevalent during the rainy season from November to February each year.
- Irrespective of housing style, roof, and wall construction quality typically with construction defects are at risk during high winds.
- In an island community in Peam Krasoub, 10-15 houses get destroyed by strong wind and storm.
- Some pathways are constructed in concrete, but majority of the decaying raised pathway made from wood pose a safety hazard for the informal settlement in the northern part of Koh-Kong city.
- All communes are affected by sanitation issues due to poorly constructed septic tanks and/or improper waste disposal methods.
- Solid waste causes drainage blockages and are compounding sanitation issues.
- Water quality is perceptibly worse during the dry season where freshwater availability is reduced.
- Some communes already practice rainwater harvesting through the use of plastic drums connected to the downspouts of each house.

Site Records

Coastal Cambodia Building Style Observations and Issues

In poor communities along the southern coast of Cambodia, traditional building styles are prevalent. Construction of housing stock is often mixed with both modern and traditional materials and building techniques.

Upon site visit and investigation, a lot of housing issues are identified as typically associated with construction defects, poor workmanship, unsuitability of construction with local site context and/or poor local building techniques.

IMPLEMENTATION & SOLUTIONS

Assessment of Environmental Impacts to Housing

On all consultations in different communes in Kampot and Koh-Kong City, it is concluded that vulnerability to strong winds is the most prevalent threat to housing. Annually, hundreds of houses in the region suffer damage as a result.

Therefore, it is evident that enhancing the resilience of housing in the area, particularly in terms of wall bracing and roof construction, is an urgent necessity.

Although water marks above floor level were found on numerous housing structures, flooding was perceived as a relatively minor concern for the community. This perception stemmed from the fact that most traditional houses were constructed at an elevated position, safeguarding them against low-level floodwaters. Conversely, masonry houses were observed to possess sufficient strength to endure minor flood events.

However, due to the escalating sea levels and the growing trend of constructing houses with masonry flush to the ground level, there is an increasing risk of housing infrastructure becoming susceptible to more significant flood events. To mitigate this risk, the communes should conduct hazard mapping exercises to identify areas that are at a higher risk of flooding. Furthermore, educational programs associated with housing resilience should incorporate guidelines specifying the flood protection requirements for events that occur once in a hundred years.

Increased Adoption of Masonry Construction

Cambodian people are finding it more difficult to acquire the raw timber materials needed and are resorting to more modern materials such as brick, cement, and corrugated sheeting.

Increased adoption of masonry and concrete elements for housing construction is consistent with information received during consultation sessions with the local communes. Homes built from masonry and concrete are favoured due to their greater resilience to extreme weather and competitive costing due to limited availability of timber materials.

Based on the increased adoption of concrete and masonry house construction and evidence that masonry houses are affected by environmental factors, it is proposed that any training on building practices provided to communes (in addition to the repair and construction of traditional timber houses) include training on construction methodology for masonry houses to address key construction shortcomings.



Figure 2 Typical Khmer House Design

On-site Upgrading of Informal Settlements in Sangkat Smach Mean Chey, Khemarak Phoumin

Urban upgrading of informal settlements should balance development, adaptation and mitigation (Satterthwaite, et. Al., 2018). The paper has identified key factors that could be improved on informal settlements.

- Urban Form – Housing density and spatial planning should put into place to promote liveable density. Avoiding sprawl can preserve biodiversity and ecosystem services around the urban periphery, which can enhance resilience to climate-related shocks and stresses (Campbell-Lendrum and Corvalán, 2007; McPhearson et al., 2012).
- Buildings and Infrastructures – no housing improvement investment will be done in this area. But the village can learn a thing or two about resilient housing design, construction, and techniques.
- Industry and Livelihood – the existing identified industry of the community should be strengthened. Provide additional skills training for alternative livelihood for the community.
- Drainage, Sanitation, Waste, & Water - Trainings and capacity building about solid waste and wastewater management should also put into place as the community is built on a wetland, avoiding, and mitigating further pollution.
- Urban Ecology – existing urban ecology in nearby locations and in the area should be maintained. These areas may be the location for source of food. Capacity building and trainings regarding the topic is advised to be conducted.
- Public Space – Improvement on the existing elevated pathways is advised to be implemented. Current condition of the material poses a safety threat to people. Community-driven reblocking could also be done. Obstruction along the public pedestrian flow should be cleared. This will make the streets easy to traverse, well lighted, and safe to all passers.



Figure 3 Top view of the informal settlement village with red lines indicating existing raised pathways.

The major thoroughfares in this community should be mapped and identify where the new elevated pathways should be located. There are existing concreted pathways, but majority of it is still built with wood which are already decaying. The width of the pathway varies from 140mm to 240mm width. Wider pathway should be located where there is major traffic flow.

Below is a proposed design of the elevated pathway. A licensed and board-certified structural engineer should check and implement the final design of the reinforced concrete structure.

The pathway will be designed by modules at length of 9 meters to allow movement of each module. Columns shall be provided with combined footing to avoid earth pull and displacement of the modules.

For safety reasons, a minimum of 900mm handrail shall be installed. This will be made from composite PVC with reinforced concrete core, and polyester ropes. A solar powered lamp post will also be installed to provide sustainable lighting at night. All metallic material shall be painted with anti-corrosive paint to prevent rusting and decay.

Construction Techniques and Quality Materials for Resilient Demo Housing

The proposed training and workshops to be provided as part of this investment is to emphasize the importance of quality building materials, and to provide guidance on which materials/techniques allow for quality, low-cost construction. Locally available precast construction elements for incorporation into housing construction in lieu of other materials is to be evaluated as part of these workshops.

Construction Guidelines:

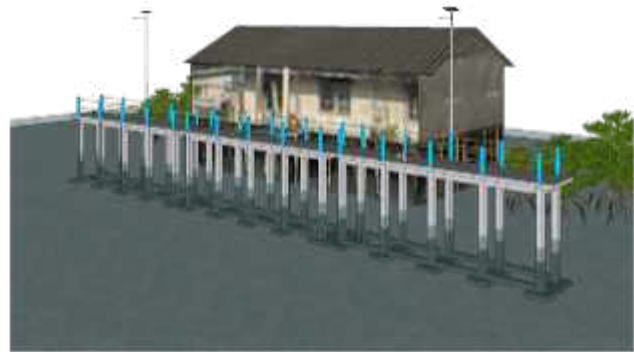


Figure 4 Perspective for proposed raised pathway design.

Foundation

- Foundation should be embedded in at least 1 meter from ground line.
- Provide footings with ample area coverage on ground for stabilization.
- Provide footing tie-beams for stabilization of structural elements and avoid displacement of columns.
- For columns, beams, and footings, ensure a minimum concrete cover of 2" for metal rebars.
- Height of floor elevation may vary. Areas susceptible to flooding can utilize the 3m stilt heights. Where low susceptibility is expected, floor level can be at 600mm above ground level.

Roof

- Maintain a suitable roofing slope between 25deg to 40deg only.
- Roof eaves and overhangs should project 18" to 20" only.
- Use at least 4mm thickness or 24 to 26 Gauge G.I. sheets, for metal roofing.
- Use fittings with broader washers and dome head to avoid tearing. When using screws, use thicker roofing sheets.
- At ridges, eaves and overhangs, provide fixings at every two (2) corrugations. At all other locations, provide fixings at every three (3) corrugation at maximum spacing.
- Corrugated sheets should overlap at least 2 ½ corrugation.
- Roof trusses must be braced.
- Provide metal tie-down straps to connect roof structure to foundation.
- Anchor roof framing to concrete members through anchor bolts embedded in concrete cores.
- Metal roof sheets and other metal parts (i.e., bolts) should be painted with anti-corrosion paint to avoid rusting.

Walls

There are numerous materials that can be utilized for wall cladding.

- Masonry walls
 - Pros – strong resistance to wind and other forces, easy to maintain when painted.
 - Cons – expensive, relative heat gain
- Metal Sheets
 - Pros – easy to install, light weight, readily available.
 - Cons – high heat gain, prone to corrosion, relatively expensive
- Thatch wall (Leaf & Bamboo wall)
 - Pros – ecological, inexpensive, light weight, allows natural ventilation, minimal heat gain.
 - Cons – susceptible to strong winds and decay, time consuming to install.
- Wooden Wall
 - Pros – relatively inexpensive, easy to install, minimal heat gain.

- Cons – scarcity of material, relatively expensive, susceptible to decay

Challenge for Expandability

To adapt to changing requirements for every household, the demo houses will be designed where in the future it can be expanding by adding additional floors.

When a house is expanded and is built with extensions, the current trend in the rural areas in Cambodia is to extend the back side of the house or extend upwards. Because of limited land availability, the proposed conceptual demo houses will expand upwards.

The base structure for the first level will be built from reinforced concrete. Currently, houses built on stilts have the columns and framing of the first floor built with reinforced concrete only. To achieve expandability upwards, the concrete column will continue upwards where a reinforced concrete framing provision for second floor will be provided. Construction on the top level will follow the traditional way of timber construction.

The structure will be designed with a roof truss that can be pre-assembled and be reused when an additional floor is added.



Figure 5 Conceptual base structure for proposed resilient housing design.

Conceptual Base Structure: Figure 5

Sanitation

Poor sanitation facilities have been identified as an issue during by both community consultations and on-site visits. Sanitation and hygiene awareness workshops should be carried out which emphasise the importance of latrines uses with activities and visual representations to connect open defecation to river water, which people might drink. Poor sanitation is a particular concern for women. Participants should understand the importance of latrines and be motivated to build one in their home.

Research by the World Bank’s Water and Sanitation Programme published in 2012 argued that more than half of the Cambodian households that lack a latrine could, in fact, afford one.

Conceptual Perspective:

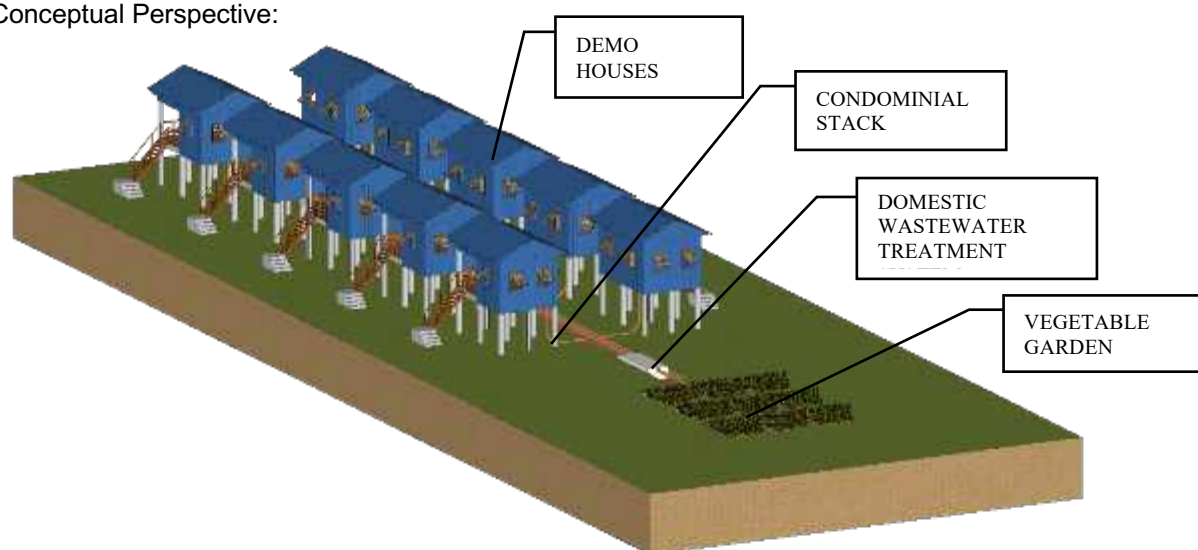


Figure 6 Conceptual perspective for wastewater treatment system for demo house community.

Conceptual Top View:

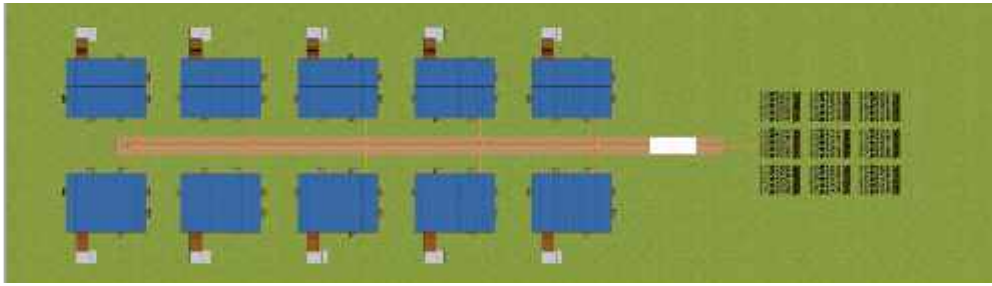


Figure 7 Conceptual top view for wastewater treatment system for demo house community

Condominial Wastewater Treatment System

The proposed wastewater system for the demo housing community will be the condominial wastewater treatment system. It is a system where the house blocks are connected to a single condominial branch that is connected to a domestic septic tank of ample size based on the discharge of the number of households that will be in the community and is designed to ensure that the effluent discharge will have low concentration of contaminants. When public sewer is not available, the discharge of the treated water can be used as natural fertilizer for gardening.

Protective Vegetation

Housing, where protected by a shelterbelt of vegetation, were reported by residents as more resilient against strong winds. It is recommended that housing resilience educational programmes include information on the introduction of vegetation shelterbelts as cost effective wind protection.

The type of vegetation should be strategically selected to mitigate possible uproot that may fall and damage adjacent housing. Vegetation should be planted to a specified distance from the house.

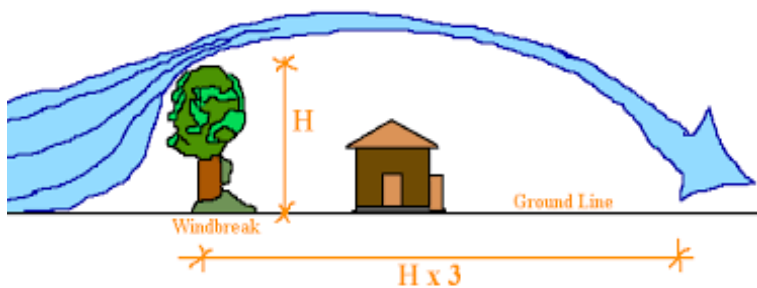


Figure 8 Conceptual diagram for protective vegetation



Figure 9 Conceptual diagram for rainwater harvesting system

Stormwater Harvesting/Retention

With water of increasingly greater scarcity in the area, safe drinking water harder to access, existing housing stock and new housing stock should incorporate storm water storage from roof runoff. Poor access to quality drinking water is reiterated by the residents who reportedly at relative high cost and effort purchase water from distant reservoirs.

Rainwater is considered to be of very high quality by both recipients and non-recipients and was thus used extensively where available. The annual rainfall in the regions, which is in excess of 1400mm per year, can facilitate rainwater harvesting efforts in the region. Costs for domestic rainwater tank reportedly range from US\$160 for a jumbo jar to US\$250 a concrete ringed tank (Refer to Figure 9).

Long-term sustainability of the training programme:

To maximise the continuance key learnings of the program within the targeted communities:

- Best practices to be documented in paper and digital formats and distributed to public facilities including local government offices and schools. Discussion sessions will also be held to support fewer literate people in the community who may not be able to benefit from written information:
- Best practices to be documented in both written and video format in Khmer, using accessible language.
- Videos to be uploaded online to YouTube and shared to people who have access to smartphones (increasingly common in the target area)
- Prior to completion of the training programme, local municipality to be offered the opportunity to fund extensions to the programme.

Otherwise, it is expected that the housing resiliency learnings will be informally conveyed through the broader community and their families.

Community Engagement

Key to the success of the investment is ensuring community involvement in the development of housing styles with construction techniques suitable for the local context. Community involvement in the development of hazard maps is also critical.

In order to encourage the community to participate in the construction of their home, the People's Process approach will be utilized to mobilize the beneficiaries. Through this process the community will be involved in discussing the problem, identifying alternative solutions, selection of the beneficiaries through a transparent process, management of funds, monitoring of the construction and closing of the accounts. Involvement of women and youth will be given particular attention during the implementation of the community consultation process.

A Community Implementation Agreement (community contracting) instrument will be used to transfer funds from UN-Habitat to the community organization for the use of grant funds for the construction of the houses and small infrastructure.

These are tools for community empowerment and a process that ensures both social and economic accountability. The communities are accountable not only to the funding agency but also to the people that they represent and serve. This process changes the community from a recipient of development to a partner in development process.

Construction Requirements

A structural engineer trained in housing resilience will be involved in the development of the implementation plan and associated documentation. The structural engineer will also be required to train staff involved in the investment as well as supervise its initial implementation.

PHOTOS



Figure 10 Typical house built on stilts design in Cambodia

Output 1.6. Build five sluice gates and embankments to prevent saltwater intrusion in Khemarak Phoumin City

INTRODUCTION

Deliverables	<ul style="list-style-type: none">• Five Sluice gates• Embankments
Beneficiaries	28,836
Budget (US\$)	643,500
Location	Khemerak Phoumin City, Koh Kong Province



Problem statement

Saltwater intrusion refers to the ability of the 'salt front' from the sea to penetrate into the groundwater and surface water. Water resources along the coasts face risks from saltwater intrusion. Rising sea levels, drought and changes in water demand and availability can increase the salinity of both groundwater and surface water sources of drinking water¹⁵⁸. As the sea levels rise, the "salt front" (location of the freshwater-saltwater line) may progress further upstream. This encroachment may be further exacerbated by drought, reduced rainfall or changes in water use and demand. Saltwater intrusion can result in the need for water utilities to increase treatment, relocate water intakes, or development of alternate sources of fresh water.

There is evidence that this is already happening in Cambodia. Cambodia's coastal zone is threatened by severe impacts of climate change such as storms, storm surges, sea level rise and seawater intrusion, and has as such been identified as a focal point in Cambodia's work in adapting to climate change.¹⁵⁹ A few findings of the Assessment of Community Vulnerability and Risks from Climate

Change in the Coastal Zone of Cambodia report¹⁶⁰ are:

- A sea level rise of 18 to 56 cm is expected by the 2090s.
- Sea Level Rise (SLR) combined with a decline in mangrove, and an increase in the frequency and intensity of storms and storm surges, has already led to some coastal inundations. A consequence is the salinization of the land surface as well as the groundwater, impacting the fertility of farming areas as well as freshwater ecosystems. This poses a threat to food security and livelihoods because most agriculture in the coastal zone is concentrated on these flood-prone low-lying coastal areas. The infrastructure in the coastal zone also comes under pressure, which can lead to an increased vulnerability over time and lost income from tourism.
- Flooding, heavy rainfall and storms destroy property and productive assets, such as crops and livestock. Flooding will often lead to poor water supply and unsanitary/unhygienic conditions, causing serious health issues and serious disease outbreaks. An increased frequency of storms will also affect cultivation, fisheries and coastal erosion.

There is a high risk of loss of crops in the wet season, and this will further increase. Climate change will likely cause loss of farmland, deteriorating soil and water quality, and increase the probability of flooding.

This project aims to rehabilitate/build five sluice gates and embankments to support local community to adapt to climate change.

However, as suggested by the report additional measures such mangrove restoration and plantation can be introduced to help adapting, including (see also component 2):

- Development of salt-tolerant paddy varieties and possibly other crop varieties as well.
- Occupational Change Support Programme
- Development of Eco- and/or Agro-tourism.
- Weather forecasting and Early warning system (see output 1.7)
- Promotion and increased availability of shorter duration seeds for crops; particularly for wet-season paddy possibly enabling harvest before onset of heavy flooding and sea water surges.
- Promotion of mari-culture (e.g. crab ponds, shrimp fields, fattening cages, etc). This is in response to increased salinity as these marine cultures live in or tolerate salt water.

Furthermore, planning policies should be put in place to regulate development in areas at risk of flooding, and to make properties resilient to flooding (see also component 2 and component 3).

¹⁵⁸ <https://www.epa.gov/arc-x/climate-adaptation-and-saltwater-intrusion>

¹⁵⁹ Assessment of Community Vulnerability and Risks from Climate Change in the Coastal Zone of Cambodia. Cambodia Climate Change Alliance, 2012.

¹⁶⁰

The provincial department of water resource management and meteorology and local authorities confirmed that these gates were constructed years ago and there is lack of regular maintenance. Some parts are broken and rusty, so they cannot perform their functions to regulate the water flow properly. Thus, the water could have overflow and get the nearby area flooded.

Location

The five gates that were visited are identified in figure 1.

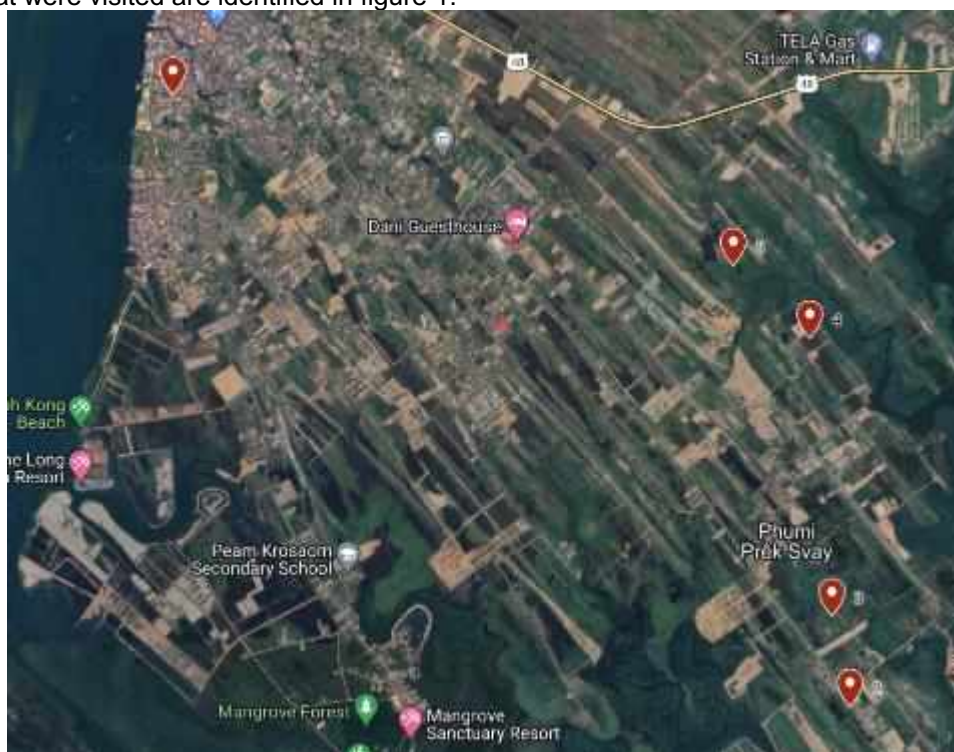


Figure 1 – Location plan (Google map)

Beneficiaries

The whole city 28,836 population (13,298 female) would be considered as beneficiaries of this output. The gates help to prevent flooding and saltwater intrusion to the agricultural land and nearby settlement and business area, and the embankment would additionally be served as accessible roads for everyone in the city.

DATA COLLECTION

Inputs

No data are available. The assessment is based on information provided by the stakeholders and observations recorded during the field trip carried out on the 29/06/23.

Consultations

A meeting was held on the 28/06/23 at Koh Kong (Annex 1).

Site Records

Five locations were visited during the field trip and photos (Figure 2, 3, 4, 5, 6, and 7) were taken during the site visit. More photos are included in the section 'Photos'.

OPTION DESCRIPTION

In some of the locations, flood protections such as flood walls or embankment, may be needed to provide adequate protection.

Watergates

Different types of gates are available, depending on the objectives that they aim to achieve. They could for example be requested to:

- Protect land and properties from flooding from the sea.
- Reduce water salinity.

These structures may have an impact on the environment (e.g. mangroves and fish migration), and as such, an assessment of the impacts should be carried out at an early stage of the development.

Conventional vertical sluice gates (see figure 2 for reference) are present in the area. These will likely form only a temporary barrier to the water flow and as such, the impact is likely to be minor compared to, for example, installing flap gates (see below).

However, as they are manually operated, they could be closed at any time to impound freshwater, blocking salt water potentially for prolonged period, which may cause a significant impact on the environment. As such, an operation and maintenance manual, which includes an assessment of the impacts for the different settings of the gates, should be developed.

Where the main objective is to limit saltwater intrusion as much as possible, still allowing the discharge of fresh water, flap gates may be an alternative option. These are self-operating control gates, used to maintain water level differences between the 2 sides of the gates by allowing unidirectional flow¹⁶¹. An example is provided in figure 2.

If implemented by itself, the flap gate, could have a significant impact on mangroves as it would significantly limit the intrusion of saltwater, and would be an obstacle to fish migration. A fish pass could be introduced as mitigation measure.

It, however, provides benefits in terms of flood risk. When the freshwater is higher than the tidal level, the flap gate would in fact automatically open to allow the discharge, rather than relying on manual operations.

Due to the tidal environment, particular consideration should be given to the material to be used.



Figure 2 – Example of Flap Gate - FLOGATE HDPE, [link](#)

Flood Protections

In addition to the gates, additional flood protection may be needed along low spots to protect properties and land from flooding from the sea¹⁶². There are three main types of flood protection systems:

- Temporary
- Demountable
- Permanent

Temporary and Demountable defences heavily rely on flood forecast and mobilisation, and as such, while they should investigate as part of the capability building, for this specific case, only passive systems, such as flood walls and embankments (permanent options) have been considered.

A topographical survey and a flood risk assessment will identify the need of additional flood protections and their extent. The level of the crest of the flood defense, should account for sea level rise. Alternatively, flexible options, which can be adapted later on, depending on most updated sea level rise forecast, should be considered.

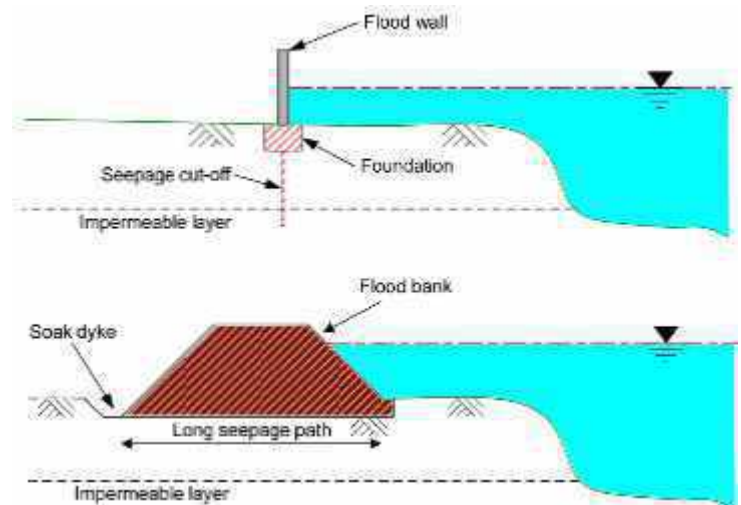


Figure 3 Typical elements of a permanent flood protection system⁵

Site 1

Site 1 (Figure 4) consists of a concrete structure which used to accommodate two vertical gates 1.9 m wide each. It is not known when and why the gates were removed. The local community is willing to reintroduce the sluice gates to protect the properties from coastal flooding.

The main element for this site would be a like-for-like reintroduction of the two sluice gates. The implementation should include the following elements:

- **Topographical survey:** the road before and after the bridge appears to be low lying and flood water from downstream the bridge could by-pass the flood gates. The topographical survey will confirm the effectiveness of

¹⁶¹ <https://wii.weida.com.my/flogate-hdpe-flap-gate/>

¹⁶² Temporary and Demountable Flood Protection Guide, defra 2011.

https://assets.publishing.service.gov.uk/media/603376bce90e0766021bf14f/_flood_protection_guide.pdf

the measure and the eventual need of introducing additional flood protection measures. These could potentially consist in either raising the road or building flood walls along the river.

- **Flood risk assessment:** This should consider flooding from the sea and surface water flooding. The assessment will be used to further detailed the structure and their operation, to be recorded in the Operation and Maintenance (O&M) Manual. If flooding from the watercourse is an issue, alternative passive structure, such as an additional flap gate or an overflow, should be considered, to avoid relying only on manual operation.
- **Environmental assessment:** any impact on the upstream wetland, which includes mangrove, should be evaluated and avoided or mitigated.
- **Site investigation:** to include assessment of asset condition and dimension and ground investigation. The gates are manually operated, and access is through a stair and an upper bridge. As such, the assessment should include H&S considerations.
- **Design**
- **Construction**
- **O&M Manual.**



Figure 4 Site 1 location

In addition, a trash boom has been considered in this location as part of output 1.3.

Site 2

Similar considerations to site 1, apply to site 2. Some differences are that the gates are present and still in operations, the asset is smaller, the upper catchment is more rural, and as such there may be a minor risk of flooding to properties and a higher risk of damages to crops.

The concrete structures looked in poor condition, and especially the wingwalls, which may need to be rebuilt.

As per site 1 the implementation should include:

- **Topographical survey:** the topographical survey will confirm the eventual need of introducing additional flood protection measures. These could potentially consist in either raising the road or building flood walls along the road/watercourse.
- **Flood risk assessment:** This should consider flooding from the sea and surface water flooding. The assessment will be used to further detailed the structure and their operation, to be recorded in the Operation and Maintenance (O&M) Manual. If flooding from the watercourse is an issue, alternative passive structure, such as an additional flap gate or an overflow, should be considered, to avoid relying only on manual operation.
- **Environmental assessment:** e.g. fish migration and mangrove.
- **Site investigation:** to include assessment of asset condition and dimension and ground investigation. The gates are manually operated, and access is through a stair and an upper bridge. As such, the assessment should include H&S considerations.
- **Design, Construction, and O&M Manual.**

BUDGET

DESCRIPTION	QUANTITY	UNIT PRICE (US\$)	COST (US\$)
Investigations and inspection (Topographical survey, Flood risk assessment, environmental assessment, site investigation)	1	20,000	20,000
Consultancy and detail design	1	40,000	40,000
Site clearance	5,000 m2	25	125,000
Embankment fill	10,000 m3	5	50,000
Watergate - culverts	5	40,000	200,000
Watergate – transport for culverts	5	2,000	10,000
Watergate – concrete	300 m3	145	43,500
Watergate - steelwork	Lump Sum		30,000
Watergate – other (mesh etc.)	Lump Sum		5,000
Temporary access track	Lump Sum		20,000
Design support team - engineer (2 engineers for 8 weeks)	112 days	320	35,840
Labor – skilled (5 laborers for 8 weeks)	280 days	50	14,000
Labor – unskilled (18 laborers for 8 weeks)	1,008 days	20	20,160
Environmental Enhancement (Solar Street Lights; Trees; etc.)	Lump Sum		30,000
		TOTAL	643,500

PHOTOS



Output 1.7. Early Warning System (EWS) for Flooding and Drought Forecasting to Reduce Disaster Risks of Vulnerable Communities in Mondol Seima District

INTRODUCTION

Deliverables	Providing and establishing early warning system (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Mondol Seima District
Beneficiaries	15,041 people
Budget (US\$)	132,000
Location	Provides improved flood and drought warnings to all low-lying areas of Mondol Seima District, Koh Kong



Problem statement

The communities of Mondol Seima district lying on the coastal plain either side of the Tonle Sap Krasas Wildlife Sanctuary are increasingly experiencing flooding from the sea, and storm surge. There is a tide gauge Khmerak Phoumin, but this is reflecting the unusual tidal and windy circumstances at the Mondol Seima district.

The Koh Kong Provincial Department of Meteorology and Water Resources and Mondol Seima District have requested the installation of early warning system (a tide gauge and weather station) on an island at Mondol Seima District to provide accurate data on sea level rise in this location and thereby improve flood warning and drought forecasting capability for the low-lying disaster-prone vulnerable communities of Mondol Seima District, Koh Kong Province.

Location

The proposed location is on an island in Boeng Kachhang community, Bak Khlong Commune, Modol Seima District. It is about 3km from the mainland (Figure 1). The location is shown on the map below with the red circle. A tide gauge at this location will be able to give a good representation of the tidal regime within the entire bay in Mondol Seima District.

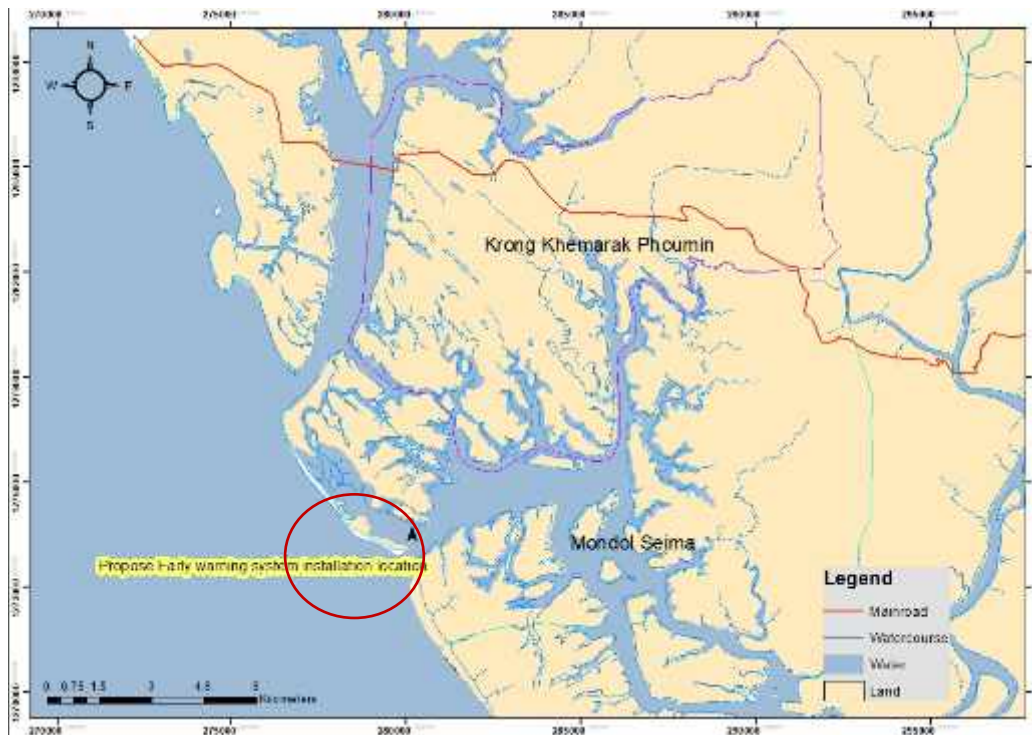


Figure 1 Location of Early Warning System Installation

Beneficiaries

15,041 people (7,520 female) in whole district would be potentially affected by flooding and storm surge especially the ones who live or work close to sea level in the low-lying coastal areas or on island. People rely on fishing and provide the tourism related services such as boating.

BUDGET

Construction and installation of tide gauge

Assume an exchange rate of US\$1.28 = GB£1.00, which is the latest exchange rate on 10th July 2023. The supplier's quote in GB£ is annexed to the end of this document – includes supply and installation. Shipping costs are assumed based on commercial shipping charges.



Installation costs by a specialist approved by the supplier is included in the supplier's costing. The equipment will be provided with an operation and management (O&M) manual and we have included a sum for training of maintenance operatives – this includes translation of the O&M Manual into Khmer.

There will also be ongoing running costs, including regular maintenance and a telemetry fee to the mobile phone network. It is assumed these will be paid by the Department of Water Resources and Meteorology once the installation is complete. The costing assumes installation by a trained specialist provided by the supplier.

DESCRIPTION	QUANTITY	UNIT PRICE (US\$)	COST (US\$)
Provision of wave and tide gauge for remote, shallow location – type 'FSI Remote Coastal Reporter'	1	23,000	23,000
Shipping, customs clearance, local shipping taxes, instalment, transshipment to shallow draught vessel for access to site and delivery	1	29,000	29,000
Automated Weather Station	1	50,000	30,000
Capacity building/training communities	1	30,000	30,000
TOTAL			132,000

DATA COLLECTION

Inputs

This study has been informed by bathymetric data, which is publicly-available online maps showing nearshore bathymetry in the identified site and a quote from a commercial supplier of wave and tide gauges. Mapping has used Google Earth satellite imagery and openly available GIS data including geology, land use, and watercourses.

Consultations

During the field mission from 28 to 29 June 2023, several consultation meetings have been carried out with the Koh Kong Provincial Hall, the Provincial Department of Water Resources and Meteorology, the Provincial Department of the Environment, and the representatives of Bak Khlang, Peam Krasaob, and Tuol Kokir Communes.

Site Records

Based on consultation with local authorities, the early warning system shall be installed in Boeng Kachhang Community located on an island. There is no mains electricity supply, so the gauge will have to work on solar / battery power. It was observed that the Smart mobile phone network provides coverage at the proposed deployment site to enable telemetry of the data.

The particular constraints of this site are that the water is shallow throughout the bay, but this is a location that is relatively easily accessed by small boat. With high tides only 3m deep well off shore, the bay is not capable of taking deep draught vessels. The risk of vandalism is considered unlikely and the risk of damage by boat impact should be minimised as the channel is generally only used by a small fishing community and the above-water equipment is finished in hi-visibility yellow paint. The gauge will be used to build up a dataset of tidal conditions in the bay to facilitate prediction of high tidal levels. The next nearest existing tide gauge is in Sihanoukville port, in deeper water 20km away on the other side of a peninsula.

IMPLEMENTATION

Design

Based on the location and condition of the identified site for early warning system installation, the project selected the LOG_aLevel Mobile Tide Gauge, which is a stand-alone remote sensing mobile tide gauge. It measures reliably and precisely water level and all kinds of water surface dynamics. With installation of the Windows Software for system, it allows analysis of measuring network, visualization, managing, storing and exporting of data easily. It can provide accurate data through remote data transmission system with cost effective, and reliable strength under extreme conditions including flood and storms.

LOG_aLevel Mobile – Tide Gauge

LOG_aLevel Mobile is an easy to carry, plug and play, stand-alone remote sensing **Mobile Tide Gauge**. Based on the well-known and proven LOG_aLevel system, this unit is also calibration-free, accurate, durable and very cost-effective. LOG_aLevel Mobile measures reliably and precisely water level and all kinds of water surface dynamics.

It can also work with ultrasound, radar or pressure sensors. LOG_aLevel can be easily extended to include a datalogger, data communication systems and additional hydrological and meteorological system to form a complete monitoring station. Furthermore, multiple LOG_aLevel stations can be interconnected to form a network. Integration in SCADA systems is straightforward.



Specifications

Measuring range:	depends on sensor technology (Ultrasound, Radar, Pressure)
Sample rates:	up to 5 Hz
Resolution:	1 mm
Accuracy:	1 cm
Power supply:	12 VDC (230/110V AC optional)
Data output:	RS232 or RS 485
Working temp:	-30 °C up to +70 °C



Applications

- * Water level and tide monitoring
- * Coastal protection
- * Harbor and Terminal Management
- * Storm Tide, Flood and Tsunami Measuring Networks
- * Hydrology and Environmental Monitoring
- * (Temporary) Level Gauge to Support Dredging, Surveying and Construction Works
- * Spectral Wave Energy Analysis for Optimal Survey Quality
- * Water/Fluids Reservoir Management
- * Wave Monitoring and Analysis
- * Ship Induced Waves
- * Load Determination for Hydraulic Engineering
- * Torrent Monitoring
- * Local Event Alerting e.g. Flood, Tsunami
- * Local Event Alerting e.g. Flood, Tsunami
- * Real-Time Data for Vessels through AIS/AtoN
- * Local Tide Analysis and Prediction System together with Tidepredictor Software
- * Wave Measurements from Jack-Ups and Rigs
- * Server-based Fleet Management Networks incl. Web Portal (e.g. Ferries, Water-Planes, Supply Vessels)
- * Discharge Hydrographs
- * Flood warning
- * Identification of suitable locations for stationary monitoring stations
- * Monitoring of multiple locations with a single Tide Gauge

Annex C Environmental and Social Risk Screening, Impact Assessment and Environmental and Social Management Plan Demonstrating compliance with the Adaptation Funds' Social and Environmental Policy (ESP)

Compliance with environmental and social safeguards

The proposed Project has been designed in compliance with the set of environmental and social principles as detailed in the Environment and Social Policy (ESP) of the Adaptation Fund. Environmental and social safeguards are essential tools to prevent and mitigate the potential for undue and unintended harm that could arise from project activities.

In line with the Adaptation Fund's ESP and Gender Policy and UN-Habitat's Environmental and Social Safeguard System Version 3 ([ESSS 3.1](#)), UN-Habitat and its partners are required to conduct risk screenings and impact assessments of all activities that have even a negligible risk of causing unintended harm. The checklist of ESSS 3.1 will be used during the technical design stage of all identified sub-projects and activities.

The Project outputs and activities have been identified, ensuring a participatory and consultative process with communities and local authorities articulating their concerns. This process has further ensured that no project component will adversely impact any priority biodiversity or ecosystem support areas and that there are no negative impacts on local communities or vulnerable groups.

During implementation, particular attention will be given to the monitoring and mitigation of any identified minor risks and of any unanticipated environmental and social risks through visits to project sites, annual ESP screening, and risk assessment by the project team based on the reports received from the facilitating agencies and the field offices. Annual ESP screening and risk assessment will be carried out by the project team (external consultant) for which a template will be prepared before the inception workshop. The Annual Project Performance Review will include environmental and social risks (i.e., the status of implementation of ESMP, including those measures required to avoid, minimize, or mitigate environmental and social risks). The reports shall also include, if necessary, a description of any corrective actions that are deemed necessary. Through this process, environmental and/or social risks will be identified, remedial actions will be executed immediately, and a set of recommendations on how these should be addressed in future implementation activities will be developed.

Compliance with environmental and social safeguards

The purpose of this Annex is to demonstrate the project's compliance with the Environmental and Social and Gender Policies of the Adaptation Fund. It provides an analysis of the potential environmental and social risks of the project's physical activities and highlights opportunities, concluding in an Environmental and Social and Gender Policy Compliance Plan.

To ensure compliance with the ESP of the Adaptation Fund, all project activities are screened in this Annex against the 15 environmental and social principles, as defined in the ESP of the Adaptation Fund. Where risks have been identified, this annex analyses the potential for impact and describes the measures that have been built into the project to avoid or mitigate risks and their impacts.

The analysis presented in this Annex is based on various data from numerous government sources, other secondary sources and where this is not available, primary data gathered by the project formulation team. All investments identified in the project have been developed in consultation with local and national government and target beneficiary communities. The proposed measures to avoid, mitigate and manage environmental and social safeguards risks have also been discussed extensively with local and national government stakeholders and communities.

Table 25 Outline Risk Screening and categorization

Adaptation Fund environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment required for compliance	Explanation why principle has been triggered (or not)
1, Compliance with the Law		X	All issues relating to compliance with the law have been checked through consultations with relevant national and local authorities.

			Without risk mitigation measures taken in advance to ensure compliance with the law, there is a risk that the executing entities or subcontractors violate local or national level laws and regulations because the physical construction activities proposed under Components 1 and 2 require approval of infrastructure designs and the Mangrove Plantation Management Plan from the sub-national and national governments.
2, Access and Equity		X	All project Components (1, 2, and 3) are targeted to address the needs of the poor and vulnerable groups. However, all training and capacity-building activities (Component 3) has a risk of exclusive representation of women, people with disabilities, and youth representation.
3. Marginalized and Vulnerable Groups		X	In addition, there are some risks in terms of access and equity related to the hard investment if different groups, especially the vulnerable and marginalized populations, are not equally involved in planning and implementation stages of the processes under the project. Without an inclusive needs assessment and consultation processes, the contents of Component 3 could be mismatched with the needs of marginalized and vulnerable groups (i.e. vocational training contents for alternate livelihood options).
4. Human Rights		X	Human rights risks relate primarily to gender equality, core labour rights, and involuntary resettlement related to Components 1 and 2. See also the section on "Gender Equity and Women's Empowerment", "Core Labour Rights", "involuntary resettlement" below. Further analysis of Cambodia's domestic human rights framework and its relationship with key international treaties is provided below.
5, Gender Equity and Women's Empowerment		X	There is a risk that any negative impact of the project may disproportionately affect women because Cambodian cultural norms and time-intensive household care duties often impede women's abilities to participate in community consultations and decision-making processes about sustainable management initiatives. Without proper risk mitigation measures, women and other marginalized groups including youth, the elderly, and the people with disability may experience intentional or unintentional discrimination. For example, lower salary of female labours compared to that of male labours, or less livelihood diversification options that are suitable for women with domestic work at homes.
6. Core Labour Rights		X	The Project will use unskilled and semi-skilled labor sourced from the communities for the construction works under Components 1. Without management and mitigation measures, there is a risk that these laborers could be mistreated through violation of the eight (8) International Labour Organisation (ILO) Convention core labor standards, even if unintentionally. This includes low salaries below minimum wage or market rate, hiring school-age workers, discrimination against women, poor facilities, and lack of safety equipment and informality.
7. Indigenous Peoples	X		Numeral consultations with sub-national and commune-level authorities ensure that any indigenous people live in the target areas based on the census and local registration database.
8. Involuntary Resettlement		X	Small-scale infrastructure investments under Components 1 and 2 are made entirely on public land, and all sites are accessible by public roads. The consultation process indicated no plans of resettlements or evictions by concerned agencies in the target areas in Kampot and Koh Kong Provinces.

			<p>However, during the implementation of activities under Component 1, a small number of private plots could be affected by the. Without clear demarcation process prior to the construction, construction works in or near private land may cause short-term economic displacement of some households who utilize the land close to the project site as a mean of livelihood. Inappropriately risk management and mitigation measures, construction works has a chance that private plot holders' access or livelihood earning capability may be affected without risk management and mitigation measures.</p> <p>Therefore, there is a risk of short-term involuntary resettlement without risk management and mitigation measures.</p>
9. Protection of Natural Habitats		X	<p>The initial screening and vulnerability assessment found minimal risk of reduction or loss of biological diversity. However, without appropriate mitigation measures, construction works in or close to mangrove forests may damage the ecosystem services or marine biology and coastal human livelihoods (particularly fishing, a common form of livelihood) directly or indirectly.</p> <p>Investment in mangrove plantations (Component 2) is intended to benefit the natural habitat. There is a risk, without management or mitigation measures, that the investment could be counterproductive and damage the mangrove it is designed to help. For example, without a selection of locally suitable mangrove and long-term management plan, there is a risk (even though the Project is addressing this aspect) that invasive or incompatible species could be introduced to the area, risking project failure and existing mangroves.</p>
10. Conservation of Biological Diversity		X	<p>Investment in mangrove plantations (Component 2) is intended to benefit the natural habitat. There is a risk, without management or mitigation measures, that the investment could be counterproductive and damage the mangrove it is designed to help. For example, without a selection of locally suitable mangrove and long-term management plan, there is a risk (even though the Project is addressing this aspect) that invasive or incompatible species could be introduced to the area, risking project failure and existing mangroves.</p>
11. Climate Change		X	<p>There are three potential risks under this principle if risk mitigation measures are not taken or are unsuccessful;</p> <ol style="list-style-type: none"> 1) unnecessary emissions arising from the construction or operation of the infrastructure, 2) maladaptation arising from the poor or unsuitable design or improper functioning of infrastructures may bring no benefits or by shifting climate change-related risks and vulnerabilities to other areas. 3) inappropriately managed mangrove forests may exacerbate risk of coastal erosion, storm surges, saltwater intrusion, or damage ecosystems.
12. Pollution Prevention and Resource Efficiency		X	<p>Without proper waste management and mitigation measures, there is a risk of small-scale, localized air, water, and land pollution in and around the construction sites through routine, non-routine, and accidental circumstances with the potential for adverse local impacts.</p> <p>Without sufficient capacity building trainings on solid waste management (SWM) to local authorities and communities, there is a risk that the invested drainages, canals will be inappropriately managed after the project, and could cause water contamination through inappropriate waste disposal practices. The combination of these risks and their potential impacts mean that risk mitigation and management measures are required, and are proposed below.</p>
13. Public Health		X	<p>Risks to public health and safety could arise from the following factors if the project will not appropriately manage or implement mitigation measures:</p> <ul style="list-style-type: none"> - Poor construction site management may cause health risks to both construction workers and people living in the area affected by construction (i.e., risks from vehicles entering and leaving the site, risks to children, etc.).

			<ul style="list-style-type: none"> - Contamination of drainage water, air and noise (either directly or indirectly from project activities) may be caused by the release of construction materials and waste. - If the invested infrastructure (embankments and water gates) would be ineffective or fail including broken parts or accidental misuse during the project and beyond, there could be outflow of substantial amounts of water to the vulnerable households.
14. Physical and Cultural Heritage	X		The initial screening and vulnerability assessment did not identify cultural heritage sites in selected project locations. There are no UNESCO World Heritage sites in any of the target areas.
15. Lands and Soil Conservation		X	<p>This risk has been triggered as investments under Components 1 and 2 involve disturbing soil. This risk has been triggered as investments under Components 1 and 2 because construction works involve dredging and distribution of soil from reservoirs, canals, waterways, and waterbodies to enhance adaptive capacity of these natural assets for inundation/ flooding/ saltwater intrusion and to control vector-borne and water-borne diseases.</p> <p>If the excavated soil from these natural assets are contaminated and utilized them for the embankment enlargement and other purposes, unintentional soil contamination could be caused.</p>

Environmental and Social Risks Description

Principle 1: Compliance with the law

Screening result: Potential low-level of risk arising from some activities under Component 1 and 2

Explanation: Issues relating to Compliance with the Law have been checked and reviewed as Part II, Section E of the proposal. The construction and planting activities proposed under Components 1 and 2 require approval of infrastructure designs and the Mangrove Plantation Management Plan at the sub-national and national level. Consultation processes clarified that project activities under Components 1 and 2 may affect a small number of private plots by some disturbances in terms of noise which is related to Principle 8: Involuntary Resettlement.

The proposal development team assessed that there are no legal compliance issues relating to activities under Components 1 and 2 other than involuntary resettlement issues relating to prior consent. This is discussed under Principle 8 – Involuntary Resettlement.

Principle 2: Access and equity and

Principle 3: Marginalized and vulnerable groups

Screening result: Potential low-level of risk arising under Output 1.5 and Output 3.1-3.4

Explanation: For the purpose of this Environmental and Social Safeguards Annex, these principles have been merged because they cover similar issues; marginalized or vulnerable groups are at risk of inequitable access, without risk mitigation and management measures.

The potentially marginalized groups identified during the assessment are women, people with disabilities, the elderly, and youth.

Outputs 1.1 – 1.4, 1.6, 1.7, and 2.1 provide protective infrastructure and therefore it is assumed that this infrastructure will provide equal benefits to people living in the target area. Therefore, there is no additional risk of exclusion or unequal benefit. However, without public consultation that includes the aforementioned potentially marginalized groups, there is a risk that infrastructure planning and design may not be participatory and therefore exclude potentially marginalized groups.

On the other hand, Output 1.5 provides targeted benefits determined based on the selection criteria link to IDPoor levels.¹⁶³ Although the beneficiaries will be selected based on the selection criteria finalized through extensive consultations, this intervention could lead to preferential or unequal selection if management measures (i.e. effective procedures with rational selection criteria to fairly select beneficiaries) are not taken. As of now the project plans to include: (1) a household that owns the land for construction at the selected target areas, (2) a poor household with ID Poor I and II, (3) a house that was fully destroyed or partially destroyed (up to 40%) by disaster (strong wind/rain/flood

¹⁶³ The Ministry of Planning established the Identification of Poor Households Programme (IDPoor) in 2006 to provide regularly updated information on poor and at-risk households. Based on this Sub-Decree 291 on Identification of Poor Households in December 2011, IDPoor is the mandatory standard tool for all organizations who want to target social services to poor households and at-risk households in Cambodia. IDPoor categorizes households into four categories, namely (1) Poor Level 1 (very poor), (2) Poor Level 2 (poor), (3) At-risk, and (4) Non-poor.

etc.), (4) a household with a widow and with more than five household members, (5) a household that includes people with disability, illnesses, or elderly members, and (6) a household that does not own a house and lives in poor condition.

All training and capacity-building activities (Component 3) also provide targeted benefits to invited participants who live in specific area or unskilled/ semi-skilled construction labours. However, a level of risk still exists as, without proper risk mitigation measures, the marginalized populations could potentially be excused from the capacity building activities and selection as unskilled or semi-skilled construction labours. Therefore, a low level of risk exists, and management and mitigation measures are proposed.

Principle 4: Human rights

Screening result: Potential low-level risk arising under the project as a whole

Explanation: Human rights risks relate primarily to gender equality, core labour rights, and involuntary settlements related to Components 1 and 2 (See Principle 5: Gender equality and women’s empowerment, Principles 6: Core Labour Rights and Principle 8: Involuntary Resettlement). The project has been screened for other potential human rights related risks and no realistic risks could be found.

As Table 24 shows a summary of the ratification of various human rights treaties, Cambodia has ratified the major rights treaties, such as CEDAW and the International Covenant on Civil and Political Rights. Cambodia has had a Special Rapporteur on Human Rights since 1998 and records show extensive visits and reports by the Special Rapporteur since 1998¹⁶⁴.

Of the 6 treaties that Cambodia hasn’t ratified, 5 are optional protocols, where the corresponding main convention has been ratified. The only convention that Cambodia hasn’t ratified is the International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families. The proposal development team has assessed the area and ascertained that there are no undocumented migrants in the project’s target area, and nothing to indicate that there will be an influx of migrants in the near future.

However, because there is a possibility for a lack of protection, precautionary mitigation and management measures are discussed under those respective principles.

Table 26 Human Rights Treaties Ratified by Cambodia

Organisation consulted	Possible human rights issue (cited, non-ratification)	
OHCHR	Of the 18 ‘core’ human rights treaties, Cambodia has ratified 12 of them ¹⁶⁵ . These are as follows:	
	<p>Ratified</p> <ul style="list-style-type: none"> ● International Convention on the Elimination of All Forms of Racial Discrimination (1969) ● International Covenant on Civil and Political Rights (1976) ● International Covenant on Economic, Social and Cultural Rights (1976) ● Convention on the Elimination of All Forms of Discrimination against Women (1981) ● Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (1987) ● Convention on the Rights of the Child (1990) ● Optional Protocol to the Convention on the Elimination of All Forms of Discrimination against Women (2000) ● Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict (2002) ● Optional Protocol to the Convention on the Rights of the Child on the sale of children, child prostitution and child pornography (2002) ● Optional Protocol to the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (2006) ● Convention on the Rights of Persons with Disabilities (2008) ● International Convention for the Protection of all Persons from Enforced Disappearance (2010) 	<p>Not ratified</p> <ul style="list-style-type: none"> ● Optional Protocol to the International Covenant on Civil and Political Rights (1976, signed but not ratified) ● Second Optional Protocol to the International Covenant on Civil and Political Rights, aiming at the abolition of the death penalty (1991) ● Optional Protocol to the International Covenant on Economic, Social and Cultural Rights (2013) ● Optional Protocol to the Convention on the Rights of the Child on a communications procedure (2014) ● International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families (2003, signed but not ratified) ● Optional Protocol to the Convention on the Rights of Persons with Disabilities (2008)

¹⁶⁴ https://spinternet.ohchr.org/_layouts/15/SpecialProceduresInternet/ViewCountryVisits.aspx?Lang=en&country=KHM

¹⁶⁵ <https://indicators.ohchr.org/>

Principle 5: Gender equality and women's empowerment

Screening result: Potential moderate-level risk arising under the project as a whole

Explanation: There is a general but low-level risk that all activities under the project may have insufficient participation from women. This is partly due to lower rates of labour force participation among women, and because government departments at the national and sub-national level are heavily male dominated even though Cambodia women don't face as extensive barriers and challenges as in some other Least Developed Countries – they have the same rights to work as men.

However, specific risks arise in relation to the physical infrastructure works under Component 1 may negatively affect women because they normally undertake domestic work at homes including child and the elderly care based on cultural norms. It potentially impedes women's abilities to participate in community consultations and decision-making processes about sustainable management initiatives. Without proper risk mitigation measures, women and other marginalized groups including youth, the elderly, and the people with disability may experience intentional or unintentional discrimination. For example, lower salary of female labours compared to that of male labours, or less livelihood diversification options that are suitable for women with domestic work at homes. Given these risks, management and mitigation measures have been proposed. In addition, Annex D has been provided description about gender equality (and inequality) issues in Cambodia.

Principle 6: Core labour rights

Screening result: Low levels of risk resulting from investments under Outputs 1.1-1.7. No risk under any other outputs of the project.

Explanation: Generally, there is a low-level of risk to core labour rights in Cambodia because the country has ratified all eight (8) International Labour Organisation (ILO) Convention core labor standards (**Table 25**).

The Project will use unskilled and semi-skilled labor sourced from the communities for the construction works under Components 1. Risks potentially arises particularly in relation to physical construction works under outputs 1.1-1.7 where engineering and construction subcontractors will be used by the Project rather than the direct hiring by the Project.

Risk therefore arises in terms of non-compliance with the law. In this regard, risk arises particularly in relation to physical works under Outputs 1.1-1.7 where engineering and construction subcontractors will be used by the Project (rather than the project directly hiring people). Without management and mitigation measures, there is a risk that these laborers could be mistreated through violation of the eight ILO Convention core labor standards, such as low salaries below minimum wage or market rate, hiring school-age workers, discrimination against women, poor facilities, and lack of safety equipment and informality. In this regard, management and mitigation measures for this risk are proposed below.

Principle 7: Indigenous people

Screening result: No risk triggered

Explanation: Numeral consultations with sub-national and commune-level authorities ensure that any indigenous people live in the target areas based on the census and local registration database.

Principle 8: Involuntary resettlement

Screening result: Low risk arising under Outputs 1.1-1.6. No risk arising from other outputs under the project.

Explanation: Small-scale infrastructure investments under Components 1 and 2 are made entirely on public land, and all sites are accessible by public roads. For the land of Output 1.5, local authority authorized the vulnerable households to stay in the targeted communities long-term. The repeated field visits and consultations with communities and national, provincial, district, and commune representatives indicated no plans of resettlements or evictions by concerned agencies in the target areas in the Kampot and Koh Kong Provinces.

Output 1.1— 1.6 are designed to enhance adaptive capacity of the communities through rehabilitating or improving the reservoirs and embankments, renovating medium/small-scale wastewater treatment plant, establishing filter nets on the canal outlets, and building sluice gates in public property. No additional land acquisition is required for these investments. Moreover, the activities specifically Output 1.1 and 1.4 and 1.5 has been designed to be community-led under the People's Process, which has the co-benefit of reducing risks of (among other things) inappropriate management and maintenance, as local government and communities will contribute tree planting, vegetation, labours, etc. While all of six (6) outputs under Component 1 are on public land, a small number of private plots may be affected by some disturbance in terms of noise, possibly construction workers from outside the household and the presence of building materials at the site. This raises a moderate risk relating to these plots, even though the project does not plan to resettle these plot holders.

A low level of risk also arises from the construction works under Output 1.1-1.6, which will be ongoing in several stages over 4 years. During construction works, plot holders may be inconvenienced or have access to their plots temporarily limited, or livelihood earning capability may be affected. As the possibility of these risks cannot be eliminated entirely, risk management and mitigation measures are proposed below.

***Principle 9: Protection of Natural Habitats and
Principle 10: Conservation of biological diversity.***

Screening Result: Moderate risk arising from Outputs 1.5, 1.7, 2.1 and 2.2

Explanation: There are currently 49 protected areas in 8 categories¹⁶⁶ and a number of biodiversity corridors covering over 7.4 million ha (41 percent of Cambodia).¹⁶⁷ Mondol Seima District in Koh Kong Province has protected areas including national park.

Output 1.5 is construction of resilient housing and toilet in the community located in or nearby the mangrove forest where is included in the protected area. It should be noted that local authorities authorized the vulnerable households to live in the current location and upgrade the resilient housing with toilets in the same locations. As the construction of resilient housing will be done based on the existing housing, this investment has a low risk of damaging the ecosystem services or marine biology and coastal human livelihoods directly or indirectly if appropriate risk management and mitigation measures will not be taken.

Work under Output 1.7 will require components and machinery to be brought to the identified site in the island and nearby mangrove conservation area and vulnerable floating community with disposed solid waste in the waterbody. During transportation and installation of the machine through a floating platform, vessel may damage mangrove or ecosystem services if they approach near to mangroves and has a risk to leak oil without proper risk management and mitigation measures. Accurate data collection and lifespan of machines may be affected by accumulated solid waste on the water without clean-up activities prior to the installation. Inappropriate management of solid waste from construction may cause local pollution problems, such as pollution of water bodies.

Outputs 2.1 and 2.2 are designed to benefit both the natural environment and habitat through restoration of destroyed mangrove ecosystems in the protected area and development of EbA management plans. Without management or mitigation measures, the investments could be counterproductive and damage the mangrove it is designed to help. For example, the activities may introduce invasive or incompatible species and risk existing mangroves if the Project does not select locally suitable mangrove species. Both mangrove plantation and development of management plan will not involve any chemicals or other materials that have potential risk.

In this regard, risk management and mitigation measures are presented below.

Principle 11: Climate change

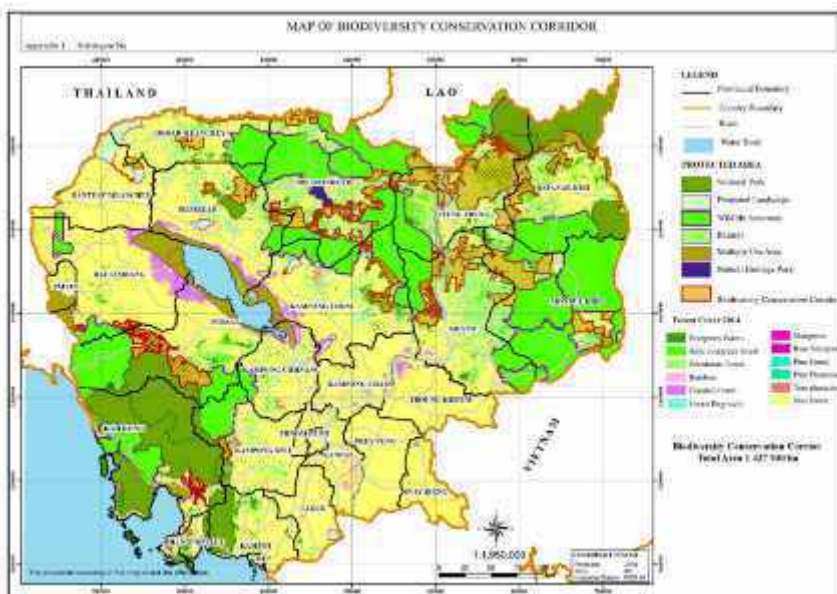
Screening result: Potential risk resulting from activities under Investments under Component 1. No risk arising from any other activities.

¹⁶⁶ These include National Parks, Wildlife Sanctuaries, Protected Landscapes, Multiple Use Areas, Ramsar Sites, Biosphere Reserves, Natural Heritage Sites and Marine Parks

¹⁶⁷ <https://cambodia-redd.org/protected-area-strategy.html>

Explanation: The Project is designed to bring adaptation benefits. However, all investments under Component 1 carry some limited climate change related risks if risk mitigation measures are not taken or are unsuccessful.

In all cases, materials need to be transported to the sites. Greenhouse gas emissions (GHG) could be generated by project activities if mitigation measures are not taken. For example, local transportation of materials and equipment lead the possible greenhouse gas emissions relating to transportation. Output 1.7 could generate greater GHG emissions because the Project will import equipment for the tide gauge and weather station from a neighbouring country (likely Thailand). Aside from this, no other materials will be imported from abroad. The Project will not implement any other emitting activities, such as consuming fuel or generate emissions from waste. But waste generated from construction can also cause methane emissions if improperly disposed of or recycled.



Maladaptation may arise from the poor or unsuitable design or improper functioning of infrastructure under Component 1 may bring no benefits or by shifting climate change-related risks and vulnerabilities to other areas (i.e. enlarged embankments may cause flooding at the opposite side of reservoirs). Inappropriately managed mangrove forests under Output 2.1 may possibly exacerbate long-term risks of coastal erosion, storm surges, saltwater intrusion, or damage to ecosystems. Resilient housing and toilet under Output 1.5 could prove maladaptive if it is not natural-disaster (especially flooding) resilient and contributes to water contamination during flood periods.

Principle 12: Pollution prevention and resource efficiency

Screening result: Low risk arising from activities under Outputs 1.1, 1.2, 1.3 1.4, 1.5 and 1.6. No risks identified under other outputs.

Explanation: Construction activities under Output 1.1-1.4 and 1.6 will use concrete and other construction inputs, such as rocks, sand and soil. This is likely to generate a small amount of waste which, if disposed of incorrectly, would risk localized pollution in and around the construction sites. This infrastructure is not expected to lead to waste generation or resource inputs in its day-to-day operation.

Without sufficient capacity building trainings on SWM to local authorities and communities (Output 3.3), there is a risk that the invested drainages and canals will be inappropriately managed after the project, and could cause water contamination through inappropriate usage by communities to dispose solid waste.

Under Output 1.5, the Project will also use some construction materials for resilient housing construction. As these are household level, this will include timber, tiles and small amounts of concrete, which will generate very small amounts of localized waste. The project will not use any hazardous materials such as asbestos.

The risk levels from the above are low, but appropriate risk management and mitigation measures are listed below.

Principle 13: Public Health.

Screening Result: Potential risk resulting from some activities under Component 1. No risk arising from any other activities.

Explanation: Most of the investments provide protective rather than provisioning services, meaning that there are few public health type risks emerging from their operation after the construction period. However, risks to public health and safety could arise from the following factors if the project will not appropriately manage or implement mitigation measures:

- 1) Poor construction site management may cause health risks to both construction workers and people living in the area affected by construction (i.e., risks from vehicles entering and leaving the site, risks to children, etc.).
- 2) Contamination of drainage water (either directly or indirectly from project activities) may be caused by the release of construction materials and waste.

- 3) If the invested infrastructure (embankments and water gates) would be ineffective or fail including broken parts or accidental misuse during the project and beyond, there could be outflow of substantial amounts of water to the vulnerable households.

Principle 14: Physical and cultural heritage

Screening result: No risks

Explanation: During the field visits and consultations conducted in the preparation of the proposal, no heritage sites were found to be situated within the selected project locations. There are no sites of historical, religious or cultural importance in the target area or adjacent to them, and no areas nearby UNESCO World Heritage sites in any of the target areas.

Principle 15: Land and soil conservation

Screening result: Moderate risk arising from activities under Output 1.1 – 1.4, 1.6, and 2.1

Explanation: Output 1.5 does not require any digging or disturbance of the soil beyond the installation of house foundations. Considering that the target community is floating community and does not use the land for any agricultural purpose, there is no risk. Output 1.7 also does not lead to any risk on soil and land conservation because this activity is installation rather than construction without any soil disturbance.

Activities under Outputs 1.1, 1.2, 1.3, 1.4 and 1.6 will dredge and distribute soil from reservoirs, canals, waterways, and waterbodies during the construction because the investments aimed at enhancing adaptive capacity of these natural assets for inundation/ flooding/ saltwater intrusion and to control vector-borne and water-borne diseases.

Output 1.1, 1.4 and 1.6 also enlarge or build embankments. While neither of these activities involve digging or dredging, they do require embankment fill material (i.e. natural soil/earth type material). Without risk management or mitigation measures, there is a risk that this material could be contaminated, and thus unintentional soil contamination could be caused after solid distribution for embankments.

Investments for mangrove restoration and management activities under Outputs 2.1 and 2.2 have potential risk because planting activities inherently involve digging and changing the exact nature of the soil. As identified under Principle 9, project failure (i.e. introduction of unsuitable species or death of mangroves) is the main risk, and this would be a risk to land and soil conservation in the same way that it is a risk to the natural habitat.

The impact assessment below is presented in summary form to comply with proposal length restrictions. It was prepared using secondary data, reports, analysis and in some cases through interviews and consultations to reach conclusions about the likely impacts of the risks if risk management and mitigation measures are not implemented.

Table 27 Environmental and Social Impact Assessment for investments under Component 1 and 2

Project activities	Potential risk / impact	Impact assessment
<p>All investments (see right-hand column where impacts relate to specific investments)</p>	<p>Risks identified all under ESP Principles, except Principles 7 and 14</p>	<p>Compliance with the law As outlined above, activities under Components 1 and 2 require approval of infrastructure designs and the Mangrove Plantation Management Plan at the sub-national and national level.</p> <p>Failure to comply with this legal/regulatory requirement would result in either an illegal construction or a construction that does not comply with regulatory requirements. The impacts of this could be as follows:</p> <ol style="list-style-type: none"> 1) A construction where safety is compromised 2) Potential for legal proceedings against one or more of NCS, UN-Habitat, or the Ministry of Environment 3) Reputation damage for the above parties 4) Worsened relations with communities <p>Access and Equity and Potentially Marginalised Groups The project has two types of investments. Outputs 1.1 – 1.4, 1.6, 1.7, and 2.1 provide general benefits to all people in a specified geographic location and there is no discrimination in the benefits they provide. However, without public consultation that includes the aforementioned potentially marginalized groups, there is a risk that infrastructure planning and design may not be participatory and therefore exclude potentially marginalized groups. In the proposed project, only Investments under Output 1.5 provide targeted benefits. With this in mind, the risk assessment only identified access and equity risks under this output.</p> <p>Output 1.5 provides targeted benefits determined based on the selection criteria. Although the beneficiaries will be selected based on the selection criteria finalized through extensive consultations, this intervention could lead to preferential or unequal selection if management measures (i.e. effective procedures with rational selection criteria to fairly select beneficiaries) are not taken.</p> <p>There are similar but slightly different potential impacts:</p> <ol style="list-style-type: none"> 1) Implicit or explicit exclusion (i.e. vocational training contents are not reflected certain needs from the marginalized populations are overlooked despite their need) –implicit or explicit prejudice against one or more of these groups and selection methods could hamper the Project to reach population in greatest need. 2) Quarrel for the ownership of the resilient housing – preferential or unequal selection process and criteria may cause quarrel or harm local solidarity among the vulnerable households in the communities because the project is capable to construct limited demo resilient houses under Output 1.5. <p>Human Rights As highlighted in the risk assessment, human rights issues mainly present themselves in terms of gender equality, core labour rights, and involuntary resettlement. As such, these concerns are addressed under these respective principles. No additional human rights risks were identified, and the proposal development team was satisfied that Cambodia’s commitments on human rights mean no additional risks, beyond the aforementioned, present themselves. As such, no further impacts identified, but general management and mitigation measures are presented, below.</p> <p>Gender Equality and Women’s Empowerment (for all components)</p>

		<p>There are important differences between men and women in terms of opportunities in education and work in Cambodia. On average, women in Cambodia provide 3.5 hours' per day more unpaid domestic work (such as cooking and caring for children) than men. As the ADB notes, "Women face a double burden in that they are expected to keep the house and family while working and bringing in an income at the same time."¹⁶⁸ Consequently, this means that any loss of income for women is magnified because women face greater burdens of responsibility. It potentially impedes women's abilities to participate in community consultations, decision-making processes about sustainable management initiatives, and vocational trainings to diversify livelihood options.</p> <p>Relating to capacity building sessions on resilient housing for unskilled and semi-skilled labours under Output 1.5, it may also hamper the possibility of female to participate the training and utilize skills developed through the training and implementation processes of the project to seek new working opportunities and to gain additional income in the future. Women and other marginalized groups including youth, the elderlies and people with disabilities may also experience unequal treatment, such as lower salary of female labours compared to that of male labours., or less livelihood diversification options that are suitable for women with domestic work at homes.</p> <p>Although no detailed statistics are available for architecture, a comparable example from agriculture is telling; despite the fact that half of all agricultural workers are women, only 10 per cent of agricultural extension services offered reach women. Moreover, there are significant gender disparities in access to agricultural equipment.¹⁶⁹ This suggests that without proactive measures to include and ensure women's participation, services will tend to be oriented towards men and benefit them disproportionately (if we assume agricultural extension services are comparable with architectural training).</p> <p>Core Labour Rights</p> <p>As highlighted above, there is a risk to people working on construction activities under the project. This risk must be seen in the context of fairly high rates of informality in unskilled and semi-skilled work in Cambodia. Risks potentially arise particularly in relation to physical construction works where engineering and construction sub-contractors will be used by the Project rather than the direct hiring by the Project. Despite signing all eight fundamental conventions of the ILO into law, enforcement can be patchy, and compliance limited.</p> <p>In Cambodia, the labor force participation rate among females is 69.6 percent, and among males is 82.1 percent for 2022.¹⁷⁰ Gender disparities are apparent in other non-agricultural industries including construction sector where males were employed in greater numbers, while females were more frequently employed in manufacturing, wholesale, and retail trade. In terms of salary, more females than males earned less than KR400,000 (\$100) per month in 2019 (55.1 percent versus 44.9 percent), while more males earned KR 400,000 or higher. The survey found that about 88.3 percent of the total employed persons aged 15 or older were in informal employment, while 11.7 percent were in formal employment. Informal employment was higher in rural areas (90.0 percent) than in urban areas (85.0 percent).¹⁷¹</p> <p>The National Institute of Statistics survey found that 36.0 percent of total employment usually worked more than 48 hours per week (36.8 percent for males, 35.1 percent for females), even though "Article 137 of Cambodia's labour law (in section 2, on hours of work, as well as daily and weekly hours of work) states that in all establishments of any nature, whether they provide</p>
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¹⁶⁸ ADB (2015) Promoting women's economic empowerment in Cambodia, p.19, [link](#)

¹⁶⁹ *Ibid.*, p.23, [link](#)

¹⁷⁰ <https://genderdata.worldbank.org/countries/cambodia/>

¹⁷¹ *Ibid.*, p.xi

vocational training or are of a charitable nature involve the liberal professions, the number of hours worked by employees of either sex cannot exceed eight hours per day or 48 hours per week.”

Without mitigation measures, the impacts of the risks identified above are as follows:

- 1) The sub-contractors working on the physical works under Outputs 1.1-1.7 would be in breach of labour laws, exposing them through informal working arrangements, long working hours, low wages and differential conditions for women, and potentially the project to legal issues. If this were to happen, then
- 2) Workers employed using project funds may be underpaid, denied labour rights or exposed to unsafe working practices, potentially leading to physical injuries. The proposal also acknowledges that low levels of education and persistent illiteracy make it more difficult to employ basic labour protections when illiteracy rates are high (meaning people are unable to read or understand contracts and other written information) the norm to which they are accustomed is informal work.
- 3) Women may be differentially treated, especially considering that the construction sector is male-dominated in Cambodia (as in many countries)

Understanding the above, it is clear that there is potential for the risks to lead to impacts based on existing data from the Report on the Cambodia Labour Force Survey 2019. However, extensive legal and contractual means exist to ensure executing entities and any sub-contractors comply with Cambodia’s laws and international labour related norms and standards. Beyond this, there will be regular monitoring to ensure compliance. These measures are detailed further in the next section of this Annex.

Indigenous people

As no risk is triggered under this principle, no impacts have been identified.

Involuntary Resettlement

Small-scale infrastructure investments under Components 1 are made entirely on public land, and all sites are accessible by public roads. The repeated field visits and consultations with communities and national, provincial, district, and commune representatives indicated no plans of resettlements or evictions by concerned agencies in the target areas in the Kampot and Koh Kong Provinces.

The realistic impacts arising from the risks identified are as follows under Outputs 1.1— 1.6:

- 1) Without permission and a clear demarcation, construction works could be carried out in private plots. This has several damaging impacts: it creates legal issues for the project, it could result in construction being halted, or it could mean that households feel they must move (though note that, despite the works involving a small number of plots, there is no realistic risk of resettlement).
- 2) For all other plots, the works could lead to noise, disrupted access or general inconvenience. Noise may disturb young children and people who work in or from home and public institutions including schools and clinics. Access issues may prevent people from earning a living, children from attending school, or people from health clinics. Some people may also feel threatened or unsafe when construction workers are working in the vicinity of their households.

Protection of Natural Habitats and Conservation of Biodiversity

The risk assessment notes risks arising under Outputs 1.5, 1.7, 2.1 and 2.2 that will be located in or near critical habitats and protected mangrove area in Mondol Seima District, Koh Kong.

Related to Outputs 1.5 and 1.7, the risk of works causing damage to natural habitats was found to be minimal. Impacts to the natural environment from potential pollution are discussed in Pollution Prevention and Resource Efficiency, below. No evidence was found that small-scale investments such as these have caused major habitat loss or damage to the environment in Cambodia.

		<p>Regarding mangrove restoration and management under Output 2.1 and 2.2, mangrove forests have been in alarming decline in Cambodia in recent years. The country lost 42 per cent of its mangroves in the period 1989-2017. According to the Phnom Penh Post, 50ha out of a total of 522ha of mangrove forest in the Chroy Svay community protected area – consisting of six villages in Koh Kong province’s Chroy Svay commune have been cleared illegally because of several problematic activities including the illegal encroachment on mangrove forestland, illegal construction and legal land concessions to coastal development companies.¹⁷² Studies indicate up to 74 different species of Mangroves in Cambodia from 35 families. The dominant species belong to the genera <i>Rhizophora</i> (<i>R.piculatea</i>, <i>R.piculatea</i>) <i>Avicennia</i>, <i>Lumnitzera</i>, <i>Bruguiera</i>, <i>Ceriops</i> and <i>Xylocarpus</i>. In addition to mangrove trees, other associated species include the mangrove palm, <i>Nypa fruticans</i>¹⁷³. The mangrove species throughout Cambodia’s coastal zone have been mapped, and as such the risk and impact of planting incorrect or incompatible species are minimal. The Ministry of Environment, Ministry and Agriculture, Forestry and Fisheries and the UN Food and Agriculture Organisation have collaborated to produce detailed surveys¹⁷⁴ With this in mind, management and mitigation measures are proposed.</p> <p>According to UN Environment Programme (UNEP), “Excessive logging, conversion of forest lands for agriculture, and hunting wildlife for trade and local consumption have contributed to the increasing rate of wildlife habitat loss and biodiversity destruction in Cambodia” . The same report goes on to note, however, that “The absence of a strong land use policy framework, inadequate coordination among ministries and department dealing with natural resources and land use development as well as a lack of accurate information to guide land use allocation are other important factors that have contributed to continuing pressure on the forest and hence, constraints on appropriate land use management of the country”. This provides further evidence from risks arising from ineffective oversight of development activities and thus local impacts arising from damage to or loss of local habitats. With this in mind, risk management and mitigation measures are proposed below.</p> <p>Climate Change</p> <p>The Project is designed to bring adaptation benefits. However, all investments under Component 1 carry some limited climate change related risks if risk mitigation measures are not taken or are unsuccessful. 2 risks have been identified under this principle, increased GHG emissions and maladaptation. For GHG emissions, the impact would be a negative contribution to national efforts to reduce its GHG emissions, and reputational risks for the Adaptation Fund, the implementing and executing entities, and the government, especially the Ministry of Environment.</p> <p>Risks related to maladaptation may arise from the poor or unsuitable design or improper functioning of infrastructure under, or it simply shifts climate change-related risks and vulnerabilities to other areas. The impacts of these potential maladaptation are as follows:</p> <ol style="list-style-type: none"> 1) Under Outputs 1.1, 1.2, 1.3, 1.4, and 1.6, ineffective infrastructure would result in a wasted investment and continued vulnerability to climate change related flooding hazards. 2) Under Output 1.5, ineffective design and construction of housing and toilet with construction defects, poor, and inadequate local building techniques may potentially cause them prone to disasters and contributes to water contamination and unsanitary environment. 3) Inappropriate management plan of mangrove forest under Output 2.1 and 2.2 may possibly exacerbate long-term risks of coastal erosion, storm surges, saltwater intrusion, or damage to ecosystems.
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¹⁷² Orm Bunthoeurn (2021, November, 3), Activists say mangroves under threat, [link](#)

¹⁷³ Vongwattana, K (undated) National Report on Mangroves in the South China Sea, p.4

¹⁷⁴ See, for example, FAO (2005) Global Forest Resources Assessment, Thematic Study on Mangroves

		<p>4) Moving climate change-related risks elsewhere would simply transfer the vulnerabilities to another location. It could also increase the impacts if natural hazards occur in areas without proper infrastructure.</p> <p>5) Ineffective infrastructure and shift of climate change-related risks and vulnerability elsewhere could lead to reputation risk and damaged relations and trust between the beneficiary communities, the implementing and executing entities, the national and sub-national governments.</p> <p>Pollution Prevention and Resource Efficiency <i>The construction activities may generate noise pollution and solid wastes. According to IGES and the UN Environment Programme, Construction and Demolition waste includes “most commonly includes paper/cardboard, garden/ vegetation, wood/timber, carpets, other textiles, rubber, glass, plastics, metals, hazardous waste, ceramics, soil/rubble, cobbles/boulders, clean soil, concrete, plasterboards, bricks, asphalt/bitumen, cement sheet, insulation and others”. The types of waste likely to be generated from this project (the investments under Component 1) fit into this category (however, no hazardous materials are to be used).</i></p> <p>In many cases in Cambodia, construction related waste is not disposed of correctly, sustainably or in accordance with the law. There are numerous potential impacts of this. 1) It leads to increased local pollution problems such as unsafe/ hazardous conditions in nearby water bodies, 2) Solid waste blocks drainage facilities, contributing to flooding in flood prone areas, and 3) Open solid waste emits methane, a greenhouse gas up to 20 times more potent than carbon monoxide.</p> <p>Considering these issues, management and mitigation measures are proposed in the following section.</p> <p>Public Health Component 1 involves construction sites. As highlighted above, construction sites and unsafe construction practices carry risks to workers and the neighbourhood communities. The potential impact of these physical injuries arising from unsafe construction site management practices. Health impacts to construction workers have occurred at construction sites managed by illegal, informal or small construction companies, whose procedures and policies are non-existent or less well developed. Specific impacts related to contamination of wastewater are highlighted in the Pollution Prevention and Resource Efficiency of this impact assessment.</p> <p>Considering the construction site risks and impacts, noted above, management and mitigation measures are proposed in the next section.</p> <p>Physical and Cultural Heritage As no risk is triggered under this principle, no impacts have been identified.</p> <p>Land and Soil Conservation Impacts from project failures under Component 1 and 2, for which risks occur to land and soil conservation, are highlighted above under protection of natural habitats and climate change. No additional impacts arise that are not discussed there.</p>
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Table 28 Environmental and Social Risk Management and Mitigation

Environmental and Social Policy Area	Risk and impact assessment	Measures proposed to avoid, manage or mitigate risks
Compliance with the Law	Low risk	UN-Habitat will require the Executing Entity to produce all permits and approval on infrastructure designs prior to construction commencing and approval on the Mangrove Plantation Management Plan prior to mangrove plantation. UN-Habitat will, as part of its oversight function, ensure that all construction and planting works will take place during the permitted sites within the agreed demarcation.
Access and Equity and Marginalized and Vulnerable Groups	Low risk	<p>Under Component 1 and 2, extensive consultation processes have already been held as part of the proposal development.</p> <p>However, before construction and mangrove planting starts there will be a further consultation process before, during and after construction works and planting activities to ensure continued consent, inclusion and that there has been no change in the circumstances described in the proposal.</p> <p>Under Output 1.5, the Project ensures to select the most vulnerable households to receive the resilient housing and toilet based on the selection criteria including ID Poor levels. Considering the importance of houses and toilets matching with their needs and culture, the detailed design will be decided through community consultations and reflection of their comments. The Project will ensure the design and construction process will not pose any risk and negative impacts to children, youth, the elderly, and people with disabilities. Community monitoring will be conducted during and after the processes and improvements based on the grievances and comments from the beneficiary communities will be done.</p> <p>Capacity building trainings under output 3.4 will build capacity of unskilled and semi-skilled labours on the resilient housing and toilet techniques. Trainees can utilize skills developed through the training and implementation processes of the project to seek new working opportunities and to gain additional income. Trainees will be enabled to collective advocate for improved housing resilience, greater inclusion of the poor and on other issues relation to housing as they emerge.</p>
Human rights	Low risk	<p>As highlighted in the risk assessment, human rights issues mainly present themselves in terms of gender equality, core labour rights, and involuntary resettlement. As such, measures to mitigate and manage risks to human rights issues are presented in the respective sections.</p> <p>In general, Project Manager will monitor the compliance of the human rights during the project. In case of unanticipated case of violation of human rights, the respective mitigation measures will be developed and implemented with consultation of key stakeholders including the beneficiary communities. A clause will be included in all contracts stating that the contractor will comply to human rights markers (and all other safeguard standards).</p>
Gender equality and women's empowerment	Moderate risk	<p>There will be a target of 50 percent of women engaged in the design and build of all infrastructure under Component 1, with designs reflecting the perspectives and needs of women. The Project also envision 50 percent women participation during all training and capacity-building activities under Component 3 (Only Output 3.4 aims at 30 percent of women participation).</p> <p>To achieve 50 percent participation target of women in the capacity building trainings, women will be allowed to bring infants and small children under their care to trainings if they don't have any other options (assuming that one potential barrier for women is the unavailability of childcare).</p>
Core labour rights	Low risk	All workers employed under the project and by its contractors will be formalized, with proper, legally binding contracts that workers understand. All construction contract workers will have the right to have their contracts explained to them, and they will also be empowered to report anonymously to the Project Manager or through the grievance mechanism if they feel they are being unfairly treated in any way. Targets for female employment will be set in conjunction with contractors.

		<p>The Project comply with minimum wage, if applicable, and ensuring equal pay for men and women, and will only take place during the daylight hours. Understanding that occupational health and safety is problematic in Cambodia, particularly in the construction sector, all workers will be given basic safety equipment including helmets and high visibility jackets. Sub-contractors also ensure to stock aid kits and prepare emergency contact lists.</p>
Involuntary Resettlement	Moderate risk	<p>Small-scale infrastructure investments under Components 1 and 2 are made entirely on public land, and all sites are accessible by public roads. The repeated field visits and consultations with communities and national, provincial, district, and commune representatives indicated no plans of resettlements or evictions by concerned agencies in the target areas in the Kampot and Koh Kong Provinces.</p> <p>However, construction works under output 1.1-1.6 have a potential to lead: 1) legal issues without permission and a clear demarcation, and 2) noise, disrupted access, or general inconvenience. Although no risk of physical and economical resettlements found during the consultations in all project activities, a further re-inspection of the sites will take place prior to the start of construction or plantation works. If no evidence of dwelling or livelihood activity at the sites is found at the point (through visits to the sites, photographs, and meetings with local people, commune officials and the Provincial Development of Land Management, Urban Planning and Construction), construction can commence. If evidence is found that people have recently moved to the site (either dwelling or for livelihood), the project will enter into a consultation period with the affected people to reach a negotiated and agreed solution. It should also be noted that upon approval of the project by the AF Board, the respective Provincial Governments and Commune Councils will be informed, who in turn can informally inform any new incumbents of the land that it is earmarked for development. It should be reiterated at this point that all land where the investment will take place under this project is state public land.</p> <p>Besides that, a clause will be included in all contracts stating that contractors will comply to human rights markers (and other relevant safeguard standards). The Project Manager and PEU will check compliance.</p>
Protection of Natural Habitats and conservation of biological diversity	Low risk	<p>The risk assessment notes risks arising under Outputs 1.5, 1.7, 2.1 and 2.2 that will be located in or near critical habitats and protected mangrove area in Mondol Seima District, Koh Kong.</p> <p>Outputs 1.5 and 1.7 involve small-scale construction/ installation works with a minimum risk to damage natural habitats. A clause will include in all contracts to prepare a Solid Waste Management Plan.</p> <p>Investments 2.1 and 2.2 will a mangrove restoration/ plantation and development of the Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems. A budget of US\$ 70,000 has been allocated for a very detailed assessment. One of the main purposes of this study is to re-confirm the selected species. It will also identify general management practices necessary to ensure that the mangroves planted make a continued contribution to enhancing natural habitats and biodiversity, as well as providing adaptation benefits.</p>
Climate Change	Low risk	<p>In line with the above, contractors will be required to prefer local materials over imported materials to minimize GHG emissions from transportation.</p> <p>For Output 1.5, sustainably sourced materials will be used to construction the resilient housing and toilets. Infrastructure under Output 1.1-1.4 and 1.6 were designed to ensure improvement/ renovation/ rehabilitation of natural assets and the communities will not affect or minimum affects by climate change-related risks and vulnerability compared to the pre-project interventions. Design specifications in Annex B reflected the consideration of worst case future climate change impacts.</p> <p>Regarding Component 2, as highlighted above, the mangrove restoration/ plantation will be done based on the suitable</p>

		species selection and appropriate plantation as well as management through the development of mangrove management plan (Output 2.1) and the EbA management plans (Output 2.2).
Pollution Prevention and Resource Efficiency	Low risk	<p>All investments, particularly construction works under Outputs 1.1 – 1.6 will generate a small amount of waste materials. None of the investments will generate significant waste products or pollutants from their ongoing use/operation.</p> <p>A clause in all contracts will include requirement to prepare the detailed Solid Waste Management Plan at the construction sites including collection, transportation and management of waste generated during the Contract, including treatment and disposal of waste (e.g. recycling of components, authorized dumping sites, etc.).</p>
Public Health	Low risk	<p>Outputs 1.1- 1.6 involve construction sites. Risks and impacts have been highlighted above. To manage and mitigate public health risks and impacts, effective construction site management practices are required.</p> <p>Achieving this means following various internationally recognized good practices. Among these are Good Practices in Safety, Health and Working Conditions, an ILO Guidebook that uses Cambodia as a case study country. This guidance is particularly relevant for the smaller construction sites as the guidelines focus on smaller infrastructure. Among the measures outlined are basic safety training for all workers, masks, and scarves to protect against the sun, safety belts for workers working above 2 metres, barriers to prevent falls into dug areas, temporary shaded storage to store paints and weather sealant, all heavy materials carried by cart/wheelbarrow, mandatory use of hard hats and demarcation of construction sites with signs and barriers.</p> <p>References to standards and laws to which the activity will need to comply will be included in all legal agreements with all sub-contractors, including steps and responsibilities for compliance. It will be ensured that each person associated with the project is aware of domestic and international laws and compliance needs with technical standards requirements.</p> <p>Beneficiary communities will conduct community monitoring on the impacts of the construction activities on human health and safety.</p>
Land and Soil Conservation	Low risk	Please see above for Protection of Natural Habitats and Climate Change.

General management arrangements in place to avoid or reduce potential environmental and social risks

Both the management arrangements below and the general measures, beneath, are based on a combination of secondary research and information about typical risks and risk avoidance, management and mitigation practices in Cambodia, the community consultations conducted in preparation of this proposal and the length experience of the proposal development team in Cambodia and internationally. These measures are similar to other projects implemented by UN-Habitat in the Asia-Pacific region, funded by the Adaptation Fund.

- Responsibilities: Direct responsibility for this implementation of the project in accordance with this plan lies with the Project Manager, who has oversight and compliance responsibility. Any changes or additional activities that arise during the project implementation that add value to or complement proposed sub-projects (within allowable limits set by the Adaptation Fund) will need to be cleared by the Project Manager and approved by the Project Management Committee (PMC).
- Management and implementation of risk mitigation measures: Mitigation measures, including awareness raising and capacity building related to compliance with the Environmental and Social and Gender Policies are part of the project activities and are budgeted under these.
- A gender baseline has been developed to comply with the Gender Policy of the Adaptation Fund and this is presented separately.
- A budget has been prepared, and is presented below:

General measures to be put in place to reduce environmental and social risks

The following general actions will be put in place to ensure compliance with the Environmental and Social Policy.

- All memorandums of understand, agreements of cooperation with any executing entity (ies) will include reference to and compliance with the 15 principles of the AF ESP and the Gender Policy.
- That UN-Habitat staff specialized in human rights issues will check for compliance with the ESP during the project's implementation. The gender focal point will also check compliance against principle 5 and the Gender Policy during implementation. The project in its current form has passed the UN-Habitat PAG with agency requirements for human rights, gender, youth and climate change.
- Continued coordination with focal points within the national and local governments, responsible for compliance with national and local standards will take place throughout the project.
- Capacity building and awareness raising: The project manager and the Project Executing Unit (PEU) will provide capacity building and awareness raising on compliance with the environmental and social and gender policies to executing entities and target communities so that they are aware of potential risks and are better placed to avoid or mitigate them, or recognized the potential for them and raise them through the appropriate channels, including the grievance mechanism (described below). This capacity building and awareness raising will be done in the inception phase of the project, prior to the commencement of construction.

Grievance Mechanism Principles

The grievance mechanism will apply to all the project's target areas and will be open to beneficiaries and non-beneficiaries alike. It will allow them accessible, transparent, fair and effective means to communicate with the project management if there are any concerns regarding the project design and implementation. All employees, executing entities and contractors and people in the target areas will be made aware of the grievance mechanism to lodge any complaint, criticism, concern or query regarding the project's implementation.

The mechanism considers the particular needs of different groups in the target communities. It combines anonymous mailboxes at community level, a trained local facilitator in each community who can listen to grievances while assuring anonymity and a telephone number that enables people to call anonymously. These options allow people to make their grievance in local language, with options for people with lower levels of literacy, and internet and smart phone usages. Moreover, any stakeholder involved with the project can use any workshop, training or any other event organized by the project, either in public (i.e. through open floor discussion) or in private (i.e. discretely with UN-Habitat or executing entity staff involved with the workshop) can raise a grievance verbally.

Project staff, including those from the executing entities will also be trained to recognize grievances from community members and how to deal with grievance reports. The local facilitators in each community will also be trained on to recognize dissatisfaction and on how to report grievances. In addition, monitoring activities will also provide an opportunity for beneficiary communities to voice their opinions as they wish. This recognizes that some people don't feel confident in directly confronting grievances and don't like to be seen to complain. It allows people to raise issues in a subtle and anonymous way.

All grievances will be anonymized and presented to the PEU. All grievances will be treated with equal and urgent importance, regardless of who raised them, or the mode by which they did so. All stakeholders, including beneficiaries will be made aware of the grievance mechanism, their options for reporting, what constitutes a grievance and their right in anonymity at the start of the project, and/or whenever the project first makes contact with them (i.e. during the inception phase, whether in training, or whichever activities come first). Stakeholders will be reminded of the grievance

mechanism periodically throughout the project. The address and email address of the Adaptation Fund will be made public (i.e. project website, Facebook and mailbox) for anyone to raise concerns regarding the project:

Adaptation Fund Board secretariat
 Mail stop: MSN P-4-400
 1818 H Street NW
 Washington DC

Operationalizing the grievance mechanism

The UN-Habitat's Environmental and Social Safeguard Policy System Version 3 ([ESSS 3.1](#)) lays out a clear process for the operationalization of the Grievance Mechanism at the institutional level. At the global level, any stakeholder who has been affected by a UN-Habitat-implemented project can communicate online either through the [website](#) or by email - to unhabitat.esss@un.org. Persons wishing to submit a grievance who are not connected to the internet can also send a grievance in writing to the UN-Habitat headquarters.

This project will follow the above procedure by setting up an inbox, confidential telephone number and having a mailing address or postbox. These contact modalities will be made public and during focus groups, consultations, and trainings stakeholders will be made aware of these contact media. At the same time, any public signs or notice boards erected during the construction phase will contain contact details for the local and global grievance mechanisms. Moreover, the project will work with community leaders during any consultations or dialogues to sensitize them to the grievance mechanism and procedure, so that they in-turn can support community members who may wish to raise a grievance but do not feel empowered to do so.

The inflow and outflow procedure throughout the agency (at global, country and project level), as prescribed by the UN-Habitat ESSS 3.1 is as follows:

- Receive and register communications from the public
- Screen and assess the issues raised and determine how to address them
- Provide, track and document responses, if any, and
- Adjust the management programme, if appropriate.

The ESSS calls for UN-Habitat to provide a response to any grievance raised within “a reasonable timeframe” following the above steps.

Risk Monitoring and Evaluation Arrangements

- This monitoring programme, as outlined in Tables 28 will be used to measure the effectiveness of actions and collate results which will be reported to the Adaptation Fund in annual, mid-term and final (terminal) reports. Monitoring will be done to ensure that actions are taken in a timely manner and to determine if actions are appropriately mitigating the risk/impact, or if they need to be modified in order to achieve the intended outcome.
- Annual reporting will include information about the status of implementation of this compliance plan. The reports shall also include, if necessary and required, a description of any corrective actions that are deemed necessary.
- Direct monitoring responsibilities will be under the Project Manager, who will also have oversight and compliance responsibility. If changes or additional activities are required, monitoring indicators will be modified or added as well, as required.
- Gender specific and/or disaggregated indicators and targets have been developed as shown in the results framework and summarized below.
- The budget required is shown below.

Table 29. Monitoring of ESS management measures

Action	Indicator and method	Responsibility and frequency
Implementation of grievance mechanism	<ul style="list-style-type: none"> - Grievance mechanism information is shown in target areas (i.e. Provincial Halls) - Grievance mechanism information is shown on UN-Habitat project website 	Project manager Within half a year from inception
Consent process (communities)	<ul style="list-style-type: none"> - Consent sheets are signed by each community member before the project begins any physical works under Component 1 and 2 	Project manager, NCSD, Before inception of physical works
Permission (government)	<ul style="list-style-type: none"> - Full written permission from each required government agency obtained before construction begins 	Project manager, UN-Habitat, NCSD

Annex D Gender Baseline Assessment and Action Plan in Compliance with the Gender Policy of the Adaptation Fund

This gender assessment has been developed to provide a situational analysis of gender issues in the local context of Cambodia. This assessment will try to identify potential gender issues and the consequences of the proposed project on women and men. It will identify what measures have been taken to ensure that women and men have equal opportunities to build resilience, address their differentiated vulnerabilities and increase their capacity to adapt to climate change impacts through the project implementation. Furthermore, this assessment will ensure adherence to the Adaptation Fund Gender Policy.

This Gender Assessment is preliminary and will be revisited and expanded during the inception phase of the project to ensure the project's results framework, budget, and environmental and social safeguards approach are designed in a way to meet the differentiated adaptation needs of men and women, and to ensure that the project does not discriminate between men and women or contribute in any other way to gender inequality.

Gender Equality Status

In the 2022 World Economic Forum Global Gender Gap Index, Cambodia is ranked 11th in the region (out of 19 East Asia and Pacific countries) and 98th globally (156 countries) with a score of 0.690.¹⁷⁵ According to the Human Development Report 2021-22, Cambodia ranked 116th globally with Gender Inequality Index of 0.461.^{176, 177} The Human Development Index for Cambodia in 2021 was 0.593 (0.570 for female and 0.615 for male).¹⁷⁸ The average annual HDI growth was 2.42 percent for the decade 2000-2010 declined to 0.85 percent for 2010-2020.

Table 30 Global Gender Gap Index – Overview

	Rank	2021	Rank	2022
Global Gender Gap Index	103	0.684	98	0.690
Economic participation and opportunity	46	0.729	61	0.710
Educational attainment	128	0.919	105	0.996
Health and survival	46	0.978	42	0.978
Political empowerment	126	0.111	121	0.107

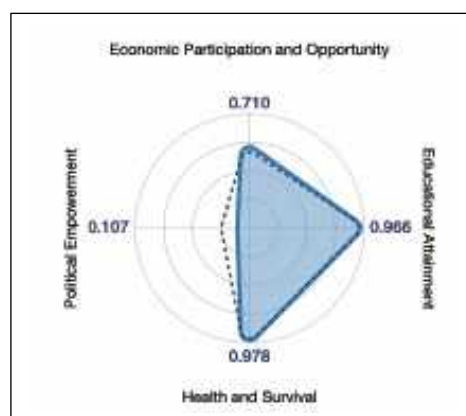


Table 31 Gender equality by sector

	Rank	Score
Health and survival		
Healthy life expectancy, years	49	1.054
Educational attainment		
Literacy rate, %	113	0.867
Enrolment in primary education, %	84	0.995
Enrolment in secondary education, %	1	1.000
Enrolment in tertiary education, %	106	0.943
Economic participation and opportunity		
Labour force participation rate, %	41	0.861
Estimated earned income, int'l \$1,000	18	0.785
Legislators, senior officials, managers, %	86	0.449
Professional and technical workers, %	102	0.672
Political empowerment		

¹⁷⁵ World Economic Forum (2022) Global Gender Gap Report 2022

¹⁷⁶ UNDP (2022) Human Development Report 2021-22, p 293

¹⁷⁷ UNDP (2023) Breaking Down Gender Biases – Shifting Social Norms towards Gender Equality.

¹⁷⁸ *ibid*

Women in parliament, %	93	0.263
Women in ministerial positions, %	124	0.103
Years with female/male head of state (last 50)	78	0.000

In Cambodia, the Ministry of Women's Affairs, as a member of the National Council for Sustainable Development (NCSD) and the National Committee for Disaster Management (NCDM), is involved in advocating and addressing the issues of gender in the development and implementation of the policies on climate change, disaster risk reduction, and impact management.

Health

Cambodia has achieved significant health outcomes in the past decades, improving many people's lives. In 2015, Cambodia was one of 10 other countries that achieved their Millennium Development Goals (MDGs) before their timeline concerning maternal and child health. Life expectancy at birth (SDG3) for females at 72.3 is better than for males at 66.8. Neonatal and under-five mortality rates have rapidly declined over the past two decades, from 37 to 8 and 124 to 16 per 1000 live births, respectively. This included an over 50 percent decrease between 2014 and 2021-2022 alone, far faster than global averages, and meeting the Cambodian Sustainable Development Goals (SDGs) eight years ahead of schedule.¹⁷⁹

The mortality rate dropped dramatically from 437 among 100,000 lives in 2000 to 170 among 100,000 lives in 2014.¹⁸⁰ It further dropped to 160 in 2017.^{181,182} Access to maternal health care has improved steadily over the years. Nearly all (99 percent) women now give birth with a skilled health provider, an increase from just over one in three women in 2000.¹⁸³ In Cambodia, the rate of adolescent fertility has remained roughly the same since 2010. The rate in 2020 was 46 of every 1,000 girls ages 15-19 gave birth.¹⁸⁴

Cambodia successfully eradicated polio in 1997 and has achieved significant progress in preventing, controlling, and eliminating other communicable diseases. The number of reported falciparum malaria cases is at its lowest ever, and it has been five years since malaria mortality was last recorded in 2018. The rates of tuberculosis incidence and mortality have decreased by around 50 percent from 2000 to 2021, and Cambodia achieved the reduction of global AIDS targets ahead of schedule.¹⁸⁵ The lack of skilled service providers in remote areas and a lack of adequate medicine and modern health equipment in health centers are still a challenge. Social, cultural, and economic factors all contribute to low levels of awareness, access to information, and healthcare-seeking behavior among women. Poverty and domestic violence compound health issues for women and girls.¹⁸⁶

Education

Cambodia has made significant progress in educating its children. Gender disparity in education has reduced at all levels, with more scholarships for poor students, especially girls, more schools at the sub-national level, and more girls' dormitories. Since 2007, the number of children enrolled in preschool programs has doubled. The number of children enrolled in primary education has increased from 82 percent in 1997 to over 97 percent in the school year 2017/18.¹⁸⁷ 63 percent of girls and 52.5 percent of boys complete lower secondary school in Cambodia as of 2021 data.¹⁸⁸

According to the Human Development Report (SDG 4.4), only 18.3 percent of females complete secondary education compared to 31.7 percent of males. Mean years of school is 5.9 for males and 4.4 for females.¹⁸⁹ Adult literacy in Cambodia is lower among women (79.8 percent) than among men (88.4 percent) (2021).¹⁹⁰ The low literacy and education levels of women of working and child-bearing age are a major concern.

While progress is tangible, children in Cambodia still need to reach learning standards appropriate for their age. At the primary level, nearly 25 percent of children in Grade 3 cannot write a single word in a dictation test. Only 27 percent

¹⁷⁹ <https://www.who.int/cambodia/news/detail/07-04-2023-cambodia-celebrates-significant-health-achievements-on-the-75th-anniversary-of-who>

¹⁸⁰ Ministry of Women's Affairs (2020) Neary Rattanak V Five-year Strategic Plan for Gender Equality and Women's Empowerment 2019-2023

¹⁸¹ <https://genderdata.worldbank.org/countries/cambodia/#:~:text=In%20Cambodia%2C%20the%20labor%20force,labor%20force%20participation%20has%20decreased.>

¹⁸² UNDP (2022) Human Development Report 2021-22, p 293

¹⁸³ <https://www.who.int/cambodia/news/detail/07-04-2023-cambodia-celebrates-significant-health-achievements-on-the-75th-anniversary-of-who>

¹⁸⁴ <https://genderdata.worldbank.org/countries/cambodia/>

¹⁸⁵ <https://www.who.int/cambodia/news/detail/07-04-2023-cambodia-celebrates-significant-health-achievements-on-the-75th-anniversary-of-who>

¹⁸⁶ Ministry of Women's Affairs (2014) Neary Rattanak IV Five Year Strategic Plan for Gender Equality and Women's Empowerment 2014-2018

¹⁸⁷ <https://www.unicef.org/cambodia/education>

¹⁸⁸ <https://genderdata.worldbank.org/countries/cambodia/>

¹⁸⁹ UNDP 2022 Human Development Report 2021-2022

¹⁹⁰ *ibid*

of 3- to 5-year-olds are developmentally on track in literacy and numeracy, and by the time they are 17 years old, 55 percent of adolescents will have dropped out of school.¹⁹¹

Economic Sector

Cambodia has made significant progress in expanding opportunities and participation of women in economic activities and is making good progress in women's economic empowerment. The World Economic Forum recorded in 2022 that Cambodia ranked 61st in economic participation and opportunity (out of 146 countries), which is an improvement compared to the 2014 ranking of 77th (total of 142 countries). In the Global Gender Gap Index, Cambodia ranked 98th (0.690 score), which is an improvement from the previous year when the rank was 103rd (0.684 score).¹⁹²

In Cambodia, the labor force participation rate among females is 69.6 percent, and among males is 82.1 percent for 2022.¹⁹³ The wage employment sector offers many opportunities for women. Still, low wages and poor working conditions curtail the benefits. There is a lot of potential for women to create and expand micro, small, and medium enterprises. Still, they need more access to business-related services and resources, including finance, and most women-owned enterprises are informal and concentrated in less productive sectors.

For women, in particular, asset ownership is a source of economic empowerment and protects them in the case of marital dissolution or abandonment. 51.4 percent of men and 61.5 percent of women owned a dwelling either alone or together in 2014. 86.3 percent of women between ages 15 and 49 say that they alone or jointly have the final say in (i) making major household purchases, (ii) decisions about their healthcare, and (iii) visits to family, relatives, and friends.¹⁹⁴

Governance

In the National Assembly, female representation has more than tripled in two decades.¹⁹⁵ And, in 2021, 21.6 percent of seats in the national parliament were held by women in Cambodia, which is roughly the same as in 2010.¹⁹⁶ According to the World Economic Forum, 43.7 percent of the firms in 2022 had female majority ownership and 57.3 percent of the firms had top female managers.¹⁹⁷ In the 2022 Global Gender Gap Index of the World Economic Forum, the political empowerment of women in Cambodia ranked 93rd in women in parliament and 124th in women in ministerial positions. During the past 50 years, no woman has risen to head of state. Women in Cambodia remain under-represented in decision-making positions in politics, the public sector, and the judiciary. Women's participation in decision-making is limited for several reasons, including the traditional belief that women are not suited to high positions and decision-making.

Legal and Administrative Framework Protecting and Promoting Gender Equality

The Constitution of the Kingdom of Cambodia states that "all forms of discrimination against women shall be abolished." According to Article 45, the exploitation of women in employment shall be prohibited. Men and women are equal in all fields, especially with respect to marriage and family matters.¹⁹⁸ Cambodia is a party to all core international human rights treaties, including the Convention on the Elimination of All Forms of Discrimination against Women. Acting on these commitments, the country has made important advances in gender equality over the past 25 years.¹⁹⁹

The Government Strategy (the 4th Rectangular Strategy 2019-2023) has highlighted in priority number one on human resource development – considers strengthening gender equality and social protection as key elements.²⁰⁰ The Environment and Natural Resources Code of Cambodia has integrated gender concerns, and its principle of gender equality in environmental protection and natural resources management emphasizes gender equity and the participation of women in all aspects of decision-making concerning the environment and natural resources be promoted and encouraged.²⁰¹

The Law on Disaster Management mentions women as one of the affected groups that need special attention. Article 18 states, "In the case of any disaster event or incident occurred, the competent on-site authorities of the affected areas shall pay close attention to the needs of women, children, elderly, handicapped, and disabled persons".

¹⁹¹ <https://www.unicef.org/cambodia/education>

¹⁹² World Economic Forum (2022) Global Gender Gap Report 2022

¹⁹³ <https://genderdata.worldbank.org/countries/cambodia/>

¹⁹⁴ <https://genderdata.worldbank.org/countries/cambodia/>

¹⁹⁵ Ministry of Women's Affairs 2014 Neary Rattanak IV Five Year Strategic Plan for Gender Equality and Women's Empowerment 2014-2018

¹⁹⁶ <https://genderdata.worldbank.org/countries/cambodia/>

¹⁹⁷ World Economic Forum (2022) Global Gender Gap Report 2022

¹⁹⁸ Cambodia's Constitution of 1993 with Amendments through 2008,

https://www.constituteproject.org/constitution/Cambodia_2008.pdf?lang=en

¹⁹⁹ UNDP 2022 Gender Equality Deep Dive for Cambodia

²⁰⁰ Ministry of Women's Affairs (2019). Cambodia Report to the General Assembly resolution A/Res/72/234 on "Women in Development"

²⁰¹ Ministry of Women's Affairs (2019). Cambodia Report to the General Assembly resolution A/Res/72/148 on "Women and Girls in Rural Areas"

The National Strategic Plan on Gender and Climate Change 2014-2023, Master Plan for Gender and Climate Change (2018-2030), and Action Plan on Gender and Climate Change 2019-2023 were prepared and used as a roadmap for formulating the projects and programs.

At the national level, RGC has developed a Cambodia Climate Change Strategic Plan (CCCSP) 2014-2023 that aims to reduce gender vulnerability and risks to the environment and climate change impacts and has set one of its objectives to "reduce sectoral, regional, and gender vulnerabilities and health risks related to climate change impacts".

Gender and Climate Change Strategic Plan (GCCSP) 2014–2023 consists of strategies to incorporate women into decision-making on climate change adaptation, mitigation, and natural resources management and to increase awareness and relevant capacities on gender and climate change.

The Government of Cambodia has further established the Gender and Climate Change Committee (GCCC) Working Group in the Ministry of Women’s Affairs (MoWA) to take responsibility for technical work, administration, finance and raise ideas relevant to climate change.

The 5th National Strategic Plan called Neary Rattanak V (2019-2023) has set one of its objectives to promote women's empowerment to adapt and build resilience to climate change and gender mainstreaming related to climate change policies, development plans, and programs.²⁰²

The Ministry of Environment, the National Climate Change Committee, and the National Council for Green Growth have developed the Cambodia Climate Change Strategic Plan (CCCSP) 2014-2028, the National Policy on Green Growth, and National Strategic Plan on Green Growth 2013-2030. MoWA has developed Strategic Plan on Gender and Climate Change to contribute to developing and implementing gender-responsive policies related to climate change. This is not a stand-alone strategy but is cross-cutting and has been integrated into the implementation processes of the Cambodia Climate Change Strategic Plan as well as the sectoral climate change strategic plans of relevant Ministries.

Cambodia has localized Sustainable Development Goals called Cambodia Sustainable Development Goals (CSDGs), which put "No One is Left Behind," and addressed the needs of people based on the different targets, groups, and areas, in particular for the poorest group, is the highest priority of the framework. The CSDG 5 and SDG13 targets for 2023 and 2030 are shown in the table.²⁰³

Table. 32 SDG Goal 5: Achieve gender equality and empower all women and girls
Goal 13: Take urgent action to combat climate change and its impacts²⁰⁴

Target	Unit	Baseline 2016	2023	2030
5.1 End all forms of discrimination against all women and girls everywhere	No.	50	55	60
5.2 Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation	%	30.6	28.0	25.0
5.3 Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation.	%	1.9	1.7	1.6
5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.	No	5	9	
5.5 Ensure fully and efficiently participation of women and equal opportunity in leadership in all levels in economic political and public life. 5.5.1. Proportion of seats held by women in legislation institutions.	%	17.81	30.0	35.0
5.5.2 Proportion of female civil servants holding management position (Ministers, Secretary of States, Under-Secretary of States) in public sectors.	%	16.27	20	31.0
5.5.3 Proportion of female as member of Capital and provincial Council.	%	13.23	20.0	25.0
5.5.4 Proportion of female as member of Municipalities, Districts, and Khans Council.	%	13.85	25.0	30.0
5.5.5 Proportion of women in Commune/ Sangkat council	%	16.75		30.0
5.6 Ensure the access to sexual and reproductive health and reproductive rights as universal agreed on the program of Action of the International	%	57.6		83.0

²⁰² Ministry of Women's Affairs (2020). Neary Rattanak V – Five-Year Strategic Plan for Strengthening Gender Mainstreaming and Women's Empowerment, 2019-2013.

²⁰³ Ministry of Women's Affairs (2019). Cambodia Report to the General Assembly resolution A/Res/72/234 on "Women in Development"

²⁰⁴ Ministry of Planning, Cambodia (2022) Cambodian Sustainable Development Goals (CSDGs) 2016-2030 Revised List of Targets and Indicators by Goals

Conference on Population and Development and the Beijing Platform for Action and other relevant documents				
5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws. 5.a.1 Percentage of adult women using financial service compare with number of population in the country receiving financial services.	%	51	52	53
5.a.2 Percentage of Adult women received financial service.	%	73	78	92
5.c Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels. 5.c.1: Number of institutions with a system to track and allocate budget to promote gender equality and empower women	No			9
5.c.2 Number of line Ministries, Line Agencies have development and Implement Gender Mainstreaming Strategic Plan	No	6	9	19
13.1 Strengthen resilience and adaptive capacity to climate- related hazards and natural disasters in all countries. 13.1.1 Percentage of communes vulnerable to climate change.	%	47	32	25
13.2 Integrate climate change response measures into national policies, strategies and planning. 13.2.2 The public expenditure for climate change.	% of GDP	1.2		1.7
13.3 Improve education, awareness- raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning. 13.3.1 Institution level that prepared for response to Climate Change indicated as percentage of institutional capacities mainstreamed on 5 components of Climate Change		27		80
13.3.2 Percentage of households (farming, animal raising, fish raising, and fishing) and local community forestry members participated workshops and received training on climate change	%	0.06	0.60	0.90

Gender Context of Kampot and Koh Kong Provinces

Increases in extreme weather conditions such as droughts, storms, and floods, which are also experienced by Kampot and Koh Kong provinces—are already altering economies, economic development, and patterns of human migration, and are likely to be among the biggest global health threats this century. Everyone will be affected by these changes, but not equally. Vulnerability to climate change will be determined by a community or the ability of the individual to adapt.²⁰⁵

The female population in Kampot Province is 51 percent, with 16.24 percent being Female-Headed Households (FHH).²⁰⁶ In Koh Kong Province, the female population is 50 percent, with FHH being 16.08 percent.²⁰⁷ As in other parts of the country, in Kampot and Koh Kong Provinces, women’s livelihoods, access to resources and capacity to adapt are different from men. In many cases, women face challenges due to social reasons and roles in the household. Women often contribute to the household income and have domestic responsibilities, for instance, caregiving for the sick and older persons and raising and educating children. Women in Kampot and Koh Kong Provinces are usually responsible for domestic chores, including water collection, small-scale gardening, cropping rice, trade, and rearing livestock –a greater range of responsibilities than men. Therefore, supporting women to adapt is crucial.

The coastal area of Cambodia, including coastal regions of Kampot and Koh Kong Provinces, are especially at risk from flooding from inland waterways, heavy rain, and coastal flooding from storm surges and sea level rise.

When drought or heavy rain threatens agricultural production, men can adapt by using their savings and economic independence to invest in alternative income sources, and in times of food scarcity and drought, women will often give priority to their husbands and family members nutritional needs before hers.²⁰⁸ According to reports from the Cambodia Humanitarian Response Forum (CHF), in September/October 2022, flooding in Cambodia affected an estimated 85,482 households across 74 districts in the 14 provinces. As many as 33,165 homes have been damaged, along with 29 health centres, 280 schools, 1,600 km of rural road and 152,386 hectares of agricultural land.²⁰⁹ Evidence suggests that women were more severely affected during such floods. Women were more likely to be in the home when floods hit or unable to leave because of domestic care responsibilities. The resulting disruption to health care infrastructure

²⁰⁵ Care International (2010). *Adaptation, Gender and Women’s Empowerment*. Care International Climate Change Brief. www.careclimatechange.org/files/adaptation/CARE_Gender_Brief_Oct2010.pdf

²⁰⁶ *Provincial Socioeconomic Report 2019*, Kampot Province.

²⁰⁷ *Provincial Socioeconomic Report 2019*, Koh Kong Province.

²⁰⁸ PRB (2012). *Women more vulnerable than men to climate change*. <https://www.prb.org/resources/women-more-vulnerable-than-men-to-climate-change/>

²⁰⁹ <https://floodlist.com/asia/cambodia-floods-september-october-2022>

and service left pregnant women to deliver in very critical conditions such as flooded delivery rooms or worse and at home where immediate medical care was not available.²¹⁰ According to CARE in Cambodia, poor women and girls of Koh Kong Province are tempted to migrate to Thailand in search of work – and many fall victim to human trafficking.²¹¹ In Koh Kong Province, the two critical underlying causes of poverty affecting young women, i.e., gender inequality and limited income generation opportunities – result in low household incomes, little knowledge of and access to markets, lack of capital, and few opportunities to improve individual capacities and skills.²¹²

Data baseline – overview of disaggregated data (beneficiaries) in target communities

One hundred twenty-three thousand three hundred ninety-two people are living in the selected districts in the project area, of whom 51.5 percent in Kampot and 50.5 percent in Koh Kong are women. In the proposed project target areas, there appears to be a balanced representation of both men and women. However, 4.8 percent of the women in both provinces have some form of disability compared to 3.6 and 3.8 percent for men in Koh Kong and Kampot Provinces, respectively.²¹³ The data indicate that averagely 16.16 percent of households in the target area are single-headed, while 9.75 percent of people in the target area live below the poverty line regarding income level.

Table 33 Beneficiaries in the target communities

Project Area	HHS	TOTAL	MALE	FEMALE	YOUTH 18-60	PEOPLE WITH DISABILITY	HHS UNDER POVERTY
KAMPOT: Kampong Trach							
Boeng Sala Khang Cheung	1,649	7,181	3,471	3,710	55.4%	45	17%
Damnak Kantuot Khang Cheung	1,533	6,111	2,952	3,159	56.6%	61	20%
Prasat Phnom Khyang	632	2,587	1,244	1,343	53.2%	32	21%
Angk Sophy	1,090	4,319	2,093	2,226	60.4%	65	18%
Damnak Kantuot Khang Tboung	1,862	8,051	3,915	4,135	47.4%	69	9%
Kampong Trach Khang Lech	1,563	6,999	3,393	3,606	44.0%	156	26%
Svay Tong Khang Cheung	920	3,664	1,782	1,882	58.9%	156	35%
Kampong Trach Khang Kaeut	1,954	8,550	4,173	4,377	59.7%	173	23%
Kampong Trach	11,203	47,462	23,023	24,438	54.2%	757	19%
KAMPOT: Krong Kampot							
Kampong Kandal	1,196	5,292	2,538	2,754	59.4%	26	8%
Krang Ampil	1,091	4,778	2,330	2,448	54.0%	72	19%
Kampong Bay	1,229	5,679	2,657	3,022	65.2%	16	5%
Andoung Khmer	2,448	10,514	5,092	5,422	45.2%	88	18%
Traeuy Kaoh	1,252	5,790	2,834	2,956	63.7%	86	16%
Krong Kampot	7,216	32,053	15,451	16,602	57.5%	288	11%
KAMPOT	18,419	79,515	38,474	41,040	53.8%	1,045	13%
KHO KONG: Krong Khemara Phoumin							
Smach Mean Chey	2,696	11,547	5,628	5,919	53.9%	101	0%
Dang Tong	2,703	13,163	6,527	6,636	63.7%	38	2%
Stueng Veaeng	920	4,126	2,060	2,066	45.0%	136	0.5%
Krong Khemara Phoumin	6,319	28,836	14,215	14,621	54.2%	275	1%
KOH KONG: Mondol Seima							
Bak Khlang	2,750	12,485	6,236	6,249	53.5%	42	6%
Peam Krasaob	331	1,463	720	743	58.7%	14	8%
Tuol Kokir	276	1,093	565	528	64.4%	20	9%

²¹⁰ International Bank for Reconstruction and Development (2019). *STRIKING A BALANCE MANAGING EL NIÑO AND LA NIÑA IN CAMBODIA'S AGRICULTURE*. <https://documents1.worldbank.org/curated/en/433961554200320844/text/Striking-a-Balance-Managing-El-Ni%C3%B1o-and-La-Ni%C3%B1a-in-Cambodia-s-Agriculture.txt>

²¹¹ ReliefWeb (2013). Cambodia: Floods - Sep 2013. <https://reliefweb.int/disaster/fl-2013-000131-khm>

²¹² CARE Cambodia (2022). Young Women in Business (YWIB). <https://www.care-cambodia.org/ywib>

²¹³ Ministry of Planning (2019). *General Population Census of the Kingdom of Cambodia 2019*. National Institute of Statistics, Ministry of Planning, the Kingdom of Cambodia.

Mondol Seima	3,357	15,041	7,521	7,520	65.0%	76	8%
KOH KONG	9,676	43,877	21,736	22,141	56.0%	351	33%
TOTAL PROJECT AREA	28,095	123,392	60,210	63,181		1,396	

Project Gender Action Plan

Women in Cambodia are mainly responsible for household tasks such as household water and sanitation, health and hygiene, cooking and managing food, and childcare, so they are more vulnerable to flood hazards, experiencing deficits in food, clothing, communications, fuel wood, disease exposure, water quality problems, and sexual harassment. Therefore, the project will ensure women participate in decision-making around appropriate infrastructure design, operation, and maintenance features.

Equal involvement of women and men in the project activities will be ensured through community planning and consultations throughout the project period through the People's Process. Addressing gender concerns will entail close consultation and collaboration with women from the project design stage, implementation, operations, and monitoring and evaluation. The project, as part of its concept and design, will actively encourage the involvement of women in implementation, advisory, and decision-making roles contributing to alleviating the absence of women in the fields of science, technology, and construction.

The specific gender objectives for the project are:

- To integrate gender-sensitive urban adaptation measures in the relevant community/sub-national/district development plans
- To contribute to improving gender equality within the targeted areas
- To promote women's empowerment and leadership within the project implementation and decision-making bodies.
- To support and strengthen the women's resilience building for climate change-related risks

Gender-Responsive Indicators

The project will ensure 50 percent representation during the meetings, consultations, community votes, participatory planning, and monitoring initiatives under the People's Process approach. A comprehensive list of indicators is included in the Gender Action Plan.

The main gender-focused indicators the project will aim to achieve are:

- 50 percent of the members of the communities established to implement the project will be female
- 30 to 50 percent of trainees at all training/workshops and learning events will be female
- 50 percent of direct beneficiaries of improved housing and toilets will be female
- 75 percent beneficiaries in livelihood promotion activities.

Policy Arrangements: The Project Management Committee will aim to enhance gender equality in the composition of members by reaching out to female government representatives and including them in the PMC.

Management Arrangements: The principal Gender Focal Point for the project will be the National Project Manager. The counterpart gender focal point within Government will be the designated gender focal point in each Province and District. Furthermore, a gender focal point will be established for each executing entity and partner as a condition of project participation.

Monitoring: Gender disaggregated information focused on climate change-related issues, needs and perceptions of vulnerable groups, activity prioritization, and identifying and verifying potential risks and impacts will be collected through community surveys and public consultations. The data will be used to monitor progress toward and achievement of the above gender targets. Gender focus group discussion will be conducted every six months, and an analysis will be included in project reports to establish a qualitative baseline of gender perceptions and monitor changes in behaviors and attitudes as the project progresses.

Knowledge Management, Information Sharing and Reporting: All knowledge components of the project will also ensure gender parity and gender considerations in the planning and implementation. The project will maintain a gender and age-disaggregated database of direct beneficiaries and stakeholders involved. A specific knowledge component to track the gender and youth responsiveness and impact of the project, a rapid survey on Knowledge Attitudes and Practices, will be organized by the Project Team through targeted Focus Group Discussions with women and youth during the project.

Grievance Mechanism: A grievance mechanism to be established under the project will further provide a platform for feedback and consultation where necessary.

Table 34 Gender Action Plan Summary Table

Project/ Program Components	Expected Concrete Outputs	Indicator	Target	Verification Means	Responsibility Party	
1. Increasing coping capacity by promoting climate resilient small-scale infrastructure	Output 1.1. Rehabilitate and improve embankment in Ou Chreaneang Reservoir (Kampong Trach Khang Lech commune, Kampong Trach District, Kampot) to meet new adaptation requirements for inundation/flooding/saltwater intrusion and controlling vector-borne and water-borne diseases.	Ensure the target population consulted for the technical studies with at least 50 percent women representation	Percentage of women consulted for the technical studies	50%	Attendance Sheet Sex disaggregated data collection	Project Manager Executing Entity
	Output 1.2. Establish/renovate five medium/small-scale wastewater treatment plants (with two in Kampot and three in Koh Kong Provinces).	Ensure the women, elderly, PWD are consulted for the designs of all infrastructure activities and their specific needs are integrated in the implementation	Number of women with access to improved housing and sanitation	50%	Periodic reports	UN-Habitat Community Mobilisers
	Output 1.3. Clear drainage systems, large canals, renovate waterways and establish filter nets on the outlet of canals for saltwater intrusion prevention and to capture waste from discharging to the sea in Khmerak Phoumin City.	Ensure the required review and risk assessment activities and workshops have at least 50 percent of women representation	Number of houses and toilets that are appropriate for women, the elderly and PWD (UN-Habitat SII)	60		
	Output 1.4. Renovate waterbodies (irrigation tanks and embankments) in Lompu Reservoir and rehabilitate Kampong Trach canal in Kampong Trach District.		Percentage of women participating in review and risk and vulnerability assessments	50%		
	Output 1.5. Resilient housing and toilet designs developed, and demonstration housing units constructed in three vulnerable communities in Koh Kong Province.					
	Output 1.6. Build five sluice gates and embankments to prevent saltwater intrusion in Krong Khemara Phoumin.					
	Output 1.7. Establish Early Warning System (EWS) for flooding and drought forecasting to reduce disaster risks of vulnerable communities in Mondol Seima District.					
2. Adapting to current impacts of climate change through recovery of coastal ecosystems, and livelihood improvement	Output 2.1. Restoration of destroyed mangrove ecosystems to improve mangrove ecosystem resilience in Mondol Seima District.	Ensure mangrove plantation activities have at least 50 percent of women representation	Percentage of women participated in the mangrove plantation activities	50%	Attendance Sheet Sex disaggregated data collection	Project Manager Executing Entity
	Output 2.2. Develop Ecosystem-based Adaptation (EbA) management plans for restored mangrove ecosystems, including prevention of waste/pollution in Mondol Seima District.	Ensure the required review and risk assessment activities and workshops have at least 50 percent of women	Percentage of women participated in the review and risk assessment activities and workshops	50%	Periodic reports	UN-Habitat Community Mobilisers
	Output 2.3. Explore livelihood diversification options (inland fisheries, fisheries product processing/value addition, seaweed cultivation,					

and diversification	mat making and livestock raising etc.) and support the most vulnerable households to support agriculture and inland fishing to increase the income of the vulnerable households (including women and youth) with initiation of these livelihoods.	representation Ensure that at least 75 percent of the livelihood promotion activities are women and youth beneficiaries	Percentage of women and youth beneficiaries	75%			
3. Building capacity and knowledge sharing to reduce vulnerability to climate change	Output 3.1. Conduct participatory vulnerability/risk assessments to mainstream climate change adaptation, including community-based in community/sub-national/ district development plans and promote climate change/disaster resilience in local development plans.	Ensure the required vulnerability/ risk assessments have at least 50 percent of women representation Capacity building program implemented at the sub-national level with at least 50 percent women engagement	Percentage of women participating in awareness campaigns and trainings	50%	Attendance Sheet Sex disaggregated data collection Periodic reports	Project Manager Executing Entity UN-Habitat Local authorities Commune representatives Community Mobilisers	
	Output 3.2. Capacity building of provincial and sub-national level Government entities and communities on mainstreaming climate change adaptation.						
	Output 3.3. Capacity building of sub-national level Government officials/communities in managing solid waste and wastewater to strengthening of waste collection and existing management systems. [Linked to Outputs 1.2 and 1.3]						
	Output 3.4. Training communities in target locations on resilient housing/latrines construction technique. [Linked to Output 1.5]	Training on resilient housing/ latrines construction technique implemented at least 30 percent women participation.					30%
	Output 3.5. Organizing communities and local authority to manage, monitor and maintain infrastructure investments to ensure sustainability. [Linked to Outputs 1.1, 1.3, 1.4, and 1.6]	Community mobilization, organization and capacity building at the community level with at least 50 percent women engagement					50%
	Output 3.6. Share knowledge and lessons through documentation of climate-resilient actions for increased adaptive capacities. (Special note: Material produced will be disability inclusive)	Knowledge sharing and capacity building program implemented at the sub-national and community level with at least 50 percent women engagement	Percentage of women participation	50%			



THE PEOPLE'S PROCESS

A RIGHTS-BASED APPROACH



PRESERVES PEACE



PROTECTS PLANET



PROMOTES PROSPERITY

SDG GOAL 11: Make cities and human settlements inclusive, safe, resilient, and sustainable.

We are **not rebuilding** cities & communities.
We are **empowering** cities & communities to:

- **Make** decisions based on consultation, cooperation, and trust.
- **Plan** land-use, municipal & fiscal taxation systems.
- **Construct** affordable housing, water & sanitation systems, and tertiary services networks.
- **Ensure** transparency, inclusivity, and no one left behind.
- **Build** resilient communities and sustainable human settlements.

THE FIVE STEPS



FROM GRASSROOTS TO GOVERNANCE

- Community Development Committees (CDCs) recognized as legal entities for business transactions by city and national authorities.
- CDCs get membership, "a voice" in legitimate forums.
- CDCs work as local expert groups in city and settlements planning.
- Formation of networks of CDCs building up to a "Federation of CDCs" at the national level.
- As demonstrated in Afghanistan, Indonesia, Bangladesh, Myanmar, The Philippines, and Sri Lanka through UN-Habitat interventions.



CREATES A PARADIGM SHIFT



ADVANTAGES & MULTIPLE SPILLOVER EFFECTS

HUMAN/COMMUNITY LEVEL

- Creativity
- Self-esteem
- Social cohesion
- Transparency & accountability
- Empowerment
- Sustainable and resilient communities.

TECHNICAL/PRACTICAL LEVEL

- Injection of cash in local economy
- Creation of jobs and skills
- Faster construction
- Better Quality
- Cheaper process



