



ADAPTATION FUND

REGIONAL PROJECT/PROGRAMME PROPOSAL

PART I: PROJECT/PROGRAMME INFORMATION

Title of Project/Programme:	Mekong EbA South: Enhancing Climate Resilience in the Greater Mekong Sub-region through Ecosystem-based Adaptation in the Context of South-South Cooperation
Countries:	China ¹ , Thailand and Vietnam
Thematic Focal Area:	Transboundary water management
Type of Implementing Entity:	Multilateral Implementing Entity
Implementing Entity:	United Nations Environment Programme (UN Environment)
Executing Entities:	Institute of Geographic Sciences and Natural Resources Research (IGSNRR), Chinese Academy of Sciences ² , supported by UNEP-International Ecosystem Management Partnership (UNEP-IEMP) ³ and national partners
Amount of Financing Requested:	US\$ 7,000,000

¹ China will be involved in South-South knowledge exchange and regional cooperation on climate change adaptation. In addition, China will co-finance a demonstration site for concrete adaptation interventions in Yunnan Province.

² IGSNRR is a multidisciplinary research institute under the Chinese Academy of Sciences. The research conducted by the institute focusses on, amongst other topics, global change, water resources, ecosystem network observation and modelling, natural resources, human geography and regional development. INGSNRR is active in international and domestic cooperation, and has established cooperative arrangements with academic institutions in more than 50 countries, including Thailand and Vietnam.

³ UNEP-IEMP is a collaborating centre of UNEP and is hosted by the Chinese Academy of Sciences.

Project Background and Context:

Provide brief information on the problem the proposed project/programme is aiming to solve, including both the regional and the country perspective. Outline the economic social, development and environmental context in which the project would operate in those countries.

Project Overview

The natural ecosystems of the Greater Mekong Sub-region (GMS)⁴ are of critical importance to the ~75 million people living within the region who rely upon natural resource-based livelihoods. Of the region's natural systems, the Mekong River^{5,6} is arguably the most essential to supporting rural livelihoods and maintaining the functionality of associated ecosystems⁷. As the Mekong flows from its origin at the Lasagongma Spring in China through the GMS countries and into the South China Sea, it delivers numerous ecosystem goods and services⁸ to some of South-East Asia's poorest people⁹. Although cultural, historical, socio-economic, geographic and environmental disparities exist among the GMS countries, the Mekong River serves as a transboundary resource and support system shared by millions of people across the region.

Despite their regional importance, the ecosystems of the GMS face a multitude of anthropogenic pressures that threaten their capacity to provide goods and services for local communities. For example, damming for hydropower generation and the extraction of water to irrigate ~10 million hectares¹⁰ of rice paddies has led to substantial changes in the flow and ecosystem dynamics of the Mekong River and its tributaries¹¹. Subsequently, sediment and nutrient transfer have been impeded, and the production of one of the world's largest and most diverse inland fisheries has decreased¹². Additionally, the GMS has undergone extensive deforestation in past decades, which has reduced the supply of important ecosystem goods and services to poor communities. From 1973–2009, the GMS¹³ lost approximately 33% of its forest cover, mainly because of extensive unsustainable logging and agricultural conversion¹⁴. Given anticipated increases in the demand for electricity, land and water in Asia, as well as the complexities associated with managing transboundary water resources, ecosystem degradation is expected to continue across the GMS into the future¹⁵ to the detriment of the region's people.

The above-mentioned baseline problems in the GMS are exacerbated by a climate that has undergone considerable change in recent decades and is expected to continue changing throughout the 21st century. Since the 1960s, the mean annual temperature of South-East Asia

⁴ – consisting of the Yunnan Province and Guangxi Autonomous Region of China, Myanmar, Lao PDR, Thailand, Cambodia and Vietnam –

⁵ , known as the Lancang river in China,

⁶ and its tributaries

⁷ like forests and mangroves

⁸ including *inter alia*: i) food and nutrition; ii) fibre; iii) biomass; iv) medicines; v) fresh water; vi) regulation of air and water quality; vii) nutrient cycling; viii) regulation of natural hazards; and ix) recreation and tourism

⁹ Approximately 20% of the 326 million people in the GMS live below the poverty line.

¹⁰ According to the Mekong River Commission.

¹¹ Dugan, P., Barlow, C., Agostinho, A., Baran, E., Cada, G., Chen, D., Cowx, I., Ferguson, J., Jutagate, T., Mallen-Cooper, M., Marmulla, G., Nestler, J., Petrere, M., Welcomme, R., and Winemiller, K. (2010). Fish Migration, Dams, and Loss of Ecosystem Services in the Mekong Basin. *AMBIO: A Journal of the Human Environment* 39:344-348.

¹² Dugan, P., Barlow, C., Agostinho, A., Baran, E., Cada, G., Chen, D., Cowx, I., Ferguson, J., Jutagate, T., Mallen-Cooper, M., Marmulla, G., Nestler, J., Petrere, M., Welcomme, R., and Winemiller, K. (2010). Fish Migration, Dams, and Loss of Ecosystem Services in the Mekong Basin. *AMBIO: A Journal of the Human Environment* 39:344-348.

¹³ excluding China

¹⁴ WWF – 2013 – Ecosystems in the Greater Mekong: Past trends, current status, possible futures.

¹⁵ WWF – 2013 – Ecosystems in the Greater Mekong: Past trends, current status, possible futures.

has risen by $\sim 0.14\text{--}0.20^\circ\text{C}$ per decade¹⁶ and rainfall patterns have become increasingly erratic. These changes in climate have been associated with an increased intensity and incidence of both floods and droughts¹⁷, leading to impacts on local communities such as: i) insufficient water for livelihoods activities; ii) reduced agricultural productivity; iii) soil erosion and landslides; iv) saltwater intrusion into agricultural lands; and v) the destruction of property and the loss of life. As temperature and rainfall patterns in South-East Asia continue to change in the future¹⁸, the livelihoods of people in the region will come under enhanced stress. Although the effects of climate change may differ spatially and temporally across the GMS, it is likely that communities reliant on ecosystems for their livelihoods will experience similar challenges in adapting to climate change.

Without appropriate adaptation interventions, it is likely that a large proportion of the GMS's population will remain extremely vulnerable to the interacting effects of climate change and ecosystem degradation. National¹⁹ and regional²⁰ institutions in the GMS are aware of this threat. Accordingly, several regional and national adaptation plans and frameworks have been developed or are under development. The *Mekong Adaptation Strategy and Action Plan* (MASAP) is a regional climate change adaptation plan being developed by the Mekong River Commission (MRC) and due for completion in 2017 – one of the primary transboundary water management institutions in the region – for the region of the GMS covering Cambodia, Lao PDR, Thailand, Vietnam. Additionally, the Lancang-Mekong Cooperation (LMC) mechanism – a relatively new, China-based transboundary water management body in the GMS – is developing the *Lancang-Mekong Environmental Cooperation Strategic Framework* which will include a focus on climate change adaptation and ecosystem management across the GMS. At a national level, most GMS countries have existing climate change adaptation plans and strategies²¹ and/or are in the process of developing National Adaptation Plans (NAPs)²². It is, therefore, apparent that the countries of the GMS are committed to enhancing the climate resilience of their people.

The implementation of regional and national adaptation plans, frameworks and strategies is, however, insufficient. There are few examples of on-the-ground adaptation interventions – particularly ecosystem-based adaptation (EbA) – in the GMS. Subsequently, many people in the region remain vulnerable to the effects of climate change and environmental degradation. Additionally, where concrete implementation does exist, there is inadequate dissemination of knowledge and lessons-learned. This limited knowledge on how to implement climate change adaptation interventions, particularly EbA, and thereby put policies and plans into practice is a significant barrier to the further effective development and implementation of regional and national adaptation plans. Given the transboundary nature of many GMS natural ecosystems, as well as the common threat that climate change poses to a diverse group of people across the region, there is a need and opportunity for South-South cooperation among the countries of the

¹⁶ WGI AR5 Chapter 2 / WGI AR5 Section 14.8.12/ WGI AR5 Section 2.6.1.

¹⁷ China National Climate Centre – Beijing - 2015 – unpublished data.

¹⁸ IPCC. 2007. *Climate Change 2007. Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press.

¹⁹ For example, government institutions such as the Ministry of Natural Resources and Environment in Vietnam, and the Office of Natural Resources and Environmental Policy and Planning in Thailand

²⁰ such as the Lancang-Mekong Cooperation Mechanism, the Mekong River Commission and the Asian Development Bank Greater Mekong Sub-region

²¹ For example, Vietnam has a National Climate Change Strategy and Mekong Delta Master Plan, and China has a National Adaptation Strategy.

²² Thailand's NAP will be completed by the end of 2017.

GMS to share knowledge and technologies for adapting to climate change.

The **proposed AF project** will implement innovative, on-the-ground adaptation technologies and share implementation lessons across the GMS. Adaptation technologies will be demonstrated in the upper (in and surrounding Nabanhe Nature Reserve in China²³), middle (in the Upper Young Basin in Thailand) and lower (surrounding Tram Chim National Park in Vietnam) reaches of the Mekong River basin to build climate resilience and generate adaptation knowledge from diverse environmental and socio-economic contexts. The proposed project will increase the resilience of beneficiary communities to the effects of droughts and floods by implementing a suite of adaptation interventions²⁴ – with a focus on EbA – including *inter alia*: i) living check-dams; ii) integrated home gardening; iii) agroforestry; iv) forest regeneration; v) water distribution canals; vi) NTFP-based and additional livelihood options; vii) climate-resilient crop varieties; and viii) natural resource-based community cooperatives. Additionally, knowledge-sharing and awareness-raising in local communities surrounding project beneficiaries will be accomplished through *inter alia*: i) knowledge-sharing days; ii) local field visits; iii) the dissemination of awareness-raising and training materials; iv) climate change centres at local schools²⁵; v) grassroots adaptation sharing events; and vi) international exchange visits. Comprehensive monitoring and evaluation, as well as small-scale research projects, will be conducted by the Chinese Academy of Sciences (CAS) and local academic institutions to generate knowledge products²⁶ on context-specific lessons learned.

The knowledge generated at the country level will be shared regionally on ways to combat drought and flood risk – specifically EbA – across the GMS in the different ecosystems of the GMS. Scaling up such measures at a Basin scale could reduce the impacts of climate change in the given country and downstream in the Mekong River Basin. Discussions on a scaling up adaptation strategy will be promoted under Component 3 linking the project experience with the available scientific information on climate change risks and the political processes in the GMS. An assessment will be undertaken to inform future decisions on the cost-effectiveness of EbA in the GMS under different socioeconomic and environmental conditions. Additionally, relevant knowledge to EbA in the GMS will be collated to produce policy briefs to inform the development and implementation of future adaptation projects and strategies across the region. These knowledge products, as well as the results of monitoring and evaluation at implementation sites, will be made widely available through existing online information platforms related to the GMS and climate change adaptation²⁷. Knowledge-sharing and project coordination across the GMS – including in Cambodia, Lao PDR and Myanmar – will be achieved through participation in regional climate change adaptation forums. The knowledge gained through the proposed project will be used to strengthen regional coordination on climate change adaptation, and will be incorporated into future versions of regional and national adaptation plans across the GMS²⁸ through: i) continuous sharing of information to national and regional stakeholders; ii) participation in adaptation planning and policy workshops; and iii) the provision of policy briefs and papers.

China will actively participate in the proposed project. This participation will include: i) the

²³ On-the-ground interventions at the project demonstration site in China will be partially self-funded.

²⁴ Guided by regional and national adaptation and development plans.

²⁵ Such as the Som Sa Ard School in Kuchinarai District, Kalasin Province, Thailand (please see Section 5.)

²⁶ E.g. EbA implementation guidelines.

²⁷ Including platforms operated by: i) the MRC; ii) ADB-GMS; iii) Lancang-Mekong Cooperation Mechanism; and iv) other regional projects, such as EbA South.

²⁸ Such as the MASAP and NAPs.

establishment of a demonstration site with financial support from Chinese Academy of Sciences (CAS) and operated by the Kunming Institute of Botany; ii) exchange of knowledge from the CAS, including the Chinese Ecosystem Research Network and various institutes in the Upper Mekong Yunnan Province; iii) provision of technical advice on various aspects of the proposed project, including monitoring and evaluation; and iv) hosting of the project management unit within the Institute of Geographic Sciences and Natural Resources Research (IGSNRR) UN Environment International Ecosystem Management Partnership (UNEP-IEMP). In addition, the China-ASEAN Environmental Cooperation Center (CAEC), which hosts the Lancang-Mekong Environmental Cooperation Center, has expressed their willingness to work with the proposed project and collaborate with the other GMS countries. This will be done through the implementation of the Lancang-Mekong Cooperation (LMC)²⁹ mechanism. The participation of China, as a country in the upper GMS, is a highlight of the proposed project. For decades, the robust cooperation on transboundary resources management in the region has been limited to the lower Mekong countries (Cambodia, Lao PDR, Thailand and Vietnam), through institutions such as the Mekong River Commission. The participation of China in this proposed project will, therefore, facilitate dialogue between upstream- and downstream countries that will enhance regional cooperation on climate change adaptation and promote South-South knowledge exchange.

UN Environment's role will be Implementing Entity for the project. UNEP has implemented over 50 projects on climate change adaptation at global, regional and national levels. These projects develop innovative solutions for national governments and local communities to adapt to the predicted effects of climate change in an environmentally sound manner. This is achieved by: i) providing methods and tools to support decision making; ii) addressing barriers to implementation; iii) testing and demonstrating proposed solutions; and iv) enhancing climate resilience by restoring valuable ecosystems that are vulnerable to climate change. Investments into ecosystems, flood and coastal protection, water catchment and storage, and alternative livelihoods are aimed at helping people buffer extremes of droughts and floods, sea level rise and to adapt to projected climate change. The agency will draw upon this accumulated body of experience during the implementation of this AF project.

UN Environment's mission is to provide leadership and foster partnership in caring for the environment by inspiring, informing, and enabling nations and people to improve their quality of life without compromising that of future generations. UN Environment catalyzes and implements an environmental agenda integrated strategically with the goals of economic development and social wellbeing – in other words, an agenda for sustainable development. UN Environment brings more than 20 years of experience working on climate change. Beyond its support to climate science and negotiations, UN Environment have helped countries build resilience to climate change and reduce their greenhouse gas emissions, mainly by promoting renewable energy and improved energy efficiency and accessing clean energy finance.

UN Environment is mandated to address climate change, as the first priority area of its 2018-2021 Medium Term Strategy (MTS). The MTS commits UN Environment to support vulnerable countries in transitioning from urgent and immediate adaptation responses to medium- and long-term national adaptation plans that integrate ecosystem-based approaches to adaptation. It

²⁹ Lancang-Mekong Cooperation (LMC) mechanism, initiated by China and officially launched in March 2016, is a sub-regional cooperation between China and the other five Mekong nations of Cambodia, Lao PDR, Myanmar, Thailand and Vietnam. The LMC has three pillars-- political and security issues; economic affairs and sustainable development; and social affairs and people-to-people exchanges. See more details in Section G.

also commits UN Environment to support scaling up, expanding and collecting more evidence on successful ecosystem-based adaptation that has taken into account gender-differentiations.

UNEP's Flagship Programme, Ecosystem-based Adaptation (EbA), represents a ground-breaking shift in focus in the realm of climate change adaptation. In 2011, this programme was commended at the 17th meeting of the Conference of the Parties to the UNFCCC (CoP17). It has also been endorsed by IUCN, the EC and GEF through the Operational Guidelines on "Ecosystem-Based Approaches to Adaptation" GEF/LDCF.SCCF.13/Inf.06 October 16, 2012. The EbA approach is multidisciplinary in nature. It involves managing ecosystems to enhance their resilience. In addition, it uses ecosystem services to promote climate change adaptation and disaster risk management. Furthermore, it provides a platform for engaging a broad range of stakeholders and sectors in the adaptation process. The adaptation interventions proposed in this AF project are well within the scope of UNEP's current work on climate change.

The LDCF project is consistent with UNEP's other work in the water sector. This work is mandated by the UNEP Governing Council and is based on the UNEP Water Policy and Strategy. It also builds on the achievements of the Environmentally-sound Management of Inland Waters Programme (EMINWA) and other programmes falling under the scope of Integrated Water Resources Management (IWRM). The majority of the infrastructure and restoration interventions will be linked to and benefit from the Green Economy paradigm led by UNEP. The project will also benefit from ongoing work within UNEP towards analysing and documenting the ecological foundation of food security.

In Asia Pacific, UNEP operates through its Regional Office for Asia and the Pacific (ROAP) and works in 41 countries in the region. UNEP works with governments, local authorities, civil society, other UN entities, regional and international institutions, as well as the private sector to develop and implement cleaner and safer policies and strategies that catalyse efficient use of the region's natural assets and reduces degradation of the environment and risks to both humans and the environment. As a result, UNEP has a long-standing engagement with many Southern Asian countries in helping them to address climate change impacts. Through its regional office in Bangkok, and capacity to work directly with governments, UNEP will be able to mobilise staff time and resources to supervise the project. Close proximity to UNEP's Bangkok regional office and regular communication with the national implementing partners will provide the means for successful project delivery. The implementation supervision role will be exercised directly from UNEP HQ office in Nairobi.

Background context

Geographical context

The Greater Mekong Sub-region (GMS) covers portions of southwest China – specifically the Yunnan and Guangxi provinces – and five countries of Southeast Asia, namely Cambodia, Lao PDR, Myanmar, Thailand and Vietnam (Figures 1 and 2). From its source in southwest China, the Mekong River flows south for ~4,800 km, dropping ~4,500 m to the Mekong Delta in Vietnam. With a mean annual discharge of 475 cubic kilometres, the Mekong ranks tenth among the world's rivers based on mean annual flow at the mouth³⁰ and drains a total catchment area of 795,000 km² into the South China Sea (Table 1). The GMS can be divided into two parts: i) the 'Upper Mekong Basin' in China – where the river is called Lancang Jiang – and Myanmar; and ii) the 'Lower Mekong Basin' from the border between Myanmar and Lao PDR to the South China Sea.



Figure 1: Map of the GMS³¹.

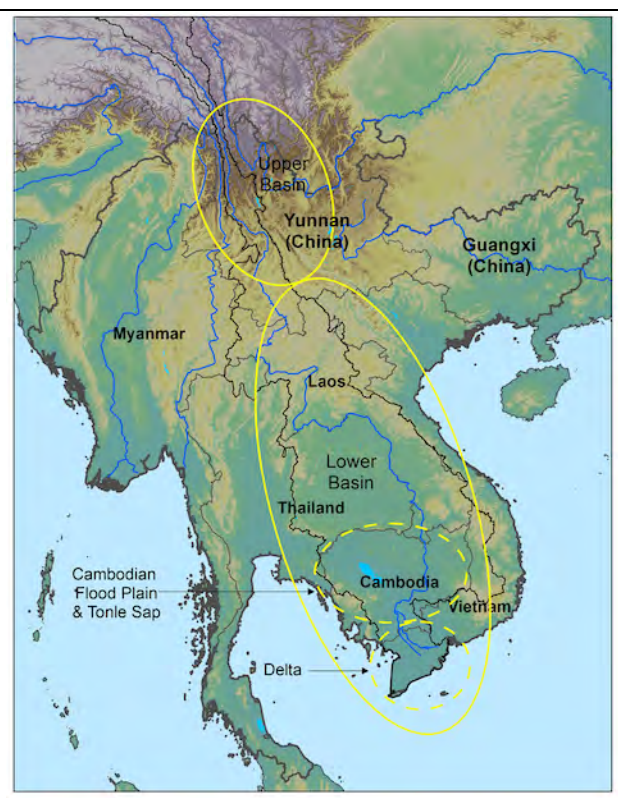


Figure 2: Broad geographical regions of the GMS³².

The Upper Basin makes up 24% of the total catchment area and contributes 15 – 20% of the water that flows into the Mekong River. The catchment in this region is steep and narrow,

³⁰ Mekong River Commission. 2005. Overview of the Hydrology of the Mekong Basin. Mekong River Commission, Vientiane. Available at: <http://www.mekonginfo.org/assets/midocs/0001968-inland-waters-overview-of-the-hydrology-of-the-mekong-basin.pdf>

³¹ Source: http://www.gms-eoc.org/uploads/map/archives/lores/GMS-Topography_28_Lo-Res_28.jpg

³² Mekong River Commission. 2005. Overview of the Hydrology of the Mekong Basin. Mekong River Commission, Vientiane. Available at: <http://www.mekonginfo.org/assets/midocs/0001968-inland-waters-overview-of-the-hydrology-of-the-mekong-basin.pdf>

resulting in extensive soil erosion. Consequently, the Upper Basin is responsible for ~50% of the sediment that enters the river³³. As the river flows into the subtropical Simao and Xishuangbanna Prefectures of Yunnan, China, the topography changes, opening out into wider floodplains and the flow rate of the river decreases. From this point, the Lower Basin continues southwards, fed by several tributaries. These tributaries are separated into two groups, specifically: i) tributaries that drain the high rainfall regions of Lao PDR, contributing to major wet season flow; and ii) tributaries that drain the low relief regions of northeast Thailand. The final stretch of the river through Cambodia and Vietnam is relatively flat and water levels rather than flow volumes determine the movement of water across the landscape. Phnom Penh marks the beginning of the delta system of the Mekong River. In the delta, the mainstream of the river breaks up into multiple branches that eventually flow into the South China Sea. Agriculture in the delta is well developed and the population density is the highest found anywhere within the GMS.

Table 1: Area of the Greater Mekong Sub-region countries, and their contribution within the Mekong River Basin Catchment³⁴.

	Cambodia	China	Lao PDR	Myanmar	Thailand	Vietnam	Total
Area (km²)	181,354	619,501	229,878	669,252	514,055	328,385	2,542,425
% of GMS Total Area	7	24	9	26	20	13	100
Catchment as a % of GMRB	20	21	25	3	23	8	100
Flow as % of GMRB	18	16	35	2	18	11	100

The GMS is characterised by highly variable climatic and topographical features, dividing it into six smaller sub-catchments classified as hydro-geographic zones (Figure 3) based on the hydrology, physiography, land use and vegetation in each zone. The diversity of landscapes is largely attributed to the monsoon climate, a complex biophysical environment with an elevational gradient >5,500 meters and a long history of human interventions. This has led to the establishment of a highly diverse and heterogeneous patchwork of ecosystems and land-use mosaics, including: i) high-elevation pastures; ii) temperate and tropical forests; iii) rubber and oil palm plantations; iv) home gardens; v) diverse croplands; vi) mixed farming wetlands; vii) lakes; and viii) mangroves. Such diverse ecosystems, across a range of elevations, provide ecosystem goods and services to support the livelihoods of more than 75 million people.

³³ Mekong River Commission. 2005. Overview of the Hydrology of the Mekong Basin. Mekong River Commission, Vientiane. Available at: <http://www.mekonginfo.org/assets/midocs/0001968-inland-waters-overview-of-the-hydrology-of-the-mekong-basin.pdf>

³⁴ Mekong River Commission. 2005. Overview of the Hydrology of the Mekong Basin. Mekong River Commission, Vientiane. Available at: <http://www.mekonginfo.org/assets/midocs/0001968-inland-waters-overview-of-the-hydrology-of-the-mekong-basin.pdf>



Figure 3: Major hydrogeographic zones of the Mekong River in the Lower Mekong Basin³⁵.

Socio-economic context

Some of Asia's poorest countries are located within the GMS, but the region has experienced rapid growth and development over the last few decades. The various national economies of the sub-region have been growing at fast rates, although there is substantial variation between countries and sectors. Rising living standards, together with rapid population growth, are creating new transboundary challenges to the sub-region in terms of water and river basin management, livelihood options and regional/sub-national migration flows. There are currently major initiatives being implemented and planned throughout the GMS to promote further regional economic growth and employment. Such initiatives include the development of more roads, railways, dams (mainly for hydropower) and other infrastructure, particularly in areas previously dominated by natural resource- and agriculture-based livelihoods³⁶.

³⁵ Mekong River Commission. 2005. Overview of the Hydrology of the Mekong Basin. Mekong River Commission, Vientiane. Available at: <http://www.mekonginfo.org/assets/midocs/0001968-inland-waters-overview-of-the-hydrology-of-the-mekong-basin.pdf>

³⁶Source: http://d2ouvy59p0dg6k.cloudfront.net/downloads/greater_mekong_ecosystems_report_020513.pdf

Most of the GMS's rural population are dependent on subsistence agriculture for food and income generation. However, the agricultural sector in the sub-region is shifting from one that is traditionally subsistence-based to one that is more commercialised. Although such commercialisation is progressing at varying rates between the different countries of the GMS, the process is generally one of specialisation, intensification and increased agrochemical use because of mechanisation. As a result of commercialization, agricultural production has steadily increased in all GMS countries over the past 20 years³⁷. For example, the production of commodities, such as rice, oil crops (soybean, groundnut, sesame, and sunflower) and coarse grains (maize, millet, and sorghum), has more than doubled³⁸. Agricultural expansion in the GMS – combined with economic growth, population growth and rapid urbanisation – has, however, increased the demand for land, water, energy and food. This, accompanied by the overexploitation of natural resources, has led to: i) increased competition and costs for resources and land; and ii) a growing number of ecological constraints. Consequently, agricultural livelihoods and food security in the GMS, although currently on the rise, are expected to be threatened in the long-term³⁹. Similarly, the amount of water required for food and energy production, as well as for domestic and industrial use, is increasing exponentially. The overexploitation and degradation of ground and surface water sources are, therefore, commonplace. Such transformations in the food-water-energy nexus create new and exacerbate old, livelihood challenges for agrarian communities throughout the GMS.

Subsistence livelihoods in the GMS are also threatened by environmental degradation resulting from regional development. Such degradation is negatively affecting terrestrial, freshwater, estuarine and marine ecosystems in the region. As a result, the supply of ecosystem goods and services to local communities reliant on them for livelihoods is compromised. The major ecosystem services on which rural communities throughout the GMS predominantly rely include:

- provisioning services (food, fibre, water);
- regulating services (carbon sequestration, waste decomposition, flood regulation, water supply and purification, sediment and nutrient retention, erosion control);
- supporting services (nutrient cycling, seed dispersal, biodiversity conservation, primary production); and
- cultural services (ecotourism, aesthetic value, recreation, education).

Major human-ecosystem interactions related to local livelihoods within the sub-region include:

- fisheries along the length of the Mekong River, especially downstream from China;
- aquaculture in the Mekong Delta;
- intensive rice production (paddy agriculture) in the lowlands;
- shifting cultivation in the uplands of the humid tropics;
- rice terraces and tea/coffee plantations in sub-tropics;
- rubber, cassava and palm oil plantations over large areas of the GMS; and
- agro-pastoral systems associated with the higher elevations of the upper basin.

³⁷ R. M. Johnston et al. 2010. Rethinking Agriculture in the Greater Mekong Subregion. IWMI. Colombo, Sri Lanka.

³⁸ R. M. Johnston et al. 2010. Rethinking Agriculture in the Greater Mekong Subregion. IWMI. Colombo, Sri Lanka.

³⁹ Rosegrant. et al. 2012. Water and Food Security in the Mekong Subregion: Outlook to 2030-2050. Proceedings of the International Conference on GMS 2020, Bangkok, Thailand, February.

Environmental context

Rapid development within the GMS – although largely positive and reflecting political stabilisation and economic growth – is resulting in widespread environmental changes. These environmental changes negatively impact people who rely on ecosystem goods and services for their livelihoods. The major environmental changes in the GMS are further described below.

- The international demand (particularly from China) for agricultural products (including sugar, rice, coffee, rubber, cassava and fruit) from the GMS is transforming the traditionally subsistence-based agricultural sector to one that is commercial and export-orientated⁴⁰. Across the GMS, agricultural land is expected to expand over the next 30–50 years, predominantly replacing natural forest. The negative effects of this agricultural intensification and expansion include: i) land degradation; ii) deforestation; iii) biodiversity losses; iv) habitat losses; v) water quality and quantity declines; and vi) the deterioration of aquatic ecosystems.
- Rapid deforestation, attributable to agricultural and civil development, is reducing the supply of ecosystem services and non-timber forest products (NTFPs) to communities. Between 1973 and 2009, the total forest cover within the GMS (excluding China) has declined by ~32%, with losses of 22% in Cambodia, 24% in Lao PDR and Myanmar, and 43% in Thailand and Vietnam.
- Poor land management and agricultural practices are resulting in: i) soil fertility declines; and ii) soil loss through erosion.
- Large-scale hydropower development and irrigation are threatening freshwater ecosystems within the GMS and the livelihoods dependent on them. Over 875,000 tonnes of freshwater fish are harvested in the Mekong Basin annually. This accounts for up to 25% of the global freshwater fish catch and provides livelihoods for at least 60 million people⁴¹ while providing important contributions to regional food security and economies. In addition to supporting livelihoods, the Mekong River is second only to the Amazon River in terms of freshwater biodiversity. At least 1,100 freshwater species are found in the GMS including the last remaining populations of the Irrawaddy river dolphin, giant freshwater stingray and the Mekong giant catfish⁴².
- High levels of hunting and poaching, over-exploitation of natural resources and habitat loss have resulted in only ~5% of natural habitats within the GMS remaining in a healthy condition⁴³. Consequently, the biodiversity supported within the sub-region, which includes over: i) 430 mammal species; ii) 800 reptile and amphibian species; iii) 1,200 bird species; and iv) 20,000 species of plants, is among the most threatened globally.

⁴⁰ Source: http://d2ouvy59p0dg6k.cloudfront.net/downloads/greater_mekong_ecosystems_report_020513.pdf

⁴¹ Source: <http://www.worldwildlife.org/places/greater-mekong>

⁴² Source: <http://www.mrcmekong.org/assets/Publications/report-management-develop/Mek-Dev-No2-Mek-River-Biodiversityfisheries-in.pdf>

⁴³ Conservation International. 2007. Biodiversity hotspots. Arlington, USA.

Climate change context

Past and present climate change

The GMS is amongst the most climate-vulnerable regions of the world, with a wide range of climate change effects already documented⁴⁴. Climate change is expected to exacerbate the impacts of existing threats to the region's inhabitants and its various ecosystems. The effects of climate change on the GMS include increased: i) temperatures; ii) rainfall variability; iii) frequency of extreme weather events – such as droughts and floods; and iv) saltwater intrusion related to sea-level rise (SLR). These climate change-related effects are discussed further below.

Across the GMS, mean annual temperatures have been increasing at a rate of 0.14°C to 0.20°C per decade since the 1960s, with average temperatures rising by between 0.5°C and 1.5°C from 1951 to 2000⁴⁵. Such climate change-related temperature increases have resulted in the sub-region's highest average daytime temperatures for the month of April being recorded in Thailand in 2016⁴⁶. Furthermore, increases in maximum and minimum daytime temperatures have resulted in more hot days and warm nights being recorded across the GMS since 1950^{47,48}.

Although temperature increases attributable to climate change are consistent across the GMS, the observed effects on rainfall are more complicated. The effects of climate change on rainfall patterns across the sub-region are highly variable because of the influence of the sub-region's numerous topographical and marine features. In general, the length of the sub-region's rainfall seasons has decreased, but the intensity of rainfall events – particularly in the middle and lower sections – as well as the amount of rain falling, have increased³⁰. For the sub-region overall, annual total wet-day rainfall has increased by 22 mm per decade since the 1950s^{49,50}. An exception to this trend is the upper section of the GMS (Yunnan Province, China), which has experienced an 11 mm decrease in rainfall per decade, with high inter-annual rainfall variability and an increase in the frequency of prolonged droughts⁵¹. In terms of extreme rainfall events, while an increasing frequency has been reported in most of Southeast Asia, the opposite is true for the GMS. Between 1961 and 1998, the sub-region experienced a decrease in the number of extreme rainfall events per annum, however, the amount of rain falling during these events increased by 10 mm per decade during this period^{52,53}.

⁴⁴ IPCC. 2007. Climate Change 2007. Impacts, Adaptation and Vulnerability. M.L. Parry, et al. Working Group II: 4th AR IPCC. Cambridge: Cambridge University Press.

⁴⁵ WWF. 2009. The Greater Mekong and climate change: biodiversity, ecosystem services and development at risk.

⁴⁶ Thirumalai K, DiNezio PN, Okumura Y & Deser C. 2017. Extreme temperatures in Southeast Asia caused by El Niño and worsened by global warming. *Nature Communications*. 8: 15531. DOI: 10.1038/ncomms15531.

⁴⁷ WGI AR5 Chapter 2 / WGI AR5 Section 14.8.12/ WGI AR5 Section 2.6.1.

⁴⁸ Hijjoka, Y., et al., 2014: Asia. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., et al (eds.)]. Cambridge University Press, Cambridge, United Kingdom, pp. 1327-1370.

⁴⁹ Hijjoka, Y., et al., 2014: Asia. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., et al (eds.)]. Cambridge University Press, Cambridge, United Kingdom, pp. 1327-1370.

⁵⁰ WGI AR5 Chapter 14 / WGI AR5 Sections 14.4.12, 14.8.12

⁵¹ China National Climate Center – Beijing - 2015 – unpublished data.

⁵² Manton, M. J., et al. 2001. Trends in extreme daily rainfall and temperature in Southeast Asia and the South Pacific: 1961-1998. *International Journal of Climatology* 21:269-284.

⁵³ WGI AR5 Chapter 14 / WGI AR5 Sections 14.4.12, 14.8.12

Conversely to extreme rainfall events, the frequency of other extreme weather events has increased. Such extreme weather events include heat waves⁵⁴, tropical cyclones⁵⁵ as well as unusually widespread monsoon floods, which have overwhelmed large areas of Thailand, Lao PDR, Cambodia, and Vietnam including extensive areas of the Mekong Delta.

In addition to the above-mentioned extreme weather events, climate change-related SLR and saltwater intrusion are threatening the sub-region's already climate-vulnerable coastal communities and ecosystems. SLR in the South China Sea was recorded at a rate of 5.5 mm per annum between 1993 and 2009⁵⁶, which is higher than the global rate of 3 mm per annum over the last decade⁵⁷. The coastal extent of the Mekong Delta is particularly at risk to the negative effects of SLR and salt water intrusion.

Past and current effects of climate change

Climate change has and is exacerbating the impacts of existing threats on the region's numerous communities and ecosystems. Among the most prevalent effects of climate change in the GMS is the rapid melting of glaciers and permafrost that supply the source and upper sections of the sub-basin, caused by increasing temperatures. This is undoubtedly strengthening the supply of water to the upper parts of the basin in the short-term but will have negative effects on the availability of water within the basin in the long-term as glaciers, in particular, recede⁵⁸. Similarly, warmer winters caused by increasing temperatures are resulting in a shorter dormant period of many alpine plant species⁵⁹.

Droughts are also negatively affecting plant species which are endemic to the GMS through a decrease in water availability⁶⁰, leading to a decline in floral diversity. Water shortages related to droughts are resulting in decreased agricultural yields, which threatens food security through the sub-region. Furthermore, the income generating capacity of water-dependant livelihood activities including freshwater fishing is reduced. Apart from declining incomes and livelihood options, the lack of water in the GMS is detrimental to human and ecosystem health, leading to major humanitarian disasters in the region. An example of such a disaster in the GMS is the recent drought in 2016/2017, which resulted from reduced rainfall attributable to El Niño and exacerbated by climate change. This drought is compounding transboundary water shortages along the Mekong River, hampering agricultural production across the GMS, which has threatened food security across the sub-region⁶¹. A decrease in the production of the region's main staple, rice, is particularly problematic and as a result, prices will rise, which will further impact the lives and livelihoods of the GMS's economically marginalised communities. Furthermore, economic growth in the sub-region, which is highly reliant on agriculture is declining. For example, economic growth in Vietnam dropped to 5.6% year-on-year (compared

⁵⁴IPCC. 2007. Climate Change 2007. Impacts, Adaptation and Vulnerability. M.L. Parry, et al. Working Group II: 4th AR IPCC. Cambridge: Cambridge University Press.

⁵⁵ Rosegrant. et al. 2012. Water and Food Security in the Mekong Subregion: Outlook to 2030-2050. Proceedings of the International Conference on GMS 2020, Bangkok, Thailand, February.

⁵⁶ Feng W, Zhong M & Xu H. 2012. Sea level variations in the South China Sea inferred from satellite gravity, altimetry, and oceanographic data. *Science China: Earth Sciences*. 55(10): 1696–1701.

⁵⁷ADB. 2008. GMS: Climate Makers or Climate Takers? Understanding and Responding to the Challenges of Climate Change. Background Paper. GMS Development Dialogue. 21 May.).

⁵⁸WGI AR5 Chapter 14 / WGI AR5 Sections 14.4.12, 14.8.12

⁵⁹Yu H, E. Luedeling, and JC. Xu. 2010. Winter and spring warming result in delayed spring phenology on the Tibetan Plateau. *Proceedings of National Academy of Science* 107: 22151-22156.

⁶⁰ Qiu, J. 2010. China drought highlights future climate threats. *Nature* 463: 142-143.

⁶¹ Available at: <https://internationalwateranalysis.wordpress.com/>.

to 6.2% in 2015) because of the drought⁶². Apart from its effects on agricultural production in the sub-region, the drought along with saltwater intrusion has resulted in a lack of potable water, which has affected ~1 million people in central and southern Vietnam⁶³.

Related to the ongoing drought in the GMS are the lowest recorded water levels in the lower Mekong River since 1926⁶⁴. As a result, saltwater intrusion is occurring earlier and more extensively than usual. To date, saltwater intrusion has been recorded as far as 90 km inland, destroying at least 159,000 ha of rice paddies in the Mekong Delta, with a further 500,000 ha still at risk.

Climate change-related SLR is also threatening agricultural production in the coastal areas of the GMS. Densely populated parts of the Thai and Vietnamese coastlines are especially vulnerable to the effects of SLR. Between 1993 and 2010, rapid rates of SLR were recorded in the western tropical Pacific⁶⁵. During this period, sea levels increased by 6 mm per year in the Mekong Delta⁶⁶. This SLR has resulted in an increase in the frequency and intensity of storm surges (especially during the typhoon season) leading to the inundation of coastal agricultural land, as well as loss of life and property. Such coastal surges were experienced during Typhoon Linda (Vietnam, 1997) and Cyclone Nargis (Myanmar, 2008)⁶⁷.

Another common climate change threat that is also associated with typhoons and cyclones in the GMS is flooding, which is attributable to an increase in the intensity of extreme rainfall events. Floods are responsible for soil erosion throughout the sub-region and landslides in the mountainous areas. Furthermore, floods are responsible for the loss of human life, the destruction of property and infrastructure, and for crop losses. The impacts of floods together with those of other previously mentioned climate change-related threats, including droughts, are expected to increase in frequency and intensity according to future climate change scenarios⁶⁸.

Future climate change

Under future scenarios, climate change is expected to accelerate current warming trends, with the entire GMS becoming hotter under all current emission scenarios projected by the IPCC Representative Concentration Pathways (RCPs). Mean annual temperatures across the GMS are predicted to increase by between 1.6 and 2.5 °C by 2050^{69,70}, and by 2 to 4 °C by the end of

⁶² Available at: <https://www.forbes.com/sites/timdaiss/2016/05/25/why-vietnam-is-running-dry-worst-drought-in-nearly-100-years/#64bc9ba174b3>.

⁶³ Available at: http://reliefweb.int/sites/reliefweb.int/files/resources/Vietnam%20Consolidated%20Report%20on%20Drought%202015-2016-Final_11%20Mar%202016.pdf

⁶⁴ Available at: <https://internationalwateranalysis.wordpress.com/>.

⁶⁵ Rosegrant, et al. 2012. Water and Food Security in the Mekong Subregion: Outlook to 2030-2050. Proceedings of the International Conference on GMS 2020, Bangkok, Thailand, February.

⁶⁶ Ryvitski, J.P.M., et al. 2009. Sinking deltas due to human activities. Nature Geosciences. Published online: 20 September 2009, doi: 10.1038/ngeo629.

⁶⁷ ADB. 2012. GMS Atlas of the Environment 2nd Edition. Manila, Philippines.

⁶⁸ Hijjoka, Y., et al., 2014: Asia. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., et al (eds.)]. Cambridge University Press, Cambridge, United Kingdom, pp. 1327-1370.

⁶⁹ Available: <https://www.ipcc.ch/report/ar5/>

⁷⁰ Hijjoka, Y., et al., 2014: Asia. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., et al (eds.)]. Cambridge University Press, Cambridge, United Kingdom, pp. 1327-1370.

the century^{71,72}.

In terms of average annual rainfall, climate change models generally project slight to moderate increases over most of the GMS of up to 13% by 2030 from the 1951–2000 average⁷³. These increases will be predominantly attributable to an increase in the intensity of rainfall during the wet season, as well as during extreme rainfall events⁷⁴. Such increases are expected in the upper sections of sub-basin, where average annual rainfall is predicted to rise by 5–25% over the next two decades and by up to 50% across the whole of the MRB by 2100. Such rainfall increases are expected to be exacerbated by the projected rise in extreme rainfall events associated with cyclones on the coasts of the South China Sea, Gulf of Thailand and the Andaman Sea. The Mekong Delta, however, is an exception to this, as it is expected to receive 15% less rainfall by the end of the century. Together with the projected rainfall variability during the wet seasons across the GMS, other impacts of climate change are likely to include: i) earlier springs; ii) longer dry and shorter wet seasons; iii) an increased risk of prolonged drought in the Mekong Delta; iv) SLR of up to 0.7 m by 2100 in South East Asia, compared with those recorded in 1990⁷⁵; and iv) the northward shifting of bioclimatic zones, particularly within the mountainous areas of the GMS⁷⁶. Such climate change-related impacts are expected to negatively affect the countries in the GMS, which are already vulnerable to climate change.

Future effects of climate change

Worldwide, four of the 16 countries that are categorised as being ‘extremely vulnerable’ to climate change are found in the GMS (including Thailand and Vietnam)⁷⁷. The predicted impacts of future climate change mentioned above will exacerbate the effects of existing threats resulting from *inter alia* land use change, habitat loss and environmental degradation on the region’s numerous communities and ecosystems⁷⁸. Additionally, the climate-resilience and adaptive capacity of the communities of the GMS dependent on local ecosystems for the supply of goods and services will be negatively affected by climate change⁷⁹.

Future climate change is expected to have negative impacts on agriculture in the GMS. Such impacts will include *inter alia*: i) declining yields as common crop varieties (particularly staples such as rice) will be pushed beyond their thermal limits; ii) crop losses resulting from droughts and flood damage; iii) the loss of arable land in low-lying areas because of SLR and salt water intrusion; iv) decreasing soil water content as a result of increased potential evapotranspiration, which will decrease agricultural production; and v) the spoilage of stored agricultural products (such as rice), attributable to increased fungal growth and insect activity⁸⁰. These impacts will

⁷¹ WWF. 2009. The Greater Mekong and climate change: biodiversity, ecosystem services and development at risk.

⁷²ADB. 2009. The Economics of Climate Change in Southeast Asia: A Regional Review. Manila..

⁷³ ADB. 2012. GMS Atlas of the Environment 2nd Edition. Manila, Philippines.

⁷⁴ ADB. 2012. GMS Atlas of the Environment 2nd Edition. Manila, Philippines.

⁷⁵IPCC. 2007. Climate Change 2007. Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press.

⁷⁶Zomer, R.J.; Trabucco, A.; Wang, M.; Xu, J.C., 2016. Projected Climate Change Impact on Hydrology, Bioclimatic Conditions, and Terrestrial Ecosystems in the Asian Highlands. ICRAF Working Paper 222. World Agroforestry Centre East and Central Asia, Kunming, China. 56 pp.

⁷⁷ Maplecroft, Climate Change Vulnerability Index 2011. Available at: <https://maplecroft.com/about/news/ccvi.html>

⁷⁸WWF. 2009. The Greaterer Mekong and Climate Change: Biodiversity, Ecosystem Services and Development at Risk. WWF Greaterer Mekong Programme.

⁷⁹ R. Edward Grumbine and Jianchu Xu. 2011. Mekong Hydropower Development. Science 332: 178-179.

⁸⁰Available at: <http://www.extension.umn.edu/agriculture/small-grains/harvest/management-of-stored-grain-with-aeration/>

severely affect agriculturally-based livelihoods, food security, economies, trade, as well as regional and national political stability in the GMS⁸¹.

Flooding, which is necessary in paddy fields for successful rice production, is expected to increase in both frequency and intensity in the middle and upper GMS. This effect of climate change will, however, be detrimental rather than advantageous to rice production, as entire crops may be lost and infrastructure necessary to store produce and access markets may be damaged⁸². Maize, another grain cultivated in the sub-region, is predicted to suffer losses in production of 3–12% by 2050, because of increases in mean annual rainfall and temperature⁸³.

In the lower parts of the sub-region, an increase in the frequency and duration of droughts are expected to result in major shortfalls in agricultural production, particularly paddy rice. Furthermore, water levels in the lower Mekong River are expected to decrease, which will lead to a loss of livelihoods reliant on them, as well as a decrease in potable and underground water supplies. Additionally, the various terrestrial and aquatic ecosystems reliant on water to function optimally will be placed under immense stress because of future climate change-related droughts.

The productivity of low-lying agricultural land – predominantly rice paddies – on the coast of the GMS is predicted to decrease because of the combined climate change impacts of saltwater intrusion (related to SLR) and increasing temperatures (which will result in heat stress of rice plants)⁸⁴. The loss of agricultural land caused by the impacts of climate change is expected to be particularly widespread in the Mekong Delta floodplain. Paddy rice production in Vietnam will be especially hard hit by such agricultural land losses in the future, which will force farmers to seek alternative livelihoods such as those reliant on goods supplied by local ecosystems.

Climate change is expected to severely impact the functioning of terrestrial ecosystems, which will include decreases in biodiversity and the supply of goods and services. Such impacts will predominantly result from the spatial shifting of bioclimatic conditions across the GMS by 2050, which will initiate a period of prolonged biophysical and biological perturbation⁸⁵. Even the most conservative estimates indicate that by as early as 2050, most of the sub-region may experience novel climatic conditions attributable to climate change⁸⁶. These climate change-related impacts are expected to directly influence biodiversity across the GMS by causing shifts in species distributions, which will have knock-on effects on ecosystem structure, composition and functioning^{87,88}. Although some species will be able to adapt to the effects of climate

⁸¹ Sivakumar, M. V. K., H. P. Das, and O. Brunini. 2005. Impacts of present and future climate variability and change on agriculture and forestry in the arid and semi-arid tropics. *Climatic Change* 70: 31–72.

⁸² TKK & SEA START RC. 2009. *Water and Climate Change in the Lower Mekong Basin: Diagnosis and recommendations for adaptation*. Water and Development Research Group, Helsinki University of Technology (TKK), and Southeast Asia START Regional Center (SEA START RC), Chulalongkorn University. Water & Development Publications, Helsinki University of Technology, Espoo, Finland.

⁸³ USAID. 2013. *Mekong Adaptation and Resilience to Climate Change*. Mekong ARCC Task 2 Synthesis Report. Bangkok, Thailand.

⁸⁴ Source: <http://www.sciencemag.org/news/2016/04/mekong-mega-drought-erodes-food-security>

⁸⁵ Felkner, J., et al. 2009. Impact of Climate Change on Rice Production in Thailand. *American Economic Review*. 99. pp. 205-210.

⁸⁶ Mora C, et al. 2013. The projected timing of climate departure from recent variability. *Nature* 502(7470):183–187.

⁸⁷ Williams, J.W., S.T. Jackson, and J.E. Kutzbach, 2007: Projected distributions of novel and disappearing climates by 2100 AD. *Proceedings of the National Academy of Sciences of the United States of America* 104: 5738-5742.

⁸⁸ Zomer, R.J.; Trabucco, A.; Wang, M.; Xu, J.C., 2016. Projected Climate Change Impact on Hydrology, Bioclimatic Conditions, and Terrestrial Ecosystems in the Asian Highlands. ICRAF Working Paper 222. World Agroforestry Centre East and Central Asia, Kunming, China. 56 pp.

change without dispersing, many will not, resulting in high rates of extinction, particularly of rare and endemic species that are specific to certain habitats^{89,90,91}. Furthermore, these negative impacts will disrupt the viability and effectiveness of the many protected areas and conservation efforts across the GMS.

Climate change is also expected to affect aquatic ecosystems in the GMS. Fish migration routes, spawning and feeding grounds, and fishing seasons are all likely to change, with impacts on fishing communities being uncertain. Rising seas, more severe storms and saltwater intrusion in the deltas will negatively impact the GMS's aquaculture industry, which is reliant on fish species with limited saline tolerance, such as catfish in the Mekong Delta⁹². A recent survey of the impacts of climate change on freshwater fisheries in 130 countries concluded that Cambodia and Vietnam are among the most vulnerable because of their heavy dependence on the sector, high exposure to climate risks and limited adaptive capacity⁹³.

Project / Programme Objectives:

List the main objectives of the project/programme.

The overall objective of the proposed project is to reduce vulnerability to climate change in the Greater Mekong Sub-region (GMS).

This objective will be achieved through three complementary outcomes:

1. Climate change adaptation interventions, particularly EbA, implemented by vulnerable communities in the GMS to manage climate change impacts, particularly droughts and floods.
2. Enhanced knowledge and awareness of adaptation measures, including EbA, to shared climate change impacts in different ecosystems to promote regional cooperation, planning and implementation of adaptation in the GMS.
3. Strengthened regional cooperation on climate change adaptation, particularly in response to floods and droughts, in the GMS.

⁸⁹ Stork, N.E., J. Balston, G.D. Farquhar, P.J. Franks, J.A.M. Holtum, and M.J. Liddell. 2007. Tropical rainforest canopies and climate change. *Austral Ecology*. 32: 105–112.

⁹⁰ Malcolm, J.R. C. Liu, R.P. Neilson, L. Hansen, and L. Hannah. 2006. Global warming and extinctions of endemic species from biodiversity hotspots. *Conservation Biology*. 20: 538-548.

⁹¹ Such species include *inter alia*: including the Asian elephant, tiger, douc langur, gaur, banteng, Eld's deer, serow, clouded leopard, pygmy loris, imperial pheasant and Edwards's pheasant.

⁹² WWF. 2009. The Greater Mekong and climate change: biodiversity, ecosystem services and development at risk.

⁹³ Allison, E.H., A.L. Perry, M-C. Badjeck, W.N. Adger, K. Brown, D. Conway, A.S. Halls, G.M. Pilling, J.D. Reynolds, N.L. Andrew and N.K. Dulvy. 2009. Vulnerability of national economies to the impacts of climate change on fisheries. *Fish and Fisheries*. Blackwell Publishing Ltd. DOI: 10.1111/j. 1467-2979.2008.00310.x.

Project / Programme Components and Financing:

Fill in the table presenting the relationships among project components, outcomes, outputs and countries in which activities would be executed, and the corresponding budgets.

Project Components	Expected Outcomes	Expected Outputs	Countries	Amount (US\$)
Component 1: Demonstration of climate change adaptation interventions, with a focus on drought and flood management, in vulnerable communities and different ecosystems.	Outcome 1: Climate change adaptation interventions implemented by vulnerable communities in the GMS to manage climate change impacts, particularly droughts and floods.	<i>Output 1.1:</i> A suite of climate change adaptation interventions, including EbA, implemented at Young River Basin in Thailand.	Thailand	5,000,000
		<i>Output 1.2:</i> A suite of climate change adaptation interventions, including EbA, implemented in communities living around Tram Chim National Park in Vietnam.	Vietnam	
		<i>Output 1.3:</i> A suite of climate change adaptation interventions, including EbA, implemented in communities surrounding Nabanhe Nature Reserve in China.	China (funded by the CAS)	
		<i>Output 1.4:</i> Monitoring programme established to collect information on the cost-effectiveness of project interventions in different socio-ecological contexts in the GMS.	China, Thailand and Vietnam	
		<i>Output 1.5:</i> Guidelines for the design and implementation of EbA monitoring and evaluation systems, including simplified methods for collecting comparable information in different socio-ecological contexts.	GMS-wide	
Component 2: Regional knowledge base on climate change adaptation	Outcome 2: Enhanced knowledge and awareness of adaptation measures,	Output 2.1: GMS-specific cost-effectiveness analysis of climate change adaptation interventions that reduce the impact of floods and droughts.	GMS-wide	751,612

expanded in the GMS.	including EbA, to shared climate change impacts in different ecosystems to promote regional cooperation, planning and implementation of adaptation in the GMS.	Output 2.2: Policy briefs developed on: i) good practice in managing shared climate changes impacts in the GMS; ii) integrating climate change adaptation into transboundary water and river basin management; and iii) cost-effectiveness of EbA for reducing vulnerability to climate change.	GMS-wide	
		Output 2.3: Knowledge on EbA that has been generated and collated through the project shared on the main regional knowledge platforms and presented at regional adaptation forums.	GMS-wide	
		Output 2.4: National level knowledge-sharing strategy implemented in Thailand and Vietnam.	Thailand and Vietnam	
Component 3: Regional cooperation on climate change adaptation.	Outcome 3: Strengthened regional cooperation on climate change adaptation, particularly in response to floods and droughts, in the GMS.	Output 3.1: Recommendations for regional cooperation on the scaling up of climate change adaptation interventions – based on the results of the project – developed and presented at: i) Lancang-Mekong policy dialogues; ii) MRC regional stakeholder forum on MASAP; iii) Thailand NAP stakeholder forum; and iv) Vietnam National Climate Change Strategy stakeholder forum.	GMS-wide	700,000
		Output 3.2: A paper on climate change adaptation strategies, including EbA, produced for the Lancang- Mekong Cooperation Outlook Report series.	GMS-wide	

		Output 3.3: Study tours, including participants from Thailand, Vietnam and China, to project intervention sites to exchange knowledge, encourage relationship-building and promote regional cooperation on climate change adaptation.	China, Thailand and Vietnam	
6. Project Execution cost (9.5%)				612,903
7. Total Project Cost				6,451,612
8. Project Cycle Management Fee charged by the Implementing Entity (8.5%)				548,388
Amount of Financing Requested				7,000,000

Projected Calendar:

Indicate the dates of the following milestones for the proposed project/programme

Milestones	Expected Dates
Start of Project/Programme Implementation	July 2018
Mid-term Review (if planned)	July 2020
Project/Programme Closing	August 2022
Terminal Evaluation	March 2022

PART II: PROJECT/PROGRAMME JUSTIFICATION

A. Project Components

Describe the project / programme components, particularly focusing on the concrete adaptation activities, how these activities would contribute to climate resilience, and how they would build added value through the regional approach, compared to implementing similar activities in each country individually. For the case of a programme, show how the combination of individual projects would contribute to the overall increase in resilience.

Component 1: Demonstration of climate change adaptation interventions, with a focus on drought and flood management, in vulnerable communities and different ecosystems.

Dependence on shared transboundary water resources can expose people from varied socio-ecological⁹⁴ contexts to a common set of climate change threats. In the GMS, people from different contexts who rely on the ecosystems of the GMS to support their livelihoods are united in their shared exposure to the region's primary climate threats; droughts and floods and the transboundary nature of river basin management. However, the way these threats manifest to impact livelihoods differs according to the specific context of the affected communities, and therefore, a one-size-fits-all approach to climate change adaptation is unlikely to be effective. In such a scenario, context-specific adaptation measures are appropriate and could be used to demonstrate drought and flood adaptation strategies to people from similar socio-ecological contexts across the GMS.

The first component of the proposed project will increase the resilience of people in three communities vulnerable to droughts and/or floods in the GMS through the implementation of concrete climate change adaptation interventions. Monitoring programmes will be established to collect information on the cost-effectiveness of adaptation interventions in different socio-ecological contexts, and guidance on monitoring and evaluation systems will be prepared.

Outcome 1: Climate change adaptation interventions implemented by vulnerable communities in the GMS to manage climate change impacts, particularly droughts and floods.

Concrete adaptation interventions – with a focus on EbA – will be implemented in the upper (China), middle (Thailand) and lower (Vietnam) reaches of the Mekong River. These locations represent a diverse array of socio-ecological contexts but are united by the common climate change threats of floods and droughts.

The specific countries for the implementation of adaptation interventions were selected during the preparation phase of this concept note through extensive stakeholder consultation. Thailand and Vietnam were selected as they are non-Least Developed Countries and therefore do not receive support for adaptation from the Least Developed Countries Fund, as well as other major bilateral funding mechanisms. China, through the Chinese Academy of Sciences (CAS), is seeking to promote South-South cooperation and knowledge exchange and is therefore willing to co-finance a demonstration site. This demonstration site, although not supported by AF resources, is therefore included in the overall project design.

⁹⁴ Including different economic, administrative, political and environmental contexts.

Specific sites have also been chosen in each of the target countries through stakeholder consultation during the concept development phase. The sites are: i) Young River Basin in Thailand; ii) communities living around Tram Chim National Park in Vietnam; and iii) communities surrounding Nabanhe Nature Reserve in China. The criteria used to select these sites were as follows:

- Representativeness of key vulnerable ecosystems in the GMS.
- Evidence of climate change impacts on people's livelihoods.
- Evidence of climate change impacts on biodiversity, including endangered species.
- Potential linkages to transboundary context.
- Presence of good practices harmonising biodiversity conservation and livelihoods.

A brief description of the sites is presented in Table 2.

Table 2: Sites for the implementation of climate change interventions.

Location	Critical ecosystem	Climate change impacts	Impacts on livelihoods
Young River Basin - Roi-et and Kalasin provinces in northeast Thailand.	Tropical paddy field	Increased droughts and flash flood frequency.	Reduced agricultural production. Damage to property.
Tram Chim National Park - Mekong Delta in southern Vietnam.	Wetland	Increased drought frequency. Sea level rise - salinity intrusion.	Loss of habitat for fisheries. Reduced agricultural production.
Nabanhe Nature Reserve ⁹⁵ - Xishuangbanna Prefecture in southern Yunnan Province, China.	Montane rainforest	Increased flood frequency.	Decreased yields of tropical crops including rice and fruit production.

Output 1.1: A suite of climate change adaptation interventions, including EbA, implemented at Young River Basin in Thailand.

Recently, the Young River Basin has experienced periods of extended drought in the upstream catchment, as well as severe floods during the monsoon months in the lower reaches. These climate impacts have negatively affected many of the ~10,000 people living in the proposed project areas, most of whom rely on rainfed rice farming to sustain their livelihoods. The proposed project will be implemented in the Sainawang (upper reaches of the basin) and Sriwilai (lower reaches of the basin) sub-districts. Villages in the Sainawang sub-district (Kalasin Province) face severe water shortages related to extended droughts and infrastructural inadequacies that reduce food security and income generation. In the Sriwilai sub-district (Roi-et Province), communities are exposed to annual flooding and drought events that result in the loss of human lives, reduce agricultural production and damage private property. In the cases of both Sainawang and Sriwilai sub-districts, communities will likely remain vulnerable to the impacts of climate change if adaptation measures are not implemented.

Through the proposed project, a suite of concrete adaptation interventions will be implemented

⁹⁵ Funded by Chinese Academy of Sciences, operated by Kunming Institute of Botany.

in the Young River Basin to increase the resilience of communities vulnerable to droughts and floods. While there will be a focus on EbA interventions, additional and alternative measures will be considered where appropriate.

Indicative activities to be implemented under Output 1.1. will include the following:

- 1.1.1. Facilitate community capacity building, awareness raising, stakeholder involvement, and local knowledge input through consultation processes prior to the implementation of adaptation interventions.
- 1.1.2. Produce implementation protocols and plans to provide detailed technical guidance on implementing a suite of concrete adaptation interventions at the Young River Basin.
- 1.1.3. Implement the adaptation protocols with full stakeholder participation.

The suite of concrete adaptation interventions to be implemented in the Young River Basin may include *inter alia*:

- living check dams to slow flood waters during the monsoon and store water during periods of drought;
- alterations to existing dykes, levees and canals to increase the availability of water during dry seasons and periods;
- river/canal bank stabilisation through multi-use tree planting and forest rehabilitation;
- multi-use home gardens to diversify food and income generation;
- river bed enhancement to remove excess sediment and reduce local flooding;
- water-spreading weirs to reduce the intensity of floods;
- sediment ponds to reduce upstream flow velocity and downstream sedimentation; and
- agroforestry.

Output 1.2: A suite of climate change adaptation interventions, including EbA, implemented in communities living around Tram Chim National Park in Vietnam.

The communities⁹⁶ living around Tram Chim National Park – a protected area of ecological importance in the Mekong Delta in Vietnam’s Đồng Tháp Province – are vulnerable to erratic drought and flood cycles that impact their agriculture- and natural resource-based livelihoods. The ecosystems within the national park are, likewise, vulnerable, experiencing anthropogenic changes in water flow dynamics which have altered ecological processes and threatened ecosystem function. Of the ~50,000 people living around the park, approximately 15,000 are under the national poverty line and rely heavily on temporary employment in agriculture and the use of natural resources. During drought and/or flooding events, agricultural production around Tram Chim is reduced, food security is threatened and farmers cannot afford to employ temporary workers. Consequently, the unemployed members of the community resort to the exploitation of natural resources within the national park to sustain their livelihoods. While six sustainable resource user groups were previously developed in communities surrounding Tram Chim, recent climate-induced hydrological changes in the park have resulted in officials banning the use of resources. Subsequently, poor people have resorted to the illegal and unsustainable use of the park’s natural resources⁹⁷ during periods of resource scarcity. In doing so, the already threatened ecosystems of the park have been negatively impacted, reducing their capacity to provide goods and services to the community’s most vulnerable people. This creates a feedback loop whereby those people most reliant on natural resources to sustain them through droughts and/or floods are negatively impacted by their own maladaptive activities.

⁹⁶ Divided into five communes and one town.

⁹⁷ especially fish, fuelwood and natural vegetables such as wild spinach, lotus and waterlilies.

A suite of concrete adaptation interventions will be implemented to increase the resilience of those people living around Tram Chim National Park that are most vulnerable to droughts and floods. Like in the Young River Basin, there will be a focus on EbA interventions, but additional and alternative measures will be considered where appropriate.

Indicative activities to be implemented under Output 1.2. will include the following:

- 1.2.1. Facilitate community capacity building, awareness raising, stakeholder involvement, and local knowledge input through consultation processes prior to the implementation of adaptation interventions.
- 1.2.2. Produce implementation protocols and plans to provide detailed technical guidance on implementing a suite of concrete adaptation interventions around Tram Chim National Park.
- 1.2.3. Implement the adaptation protocols with full stakeholder participation.

The suite of concrete adaptation interventions to be implemented around Tram Chim National Park may include *inter alia*:

- additional livelihood activities such as beekeeping, mushroom farming on water hyacinth and handicraft production using water hyacinth stems;
- multi-use home gardens to diversify food and income generation;
- river/canal bank stabilisation through multi-use tree planting and forest rehabilitation;
- floodplain and wetland development;
- water-spreading weirs (an extension of living check dams); and
- the development of water and resource management plans in and around Tram Chim National Park.

Output 1.3: A suite of climate change adaptation interventions, including EbA, implemented in communities surrounding Nabanhe Nature Reserve in China (with co-financing from the Kunming Institute of Botany – see Annex 2).

The communities⁹⁸ living inside the Nabanhe National Nature Reserve – an ecologically important protected area in the Lancang/Upper Mekong River Basin in the Yunnan Province of southwest China – are vulnerable to climate change-related events including floods, droughts, frost and cold temperatures. These climate change-related events negatively impact their livelihoods – such as rubber and tea production at low and high elevations respectively. Similarly, the ecosystems within the nature reserve are vulnerable, not only to climate-related events but also to the effects of agricultural intensification on local water resources. Such agricultural intensification, such as monoculture plantations (for example rubber) in the region, has resulted in: i) an altered hydrological regime – including the depletion of groundwater and degradation of watersheds; ii) increased habitat fragmentation; iii) declines in carbon stocks; and iv) reduced biodiversity. Additionally, in the last decade, frequent droughts have resulted in increases in the occurrence of powdery mildew disease of rubber trees and reduced local tea production. Consequently, the income generating potential of such agricultural practices is at risk. Apart from agriculture, the communities located in Nabanhe Nature Reserve also utilise NTFPs, such as wild mushrooms, to supplement their livelihoods. However, much of the harvesting of NTFPs that occurs is illegal and unsustainable as it takes place during resource scarce periods of the year. Such overexploitation, together with the effects of climate- and land-

⁹⁸ Made up of 33 indigenous villages and six administrative villages from three townships with a combined population of 5,917 from nine ethnic groups.

use change threaten the capacity of local ecosystems to provide goods and services. This in turn, further reduces the climate-resilience and adaptive capacity of local communities, particularly to the effects of floods and droughts.

A suite of concrete adaptation interventions will be implemented to increase the resilience of the communities in and around Nabanhe Nature Reserve that are vulnerable to floods, droughts and other climate change-related events. While there will be a focus on EbA interventions, additional and alternative measures will be considered where appropriate.

Indicative activities to be implemented under Output 1.3. will include the following:

- 1.3.1 The development of an inventory of traditional ecological knowledge, including an indigenous ecological calendar and locally appropriate, concrete adaptation interventions, with input from key local stakeholders.
- 1.3.2 Strengthen the capacity of key stakeholders, including reserve staff, village leaders and community members to implement EbA interventions.
- 1.3.3 Produce implementation protocols and plans to provide detailed technical guidance on implementing a suite of concrete adaptation interventions around the Nabanhe Nature Reserve.
- 1.3.4 Implement the adaptation protocols with full stakeholder participation.

The suite of concrete adaptation interventions to be implemented in and around Nabanhe Nature Reserve may include *inter alia*:

- additional livelihood activities such as the sustainable harvesting of wild mushrooms in the buffer zones, cultivation of high-value medicinal plants and mushrooms in home gardens;
- introduce the concepts of “Green Rubber” and agroforestry as more sustainable alternatives to monocultures;
- develop local indicators for monitoring climatic risks and climate change, including integrated pest/disaster management for tea and rubber, particularly with regards to the effects of droughts and floods; and
- the development of water resource and management plans in and around Nabanhe Nature Reserve.

Output 1.4: Monitoring programme established to collect information on the cost-effectiveness of project interventions in different socio-ecological contexts in the GMS.

Comprehensive monitoring programmes will be designed and executed at each demonstration site to collect information on the cost-effectiveness of concrete adaptation interventions implemented through the project. The Chinese Academy of Sciences (CAS) through the Kunming Institute of Botany will coordinate the Chinese monitoring programme. This will facilitate the exchange of knowledge from China – including the Chinese Ecosystem Research Network and various other institutes within the CAS – to other GMS countries.

The information collected through the monitoring programmes will be used to expand the regional knowledge base on climate change adaptation in the GMS. Specifically, the accumulated information will contribute the development of adaptation plans and policy briefs in outcome 2. Additionally, the programmes will serve as an example of how to integrate M&E plans into adaptation projects and generate transferable knowledge and lessons learned (Output 1.5.).

The execution of the project monitoring and knowledge development and sharing by the Chinese Academy Sciences supported by UNEP- International Ecosystem Management Partnership (UNEP-IEMP) build on the success of this project of the EbA South project⁹⁹ (funded by the Special Climate Change Fund).

Indicative activities to be implemented under Output 1.4. will include the following:

- 1.4.1. Design a monitoring and evaluation (M&E) plan for each demonstration site that is context-specific but also allows for comparison among sites.
- 1.4.2. Implement the M&E plans to monitor the results, and collect information on the cost-effectiveness, of concrete adaptation technologies in different socio-ecological contexts. This information will be used to inform a cost-effectiveness analysis under Output 2.1.

Output 1.5: Guidelines for the design and implementation of EbA monitoring and evaluation systems, including simplified methods for collecting comparable information in different socio-ecological contexts.

M&E activities form an essential part of project implementation strategies. Effective M&E systems can allow project practitioners to assess the progress of a project and identify potential barriers preventing the achievement of project objectives. In doing so, M&E can support adaptive management. Additionally, M&E can help generate best practices and lessons learned that may be applicable to other adaptation projects. The effectiveness of M&E systems for inter-project knowledge-sharing is, however, undermined if the systems are too complicated, too project-specific and/or are designed without a focus on generating broadly-relevant data and information.

The proposed project will involve the development of guidelines for the design and implementation of M&E systems for climate change adaptation (including EbA) projects across the GMS. The guidelines on cost-effective, comparable and simplified M&E systems will be developed using the lesson learned through implementing the M&E plans developed in Output 1.4. Additionally, M&E plans of other adaptation projects will be reviewed to identify design features that encourage the generation of knowledge applicable to different socio-ecological contexts across a transboundary and shared natural resource like the Mekong River.

Indicative activities to be implemented under Output 1.5. will include the following:

- 1.5.1. Collate and evaluate lessons learned from the implementation of M&E plans at each project demonstration site.
- 1.5.2. Review M&E plans from other adaptation projects to identify design features that encourage cost-effective, simplified and comparable M&E systems.
- 1.5.3. Develop guidelines for the design and implementation of M&E systems for climate change adaptation (including EbA) projects in the GMS.

Component 2: Regional knowledge base on climate change adaptation expanded in the GMS.

There are numerous policies, plans, strategies and frameworks that provide theoretical information on climate change adaptation in the GMS (see Section II:E). However, these documents provide limited information on effective concrete adaptation interventions – particularly EbA – and how they should be implemented to build climate resilience across the

⁹⁹ Enhancing Capacity, Knowledge and Technology Support to build Climate Resilience of Vulnerable Developing Countries

region. Where knowledge about on-the-ground implementation does exist, it is generally project-specific and shared mainly within the implementing country. This deficiency of adaptation information, as well as inadequate knowledge sharing among GMS countries, impedes regional cooperation on transboundary water and river basin management and limits adaptation to shared climate impacts.

This component of the proposed project will expand the regional knowledge base on concrete adaptation solutions in the GMS.

Outcome 2: Enhanced knowledge and awareness of adaptation measures, including EbA, to shared climate change impacts (droughts and floods) in different ecosystems to promote regional cooperation, planning and implementation of adaptation in the GMS.

Adaptation knowledge products will be prepared and transferred within and among GMS countries. They will focus on the implementation of concrete adaptation interventions that are effective in building resilience to climate impacts such as floods and droughts across various socio-ecological contexts. The knowledge products generated by the proposed project will be shared via existing knowledge platforms and forums across the GMS, as well as through knowledge-sharing events at the project demonstration sites.

Output 2.1: GMS-specific cost-effectiveness analysis of climate change adaptation interventions that reduce the impact of floods and droughts.

An analysis will be performed to determine the environmental and socioeconomic cost-effectiveness of climate change adaptation interventions – especially EbA – that reduce the impacts of floods and droughts in the GMS. The analysis will be conducted using several sources of information. Firstly, data and information generated through the monitoring programmes at the project demonstration sites will be used to provide examples of comparable on-the-ground adaptation interventions in different socioecological contexts across the GMS. Secondly, a comprehensive literature review of concrete adaptation interventions implemented through other projects in the GMS will be undertaken. Lastly, consultations and interviews with stakeholders involved in past and/or ongoing adaptation projects in the GMS will be conducted to gather first-hand knowledge on the cost-effectiveness of various adaptation measures. The cost-effectiveness analysis will be shared across the GMS to allow for strengthened regional cooperation on adapting to the shared impacts of floods and droughts (see below).

Indicative activities to be implemented under Output 2.1. will include the following:

- 2.1.1 Collate information on cost-effectiveness generated through M&E plans at project demonstration sites (Output 1.4.).
- 2.1.2. Undertake a comprehensive literature review on the cost-effectiveness of different climate change adaptation interventions in the GMS.
- 2.1.3. Conduct interviews and consultations with stakeholders involved in climate change adaptation projects in the GMS on the cost-effectiveness of different climate change adaptation interventions.
- 2.1.4. Develop a cost-effectiveness analysis of climate change adaptations interventions that reduce the impacts of floods and droughts. The results of the analysis will be used in the generation of a policy brief (Output 2.2).

Output 2.2: Policy briefs developed on: i) good practice in managing shared climate change impacts in the GMS; ii) integrating climate change adaptation into transboundary water management; and iii) cost-effectiveness of EbA for reducing vulnerability to climate change.

Countries in the GMS are at various stages of developing and revising national climate change adaptation plans and transboundary water and river basin management strategies. Additionally, regional bodies (Mekong River Commission and Lancang-Mekong Cooperation Mechanism) are in the process of developing cooperative adaptation plans across the GMS. To strengthen national and regional coordination during the development and revision of these plans and strategies, policy briefs will be developed to communicate the: i) shared climate issues in the GMS; ii) national and regional policy options to overcome these issues; and iii) recommended best policy options. The briefs will be generated using: i) knowledge and lessons learned from the demonstration sites of the proposed project; ii) collated information from other projects, programmes and strategies in the GMS; and iii) the results of the cost-effectiveness analysis (Output 2.1.). The policy briefs will be shared with relevant stakeholders across the GMS (Output 2.3.).

Indicative activities to be implemented under Output 2.2. will include the following:

- 2.2.1. Identify policy barriers to climate change adaptation, upscaling and mainstreaming in the GMS, with a focus on policies relating to transboundary water and river basin management.
- 2.2.2. Develop one policy brief on good practice in managing shared climate change impacts (drought and floods) in the GMS.
- 2.4.1. Develop one policy brief on integrating climate change adaptation into transboundary water management.
- 2.4.2. Develop one policy brief on the cost-effectiveness of EbA for reducing vulnerability to climate change in the GMS.

Output 2.3: Knowledge on EbA that has been generated and collated through the project shared on the main regional knowledge platforms and presented at regional adaptation forums.

The knowledge products generated above (Outputs 1.5., 2.1. and 2.2.) will be shared on several existing and relevant platforms, such as the ADB GMS CEP data portal¹⁰⁰ and the MRC data portal¹⁰¹. Additionally, the products will be shared on the Lancang-Mekong Information Sharing Platforms that are currently under development. Furthermore, generated and collated knowledge will be presented at three regional adaptation forums, such as the: i) CGIAR-WLE Greater Mekong Forum¹⁰²; ii) Sida regional workshop; and iii) Asia Pacific Adaptation Network. By using existing regional platforms and forums, the best practices and lessons generated through the proposed project would not only benefit project countries but would also be shared with the other three GMS countries. This GMS-wide knowledge sharing approach would help achieve coordination on climate change adaptation at a regional level.

Indicative activities to be implemented under Output 2.3. will include the following:

- 2.3.1. Share M&E guidelines (Output 1.5.), the cost-effectiveness analysis (Output 2.1.) and policy briefs (Output 2.2.) on three regional knowledge platforms.
- 2.3.2. Present M&E guidelines (Output 1.5.), the cost-effectiveness analysis (Output 2.1.) and policy briefs (Output 2.2.) at three regional forums.

Output 2.4: National level knowledge-sharing strategy implemented in Thailand and Vietnam.

¹⁰⁰ <http://portal.gms-eoc.org/>

¹⁰¹ <http://portal.mrcmekong.org/index>

¹⁰² <https://wle-mekong.cgiar.org/>

National-level knowledge-sharing strategies will be designed and executed in Thailand and Vietnam to share the best practices and lessons learned from project interventions between project beneficiaries and surrounding communities. This knowledge sharing will contribute to the autonomous upscaling and replication of project interventions beyond demonstration sites, thereby enhancing the climate resilience of non-beneficiary communities.

Indicative activities to be implemented under Output 2.4. will include the following:

- 2.4.1. Design knowledge-sharing strategies in Thailand and Vietnam that are locally appropriate and enhance the local transfer of applicable adaptation knowledge. Strategies may include: i) exchange visits; ii) awareness raising at temples and schools; iii) the establishment of climate change adaptation learning centres; and iv) awareness raising using media such as posters, radio and television.
- 2.4.2. Implement the knowledge-sharing strategies in communities surrounding the project demonstration sites in Thailand and Vietnam.

Component 3: Regional cooperation on climate change adaptation.

This component will focus on strengthening regional cooperation on climate change adaptation by sharing knowledge on the implementation of climate change adaptation interventions in response to climate change risks common to all the GMS countries. This will promote the harmonisation of regional and national plans through the inclusion of similar, best-practice climate change adaptation interventions.

Outcome 3: Strengthened regional cooperation on climate change adaptation, particularly in response to floods and droughts, in the GMS.

Regional cooperation on climate change adaptation in the GMS will be strengthened through several knowledge-sharing and relationship-building activities at national and regional levels. Activities under this component will encourage a coordinated approach to adapting to floods and droughts in the GMS, with a particular focus on scaling up EbA into transboundary water and river basin management in the region. To strengthen cooperation at the desired regional scale, activities under Outcome 3 will use existing national and regional institutions, committees and mechanisms as conduits for sharing the knowledge with, and building relationships between, relevant stakeholders across the GMS.

Output 3.1: Recommendations for regional cooperation on the implementation of climate change adaptation interventions – based on the results of the project – developed and presented at: i) Lancang-Mekong policy dialogues; ii) MRC regional stakeholder forum on MASAP; iii) Thailand NAP stakeholder forum; and iv) Vietnam National Climate Change Strategy stakeholder forum.

Recommendations for regional cooperation on the scaling up of climate change adaptation interventions with a focus on transboundary water and river basin management will be developed. These will be based on the experience gained from the proposed project, as well as lessons learned from other adaptation and transboundary resource management projects in the GMS¹⁰³ and elsewhere¹⁰⁴. The recommendations on regional cooperation will be shared with

¹⁰³ For example, ADB GMS CEP works on the management of terrestrial transboundary natural resource areas.

¹⁰⁴ For example, GIZ is implementing a transboundary water management project in southern Africa.

stakeholders at the primary national and regional climate change adaptation policy dialogues and forums across the GMS. The targeted stakeholders will include representatives from the countries involved directly in the proposed project, as well as from Cambodia, Lao PDR and Myanmar.

Indicative activities to be implemented under Output 3.1. will include the following:

- 3.1.1. Develop a set of recommendations on regional cooperation on implementing climate change adaptation interventions using information generated through: i) the proposed project; and ii) a review of past and ongoing projects on regional climate change adaptation and transboundary and river basin water management within and beyond the GMS.
- 3.1.2. Present the set of recommendations at primary national and regional climate change adaptation dialogues and forums, including: i) Lancang-Mekong policy dialogues; ii) the MRC regional stakeholder forum on MASAP; iii) the Thailand NAP stakeholder forum; and iv) the Vietnam National Climate Change Strategy stakeholder forum.

Output 3.2: A paper on climate change adaptation strategies, including EbA, produced for the Lancang-Mekong Cooperation Mechanism Environmental Outlook Report series.

The Lancang-Mekong Cooperation (LMC) mechanism is an emerging instrument working across all six countries of the GMS on topics that include transboundary water management and climate change adaptation. The LMC is, therefore, well positioned for fostering coordination on adapting to shared climate impacts relating to transboundary water resources across the countries of the GMS. Every four or five years, the LMC plans to produce an Environmental Outlook Report series to communicate the progress and results of LMC activities across the GMS. Through the proposed project, a paper on climate change adaptation strategies for the GMS – with a focus on EbA – will be developed for inclusion in the report series. The paper will make use of information generated through the project demonstration sites (Output 1.4.), as well as other knowledge products (Outputs 1.5., 2.1., 2.2. and 3.1.) that include information from other relevant projects.

Indicative activities to be implemented under Output 3.2. will include the following:

- 3.2.1. Collate all data and knowledge products generated through the proposed project.
- 3.2.2. In coordination with the LMC, design a framework to effectively communicate the best practices and lessons learned through the proposed project.
- 3.2.3. Develop an original paper on climate change adaptation in the GMS with special reference to: i) concrete adaptation strategies – including EbA – for shared climate impacts like droughts and floods; ii) integrating climate change adaptation into transboundary water and river basin management; and iii) regional coordination on adapting to climate change.

Output 3.3: Study tours, including participants from Thailand, Vietnam and China, to project intervention sites to exchange knowledge, encourage relationship-building and promote regional cooperation on climate change adaptation.

Intra- and inter-country study tours to project demonstration sites will be conducted by representatives from each project country. Participants may include representatives of: i) national government institutions; ii) country offices of regional institutions like the MRC and ADB; iii) national project teams; and iv) national research institutions. The study tours will allow for the exchange of ideas and knowledge between participants from different backgrounds and contexts. They will also highlight the importance of transboundary resources and shared climate

impacts in the GMS. In doing so, the study tours will encourage relationship-building between high-level stakeholders from different countries in the GMS and, therefore, contribute to regional cooperation on climate change adaptation.

Indicative activities to be implemented under Output 3.3. will include the following:

3.3.1. Organise and conduct multiple study tours to each demonstration site of the proposed project. Study tours should involve *inter alia*: i) site visits; ii) formal and informal community consultations; iii) knowledge-sharing events; and iv) presentations by local project teams.

3.3.2. Generate reports which will include information and feedback on each of the study tours.

B. Innovativeness

Describe how the project /programme would promote new and innovative solutions to climate change adaptation, such as new approaches, technologies and mechanisms.

The design of the proposed project incorporates innovative solutions which are centred around the concrete implementation of climate change adaptation interventions in the GMS. These interventions focus on drought and flood management and implications for transboundary river basin management, and the regional dissemination of the resulting knowledge and lessons learned. Implementation of adaptation interventions, most notably EbA, is limited within the sub-region and will be carried out in three vulnerable communities located in and around several different ecosystems in the upper (China), middle (Thailand) and lower (Vietnam) Mekong River. The inclusion of an intervention site in China is a highlight of the proposed project and will promote the exchange of innovative adaptation interventions (including EbA) from the CAS to other GMS countries. This will reduce the possibility of uncoordinated responses to climate change between upstream and downstream countries. Currently, adaptation- and policy-related interactions in the GMS have focused on either its upper or lower reaches. Furthermore, the majority of climate changes initiatives in the sub-region have been implemented in Lower Mekong countries (Cambodia, Lao PDR, Thailand and Vietnam). The proposed project, however, will be implemented in lower, middle and upper Mekong countries, which will provide an integrated basin-wide platform for dialogue, learning and knowledge sharing. Additionally, the project will be among the first collaborative initiatives that connect Chinese institutions with regional and international partners in the GMS through the parallel implementation of adaptation interventions, knowledge exchange and policy development. As a result, South-South cooperation, a relatively new concept involving EbA, will be promoted in the sub-region.

Under Outcome 1 of the proposed project, the implementation of the above-mentioned climate change adaptation interventions will be carried out with a particular focus on drought and flood management, a common challenge across the GMS. Instead of using a one-size-fits-all approach to the management of these climate change-related threats, the project's interventions will be context specific (with regards to community and ecosystems). Furthermore, adaptation measures will be based on local knowledge and technologies available at each of the demonstration sites. These adaptation measures can then be used to advise drought and flood management in communities from similar socio-ecological contexts throughout the GMS.

During the proposed project's implementation period, an innovative monitoring programme (including a M&E plan) will be established under Output 1.4. This monitoring programme will collect information on the cost-effectiveness and monitor the results of the project's interventions across various socio-economic contexts. The information collected by the programme will then be used to develop guidelines which can advise the integration of M&E plans into future adaptation projects in the sub-region, as well as generate transferable

knowledge and lessons learned (Output 1.5).

Output 2.3 includes the sharing of EbA knowledge – a relatively new concept in the region – and lessons learned generated during the project (Outputs 1.5., 2.1. and 2.2.) on regional knowledge platforms and adaptation forums. By sharing such knowledge on regional platforms and forums, the proposed project would benefit not only the selected countries but also those that were not directly involved with the project. This would, in turn, promote coordination and cooperation on climate change adaptation and transboundary water and river basin management across the GMS.

Under Output 2.4 of the proposed AF project, novel national-level knowledge-sharing strategies will be developed and implemented in Thailand and Vietnam. These strategies (including inter alia exchange visits and awareness raising via media) will ensure the transfer of best practices and lessons learned from project adaptation measures between beneficiary and neighbouring communities. Consequently, the autonomous upscaling and replication of measures beyond demonstration sites will be promoted, which will strengthen the climate-resilience and adaptive capacity of non-target communities.

Approaches to strengthening transboundary cooperation are outlined by Outputs 3.1 and 3.3. Under Output 3.1, recommendations for the regional implementation of adaptation measures – particularly EbA – focusing on transboundary water and river basin management will be developed based knowledge from the proposed as well as from past projects in the GMS. Recommendations will then be shared with stakeholders from across the GMS at national and regional adaptation dialogues and forums – such as the Thailand NAP stakeholder forum and Lancang-Mekong policy dialogues. Utilising emerging national and regional climate change adaptation planning mechanisms to mainstream EbA represents an innovative aspect of the proposed project.

The regional exchange of knowledge generated by the proposed project will also be carried out under Output 3.3. This Output includes intra- and inter-country study tours by stakeholders from the three beneficiary countries to project demonstration sites. The study tours will promote the exchange of innovative ideas, knowledge and skills between participants from different socio-ecological contexts.

C. Economic, social and environmental benefits

Describe how the project / programme would provide 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 would avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund.

Through on-the-ground climate change interventions in China, Thailand and Vietnam, the proposed project will directly benefit ~65,500 people from vulnerable communities in the GMS. Direct beneficiaries include ~5,500 people in China, ~10,000 in Thailand and ~50,000 in Vietnam. Indirect beneficiaries of the project include communities surrounding the implementation sites that will benefit from awareness-raising and knowledge-sharing, as well as communities upstream and downstream of intervention sites that will benefit from an improved supply of ecosystem goods and systems. The specific economic, social and environmental benefits expected from the project are presented below.

Economic Benefits:

Climate change threatens the natural resource-based livelihoods of ~75 million people in the GMS, which are vital for economic stability in the region. Increasing temperatures, erratic rainfall and increasing frequency of extreme weather events are expected to negatively impact agricultural yields, reduce the availability of fresh water, and threaten biodiversity and ecosystem services. Rural communities – making up nearly 67% of the GMS population – are particularly vulnerable because of their dependence on rain-fed agriculture and other climate-sensitive natural resources such as fishing and non-timber forest products. By implementing climate change adaptation interventions within vulnerable communities and ecosystems at demonstration sites, both the livelihoods of these vulnerable groups and the viability of the ecosystems they depend upon will be conserved and strengthened. Healthy ecosystems generate economic benefits by providing ecosystem goods and services to communities. For example, functioning ecosystems provide pollinators for food crops in agroforestry in Xishuangbanna and flood mitigation for communities around the wetland in the Mekong Delta. Furthermore, EbA has previously helped communities in northeast Thailand adapt to climate change by improving agro-ecosystem health, thereby improving food security in the region. This is especially important for the proposed project's targeted communities in the three demonstration sites, whose livelihoods are highly dependent on natural resources. EbA interventions have been shown to deliver favourable cost-benefit ratios compared with other adaptation approaches. A recent study by UN Environment¹⁰⁵ found that EbA interventions are not only less costly than other adaptation options, but also provide additional ecosystem benefits. The economic benefits of EbA are particularly important given the high poverty rate in the target communities. For example, the average poverty rate of the villagers at the Vietnam demonstration site is 17.2%, while 39-47% of income for landless households in these communities comes from fishing, aquaculture and other natural resources from the Tram Chim National Park.

Apart from improving the provision of ecosystem services, the project will build the technical capacity of local communities to plan climate change adaptation interventions and to exchange knowledge at a regional scale, promoting the adoption of climate-resilient livelihoods across vulnerable communities. Improved climate planning using EbA approaches ensures that investments in climate change adaptation that are urgently needed to safeguard the livelihoods of rural communities and the economic development of the GMS are economically and environmentally appropriate.

Further economic benefits in the short-term will be achieved through disaster risk reduction, by reducing damage to agricultural land and infrastructure by floods through the implementation of adaptation interventions. Furthermore, project activities will allow the various economic sectors to undertake medium- and long-term planning to reduce the negative impacts of climate change on land and water resources in the GMS.

Social benefits

Outcome 1 of the proposed project will build the climate resilience of vulnerable communities in the GMS to the effects of droughts and floods. Activities under Outcome 1 will build the capacity of communities to plan and implement climate change adaptation interventions. The participatory approach to technical assessment – involving local stakeholder consultations and capacity building activities especially targeted at local administrative officials – will increase the technical

¹⁰⁵ UNEP/SPREP 2012. A comparative analysis of ecosystem-based adaptation and engineering options for Lami Town, Fiji: Synthesis Report.

capacity of local stakeholders, providing valuable human resources for future climate change adaptation activities beyond the lifespan of the project. Such activities will include a focus on gender sensitivity and social inclusiveness in EbA. Adaptation interventions and planning will incorporate gender-specific indigenous knowledge on local ecosystem services such as the use of NTFPs at the demonstration sites. Furthermore, women and vulnerable groups will be prioritised as key beneficiaries in demonstration activities to ensure that benefits accruing from on-the-ground activities are directly accessible. Specific training activities provided to local communities will target both women and vulnerable groups to improve living conditions, promote skills development and diversify livelihood opportunities. The incorporation of traditional knowledge shared by women, elderly and indigenous groups will directly benefit the project by identifying and prioritising EbA measures while increasing the value of those groups in society and contributing to social unity. Local accomplishments in terms of social inclusivity at the demonstration sites will be used as a model for further regional and national strategies.

Activities under Outcome 2 of the proposed project will provide opportunities for stakeholders to exchange knowledge on adaptation interventions based on successful practices and evidence generated from interventions at the demonstration sites, facilitating the expansion of projects and generating benefits at a larger scale. Additionally, a regional approach to transboundary water management will improve relationships between neighbouring countries as well as communities, and promote the sharing of resources and knowledge across the GMS.

Environmental benefits

In addition to building the climate resilience of vulnerable communities and ecosystems, EbA interventions implemented under Outcome 1 will provide multiple environmental benefits, including *inter alia*: i) carbon sequestration; ii) biodiversity conservation; iii) flood and drought mitigation; iv) improved agricultural production; v) increased water availability and quality; vi) increase soil nutrient contents; and vii) reduced environmental degradation. Furthermore, adaptation activities at the demonstration sites will provide opportunities to test and evaluate adaptation approaches to demonstrate knowledge of best practices. This will facilitate the upscaling of project interventions and increase the environmental benefits on a broader scale.

By providing recommendations on climate change adaptation to regional and institutions under Outcome 3, the proposed project will help guide policy dialogues and improve the regional planning and management of transboundary water catchments. This will result in regional environmental benefits including *inter alia* increased water quality and availability.

D. Cost-effectiveness

Describe or provide an analysis of the cost-effectiveness of the proposed project / programme and explain how the regional approach would support cost-effectiveness.

There has been a limited focus on determining the cost-effectiveness of climate change adaptation interventions, including EbA, across the GMS as a whole. As a result, there is limited baseline information that can be used for comparative analyses of adaptation approaches which are sustainable and replicable across the entire GMS. Consequently, key outputs of the proposed AF project (1.4 and 2.1) will focus on the establishment of a monitoring programme to collect information on the cost-effectiveness of adaptation interventions in different socio-economic contexts in the GMS. The information collected will be compared with that of other potential adaptation approaches with the objective of identifying the most cost-effective interventions to improve the climate-resilience of communities and ecosystems in the GMS.

The proposed project's activities under Component 1 will promote the concrete implementation of climate change adaptation interventions, with a particular focus on drought and flood management, which are common throughout the GMS. Such interventions, including EbA, will be based on local knowledge and can be implemented by communities using locally available materials. Furthermore, the interventions can be upscaled and replicated by communities facing common climate change threats (including floods and droughts) throughout the GMS, through knowledge sharing. A growing amount of scientific literature suggests that EbA measures are cost-effective compared to the implementation of hard infrastructure. For example, an economic analysis on the use of EbA interventions and hard infrastructure in the Tha Di basin in Thailand found that the cost of living check dams (one of the possible EbA interventions mentioned in Outcome 1) was ~2.5% of the total cost of constructing a concrete weir (THB50,000 and 2,000,000 respectively). Although the lifespan of the living check dam is ~10 years – compared to several decades for a concrete weir – the EbA intervention is clearly the most cost-effective option in the long-term. Additionally, living check dams are accepted socially and can be built in less than two weeks by community members, while concrete weirs have a low social acceptance and require the expertise of engineers for construction. A further example of the cost-effectiveness of the EbA approach also emerged from an economic analysis undertaken in Lami, Fiji. This analysis included assessments of the costs and benefits of three approaches to watershed management, namely: i) EbA measures only; ii) hard infrastructure interventions only; and iii) a hybrid approach applying both EbA measures and hard infrastructure interventions. The analysis demonstrated that EbA watershed management options are at least twice as cost-effective as hard infrastructure engineering options, i.e. a benefit:cost ratio of US\$19.50:1 for EbA compared to US\$9:1 for hard infrastructure.

Under Component 2, the expansion and sharing of the regional knowledge base on climate change adaptation in the GMS will occur through existing platforms (including the ADB GMS CEP data portal and the MRC data portal) and on the Lancang-Mekong Information Sharing Platforms that are currently being developed. Furthermore, the knowledge generated and lessons learnt during the project will be shared at three regional adaptation forums, such as the: i) CGIAR-WLE Greater Mekong Forum; ii) Sida regional workshop; and iii) Asian Pacific Adaptation Network. Knowledge expansion and sharing via pre-existing regional platforms and forums will alleviate the need of the proposed project to invest in alternatives. Nationally, best practices and lessons learnt from project interventions will be shared between project beneficiaries and surrounding communities under knowledge-sharing strategies in Thailand and Vietnam. This knowledge sharing will contribute to the autonomous upscaling and replication of project interventions beyond demonstration sites, thereby enhancing the climate resilience of non-beneficiary communities, further demonstrating the cost-effectiveness of the proposed project.

E. Consistency with regional/national strategies

Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist. If applicable, please refer to relevant regional plans and strategies where they exist.

Regional level

Relevant policy and strategic documents of the three main regional bodies related to Mekong

transboundary management have been reviewed. These three bodies are: i) Lancang-Mekong Cooperation Mechanism¹⁰⁶; ii) Mekong River Commission¹⁰⁷; and iii) Greater Mekong Subregion Economic Cooperation Program¹⁰⁸. The relevance and consistency of the proposed project with these regional strategies is presented below:

Table 3: Consistency with regional policies, plans and strategies on climate change

REGIONAL
Sanya Declaration of the 1st Lancang-Mekong Cooperation Leaders' Meeting (2016)¹⁰⁹
<p>The First Lancang-Mekong Cooperation (LMC) leaders' meeting was held in March 2016 in Sanya City, Hainan Province of China, to discuss future cooperation under the theme "shared river, shared future" and to exchange views on promoting the LMC mechanism, strengthening all-round cooperation at the sub-regional level and advancing regional integration.</p> <p>The proposed project components are aligned with the following measures agreed at the meeting:</p> <p>1. Promote high-level exchanges, dialogue and cooperation to enhance trust and understanding in the sub-region with a view to strengthening sustainable security.</p> <p>4. Enhance cooperation against uncommon security threats, including terrorism, transnational crimes, and natural disasters; promote cooperation in addressing climate change impacts, humanitarian assistance, ensuring food, water and energy security.</p> <p>10. Enhance cooperation among LMC countries in sustainable water resources management and utilization through activities such as the establishment of a center in China for Lancang-Mekong water resources cooperation to serve as a platform for LMC countries to strengthen comprehensive cooperation in technical exchanges, capacity building, drought and flood management, data and information sharing, conducting joint research and analysis related to Lancang-Mekong river resources.</p> <p>26. Encourage closer exchanges among government agencies, local provinces and districts, business associations and non-governmental organisations of our six countries to discuss and carry out relevant cooperation.</p>
The Lancang-Mekong Environmental Cooperation Strategic Framework (2019-2023) (draft)
<p>The framework is currently under preparation. Its main objectives are to define priority areas of Lancang-Mekong Environmental Cooperation, ensure necessary financial support and clarify key node and timeline arrangement. Under the support and joint efforts of related agencies, the framework will guide and serve the Lancang-Mekong Environmental Cooperation through an Action Plan which includes concrete projects. Aiming to be finalised by end of 2017, the latest draft framework (June 2017) has been reviewed to define the relevance to this proposed project.</p>

¹⁰⁶ The Lancang-Mekong Cooperation (LMC) mechanism, initiated by China and officially launched in March 2016, is an emerging sub-regional cooperation that spans the entire Mekong and Lancang basin. The LMC mechanism has three pillars -- political and security issues; economic affairs and sustainable development; and social affairs and people-to-people exchanges. The Lancang-Mekong Environmental Cooperation under the LMC will promote cooperation of the Lancang-Mekong member countries' environmental protection, provide the platform on environmental laws and policy dialogues, and enhance the environmental management capacity, among others. Taking advantage of the cooperation, China is to further explore and practice South-South Environmental Cooperation with other countries to promote sustainable development of the Lancang-Mekong region.

¹⁰⁷ The MRC is an intergovernmental organisation for regional dialogue and cooperation in the Lower Mekong River Basin, established in 1995 based on the Mekong Agreement among Cambodia, Lao PDR, Thailand and Vietnam. The organisation serves as a regional platform for water diplomacy as well as a knowledge hub of water resources management for the sustainable development of the region. China and Myanmar are Dialogue Partners to the MRC.

¹⁰⁸ The Greater Mekong Subregion (GMS) is a program of subregional economic cooperation under the assistance from the Asian Development Bank (ADB) to enhance the six countries' economic relations, covering nine priority sectors: agriculture, energy, environment, human resource development, investment, telecommunications, tourism, transport infrastructure, and transport and trade facilitation. The GMS Core Environment Program is established in response to growing concern about the environmental impacts of rapid economic development with an aim to achieve an environmentally friendly and climate resilient GMS Program.

¹⁰⁹ Ref: http://www.fmprc.gov.cn/mfa_eng/zxxx_662805/t1350039.shtml

The proposed project components are aligned with the following (tentative) priority areas:

1. Mainstreaming Environmental Policies.
2. Environmental Capacity Building.
3. Ecosystem Management and Biodiversity Conservation.
4. Climate Change Adaptation and Mitigation.
8. Management of Environmental Data and Information.

Mekong River Commission Basin Development Strategy 2016-2020

The Strategy reflects the dynamic challenges encountered in the Lower Mekong Basin and takes a long-term view to deal with water security challenges, including flood, drought, climate change, hydropower, irrigation, fisheries, and industrial development. Specifically, it will address a number of basin-wide priorities, including among others, increasing cooperation with partners and stakeholders; reducing remaining knowledge gaps to minimise risks; optimising basin-wide sustainable development and cost and benefit sharing; strengthening the protection of mutually agreed environmental assets; strengthening basin-wide procedures and national implementation capacity, etc.¹¹⁰

The proposed project components are aligned with:

- Priority 1: reduce remaining knowledge gaps to minimise risks.
- Priority 2: optimise basin-wide sustainable development and cost and benefit sharing.
- Priority 4: strengthen basin-wide procedures and national implementation capacity.
- Priority 6: enhance information management, communication and tools.
- Priority 7: increase cooperation with partners and stakeholders.

Mekong River Commission Strategic Plan 2016-2020

The Strategic Plan sets out how for the period 2016-2020 the MRC will deliver the role established by the 1995 Mekong Agreement, i.e. to promote and coordinate sustainable development and management of the Mekong's water and related natural resources.¹¹¹

The proposed project components are aligned with:

- Outcome 1: increased common understanding and application of evidence-based knowledge by policy makers and project planners.
- Outcome 5: effective dialogue and cooperation between member countries and strategic engagement of regional partners and stakeholders on transboundary water management.
- Outcome 6: basin-wide monitoring, forecasting, impact assessment and dissemination of results strengthened for better decision-making by member countries.

Mekong Adaptation Strategy and Action Plan (draft)

Mekong Adaptation Strategy and Action Plan (MASAP) has been formulated as a regional adaptation strategy. It is setting a vision for the Lower Mekong Basin, aiming at strengthening the basin-wide resilience and ensuring sustainable development of the basin in line with the 1995 Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin. The MASAP sets out the strategic priorities and actions at basin level to address climate change risks on the basin and strengthen basin-wide resilience. Aiming to be finalised by end of 2017, the latest draft (June 2017) has been reviewed to define the relevance to this proposed project.

The proposed project components are aligned with all the seven strategic priorities for basin-wide adaptation to climate change:

1. Mainstream climate change into regional and national policies, programmes and plans;
2. Enhance regional and international cooperation and partnership on adaptation;
3. Enable implementation of transboundary and gender-sensitive adaptation options;
4. Support access to adaptation finance;
5. Enhance monitoring, data collection and sharing;

¹¹⁰ Ref: <http://www.mrcmekong.org/assets/Publications/strategies-workprog/MRC-BDP-strategy-complete-final-02.16.pdf>

¹¹¹ Ref: <http://www.mrcmekong.org/highlights/strategic-plan-2016-2020/>

6. Strengthen capacity on development of climate change adaptation strategies and plans; and
7. Improve outreach of MRC products on climate change and adaptation.

**The Greater Mekong Subregion Economic Cooperation Program
Strategic Framework 2012–2022¹¹²**

The 10-year strategic framework builds on the substantial progress the program has made, the likely future global and regional trends, the commitment that member countries have made in their national development plans to the promotion of regional integration, and the greater GMS integration within ASEAN and the Asia region. The vision and goals to guide the program include: (1) GMS countries envision a Mekong subregion that is more integrated, prosperous, and equitable. (2) The GMS Program will contribute to realising the potential of the subregion through (i) an enabling policy environment and effective infrastructure linkages that will facilitate cross-border trade, investment, tourism, and other forms of economic cooperation; and (ii) the development of human resources and skills competencies. (3) To ensure that this development process is equitable and sustainable, environmental and social interests will be fully respected in the formulation and implementation of the GMS Program.

The proposed project components are aligned with the sector/multi-sector priorities:

- Agriculture: Pillar 2: Promoting climate-friendly agriculture and natural resource management.
- Climate change adaptation and mitigation: GMS countries are also concerned about the potential negative impacts of climate change on food and energy security. Increasing weather variability is also likely to increase the vulnerability of ecosystem services and amplify impacts on dependent poor communities.

**The Greater Mekong Sub-region Economic Cooperation Program
Joint Ministerial Statement, 4th Environment Ministers' Meeting (2015)¹¹³**

This formal gathering of ministers, organised in Nay Pyi Taw, Myanmar, in January 2015, aimed to build a shared understanding among government and non-government environment leaders on key natural capital issues and solutions. It provided a platform for Ministers to give directions and discuss approaches for addressing environmental challenges faced by the GMS. The Joint Ministerial Statement provides political support and direction for increasing investments in natural capital.

The proposed project components are aligned with the following paragraphs from the joint ministerial statement:

- Stating that the region and its people are highly vulnerable to climate change and increased risk of natural disasters. Concerted efforts are needed, including through regional cooperation, to mitigate these impacts and to promote sustainable development.
- Encouraging to effectively implement the Core Environment Program Phase II with a focus on the following two priorities:
 - safeguarding the sub-region's natural capital/resources and associated ecosystem services; and
 - working more efficiently and effectively with other GMS working groups, development partners and stakeholders to operationalize the Regional Investment Framework Implementation Plan.

Country level

¹¹² Ref: <https://www.greatermekong.org/sites/default/files/gms-ec-framework-2012-2022.pdf>

¹¹³ Ref: <http://www.gms-eoc.org/uploads/resources/559/attachment/7.Joint%20Ministerial%20Statement%20FINAL.pdf>

The proposed project is well-aligned with national strategies. The relevance and consistency of the proposed project with national strategies is presented below:

Table 4: Consistency with national policies, plans and strategies on climate change.

NATIONAL	
Cambodia	
Component 1 of the project is aligned with:	<p>Cambodia Climate Change Strategic Plan 2014-2023</p> <ul style="list-style-type: none"> • Strategic objective 5. Improve capacities, knowledge and awareness of climate change responses. <p>Climate Change Action Plan 2016-2018</p> <ul style="list-style-type: none"> • Action 12: Launch and roll out of the national and sectoral M&E system. <p>National Strategic Development Plan 2014-2018</p> <p>The following are identified as needed:</p> <ul style="list-style-type: none"> • data and data management mechanisms for analysing and supporting responses to climate change. • a knowledge management system for collection, analysis, and dissemination of data/knowledge, including knowledge of local communities on climate change.
Component 2 of the project is aligned with:	<p>Cambodia Climate Change Strategic Plan 2014-2023</p> <ul style="list-style-type: none"> • Strategic objective 1. Promote climate resilience through improving food, water and energy security. • Strategic objective 2. Reduce sectoral, regional, gender vulnerability and health risks to climate change impacts. • Strategic objective 3. Ensure climate resilience of critical ecosystems (Tonle Sap Lake, Mekong River, coastal ecosystems, highlands, etc.), biodiversity, protected areas and cultural heritage sites. • Strategic objective 5. Improve capacities, knowledge and awareness of climate change responses. • Strategic objective 7. Strengthen institutions and coordination frameworks for national climate change responses. <p>Climate Change Action Plan 2016-2018</p> <ul style="list-style-type: none"> • Action 8: Establishment of a knowledge management system on climate change and green growth. • Action 9: Integrate climate change and environmental issues into the curriculum at all levels. • Action 10: Engage and raise awareness on climate change and green growth/sustainable consumption and production. • Action 11: Promote and improve the adaptive capacity of communities to respond to climate change. • Action 12: Launch and roll out of the national and sectoral M&E system. • Action 13: Capacity building of national institutions coordinating climate change response. • Action 14: Support to line ministries to climate mainstreaming into development planning and budgeting. <p>Cambodia's First Nationally Determined Contribution (2015)</p> <p>Cambodia's priority adaptation actions include:</p> <ul style="list-style-type: none"> • Promoting and improving the adaptive capacity of communities, especially through community-based adaptation actions, and restoring the natural ecology system to respond to climate change. • Implementing management measures for protected areas to adapt to climate change. • Developing and rehabilitating the flood protection dykes for agricultural and urban development. • Increasing the use of mobile pumping stations and permanent stations in responding to mini-droughts, and promoting groundwater research in response to drought and climate risk.

	<ul style="list-style-type: none"> • Developing climate-proof agriculture systems for adapting to changes in water variability to enhance crop yields. • Developing crop varieties suitable to Agro-Ecological Zones (AEZ) and resilient to climate change. • Strengthening technical and institutional capacity to conduct climate change impact assessments, climate change projections, and mainstreaming of climate change into sector and sub-sector development plans. <p>Second National Communication (SNC, 2015)</p> <ul style="list-style-type: none"> • South-South cooperation, in addition to North-South cooperation, should be given due attention to ensure transfer of appropriate and least-cost technologies. The transfer of adaptation technologies to Cambodia is even more important than the transfer of mitigation technologies, given Cambodia’s high vulnerability to the impacts of climate change. <p>National Adaptation Programme of Action to Climate Change (NAPA, 2006)</p> <ul style="list-style-type: none"> • 17 (out of totally 24) provinces surveyed on climatic hazards have suffered from both floods and droughts. Villagers have identified floods and droughts as the most severe climate hazards in all the 17 provinces surveyed. Water shortages are a common occurrence all year-round. • Current national policies and programmes do not integrate global policies on climate change, focusing mainly on post-disaster emergency relief. • Programmes for improving community capacity and enhancing community-based initiatives to cope with climate hazards and adapt to climate variability receives little attention. Furthermore, these programmes have limited geographical coverage of areas identified as vulnerable to climate hazards. <p>National Strategic Development Plan 2014-2018</p> <p>The following are identified as needed:</p> <ul style="list-style-type: none"> • data and data management mechanisms for analysing and supporting responses to climate change. • a knowledge management system for collection, analysis, and dissemination of data/knowledge, including knowledge of local communities on climate change. • measures to control environment and ecosystems. • farmers’ capacities in adapting to climate change in agriculture. • mitigation of impacts of climate change through the development of agro-industries. • technological and scientific capacity strengthening to assess vulnerabilities and hazard-prone areas in relation to climate change. • technical and institutional capacity strengthening to promote the mainstreaming of climate change responses into the policies, laws and plans at national and sub-national level. • capacity strengthening of national and sub-national officials, particularly at the community levels, on disaster risk reduction, climate change adaptation, and hazard resilience. • coordination and enhancement of capacity and public awareness on climate change at national and local levels. • intensifying efforts to reduce the impact of climate change by strengthening the adaptation capacity and resiliency to climate change.
<p>Component 3 of the project is aligned with:</p>	<p>Cambodia Climate Change Strategic Plan 2014-2023</p> <ul style="list-style-type: none"> • Strategic objective 1. Promote climate resilience through improving food, water and energy security. • Strategic objective 2. Reduce sectoral, regional, gender vulnerability and health risks to climate change impacts. • Strategic objective 3. Ensure climate resilience of critical ecosystems (Tonle Sap Lake, Mekong River, coastal ecosystems, highlands, etc.), biodiversity, protected areas and cultural heritage sites.

- Strategic objective 5. Improve capacities, knowledge and awareness of climate change responses.
- Strategic objective 7. Strengthen institutions and coordination frameworks for national climate change responses.
- Strategic objective 8. Strengthen collaboration and active participation in regional and global climate change processes.

Climate Change Action Plan 2016-2018

- Action 8: Establishment of a knowledge management system on climate change and green growth.
- Action 9: Integrate climate change and environmental issues into the curriculum at all levels.
- Action 10: Engage and raise awareness on climate change and green growth/sustainable consumption and production.
- Action 11: Promote and improve the adaptive capacity of communities to respond to climate change.
- Action 12: Launch and roll out of the national and sectoral M&E system.
- Action 13: Capacity building of national institutions coordinating climate change response.
- Action 14: Support to line ministries to climate mainstreaming into development planning and budgeting.

Cambodia's First Nationally Determined Contribution (2015)

Cambodia's priority adaptation actions include:

- Strengthening technical and institutional capacity to conduct climate change impact assessments, climate change projections, and mainstreaming of climate change into sector and sub-sector development plans.

Second National Communication (SNC, 2015)

- South-South cooperation, in addition to North-South cooperation, should be given due attention to ensure transfer of appropriate and least-cost technologies. The transfer of adaptation technologies to Cambodia is even more important than the transfer of mitigation technologies, given Cambodia's high vulnerability to the impacts of climate change.
- The general integration of climate change risks into policy, plans and strategies at the national and sub-national levels needs strengthening.

National Adaptation Programme of Action to Climate Change (NAPA, 2006)

- 17 (out of totally 24) provinces surveyed on climatic hazards have suffered from both floods and droughts. Villagers have identified floods and droughts as the most severe climate hazards in all the 17 provinces surveyed. Water shortages are a common occurrence all year-round.
- Current national policies and programmes do not integrate global policies on climate change, focusing mainly on post-disaster emergency relief. Programmes for improving community capacity and enhancing community-based initiatives to cope with climate hazards and adapt to climate variability receives little attention. Furthermore, these programmes have limited geographical coverage of areas identified as vulnerable to climate hazards.

National Strategic Development Plan 2014-2018

The following are identified as needed:

- data and data management mechanisms for analysing and supporting responses to climate change.
- a knowledge management system for collection, analysis, and dissemination of data/knowledge, including knowledge of local communities on climate change.
- measures to control environment and ecosystems.
- farmers' capacities in adapting to climate change in agriculture.
- mitigation of impacts of climate change through the development of agro-industries.
- technological and scientific capacity strengthening to assess vulnerabilities and

	<p>hazard-prone areas in relation to climate change.</p> <ul style="list-style-type: none"> • technical and institutional capacity strengthening to promote the mainstreaming of climate change responses into the policies, laws and plans at national and sub-national level. • capacity strengthening of national and sub-national officials, particularly at the community levels, on disaster risk reduction, climate change adaptation, and hazard resilience. • coordination and enhancement of capacity and public awareness on climate change at national and local levels. • intensifying efforts to reduce the impact of climate change by strengthening the adaptation capacity and resiliency to climate change. • increasing the involvement in international cooperation in the water sector to ensure the sustainability and effectiveness of water resources use as well as to address negative impacts arising from floods, droughts and climate change. • Increasing the awareness and encouraging the implementation of river basin development and management plan with the cooperation of concerned ministries, stakeholders and beneficiaries, especially women.
China	
Component 1 of the project is aligned with:	<p>National Strategy for Climate Change Adaptation (2013-2020)</p> <ul style="list-style-type: none"> • To strengthen the effective protection of existing forest resources and other natural ecosystems. • To enhance water resource management. <p>Second National Communication (SNC, 2012)</p> <ul style="list-style-type: none"> • China will take effective policies and measures to enhance climate change adaptation capability by enhancing scientific research on climate change, observations and impact assessments. <p>China's 13th Socio-Economic Development Plan (2016-2020)</p> <ul style="list-style-type: none"> • To strengthen the systematic monitoring of climate change and the related scientific research. •
Component 2 and 3 of the project is aligned with:	<p>National Strategy for Climate Change Adaptation (2013-2020)</p> <ul style="list-style-type: none"> • To share climate change adaptation experience with other developing countries by capacity building and joint-research. • To conduct South-South Cooperation in terms of water resource management. <p>Enhanced Actions on Climate Change: China's First Nationally Determined Contributions (NDC, 2015)</p> <ul style="list-style-type: none"> • To share good experience and best practices on climate change. • To conduct climate change international dialogue and communication. • To strengthen relevant policy coordination, and to conduct concrete cooperation. <p>China's 13th Socio-Economic Development Plan (2016-2020)</p> <ul style="list-style-type: none"> • To enhance transboundary river governance and to promote cooperation with the involved neighbouring countries. • To strengthen bilateral or multilateral dialogue and concrete cooperation on climate change.
Lao PDR	
Component 2 and 3 of the project is aligned with:	<p>Lao PDR's First Nationally Determined Contribution (2015)</p> <ul style="list-style-type: none"> • Enhance cooperation, strong alliances and partnerships with national stakeholders and international partners to achieve national development goals. • Improve public awareness and understanding of various stakeholders about climate change, vulnerabilities and impacts in order to increase stakeholder willingness to take actions. • Promotion of climate change capacity in the water resource sector. • Manage watersheds and wetlands for climate change resilience. <p>Second National Communication (SNC, 2013)</p>

	<ul style="list-style-type: none"> • The need of strengthening regional cooperation (such as Mekong sub-region) to enhance more practical, applicable and cost-effective technological transfers and knowledge exchange. • The need of more effective mainstreaming of the strategy with the sustainable social and economic development process of the country. • The need of developing technical capacities of relevant national personnel with regard to vulnerability and adaptation. <p>National Adaptation Programme of Action (NAPA, 2009)</p> <ul style="list-style-type: none"> • Priority 1: Strengthen the capacity of the national disaster management committees. • Priority 5: Awareness raising on water and water resource management. • Priority 8: Strengthen institutional and human resource capacities related to water and water resource management. <p>National Socio-Economic Development Plan (NSED, 2016-2020)</p> <ul style="list-style-type: none"> • Create coordination mechanism between the government, private sector, international organisations and development partners to jointly contribute to meeting all the NSED's targets. • Outcome 3, Output 1: environmental protection and sustainable natural resources management. • Outcome 3, Output 2: prepare to cope with the disaster risks and impacts from climate change. • Outcome 3, Output 3: Reducing the instability of agricultural production caused by disaster impact.
Myanmar	
Component 1 of the project is aligned with:	<p>National Adaptation Programme of Action (NAPA, 2012)</p> <ul style="list-style-type: none"> • The first priority in agriculture sector: reduced climate change vulnerability of rural and subsistence farmers through locally relevant technologies, climate-resilient rice varieties, and ex/in-situ conservation of plant genetic resources. <p>Initial National Communication (INC, 2012)</p> <ul style="list-style-type: none"> • A need of identifying cost-effective technological and policy adaptation measures.
Component 2 and 3 of the project is aligned with:	<p>National Adaptation Programme of Action (NAPA, 2012)</p> <ul style="list-style-type: none"> • The second priority of biodiversity sector: mainstreaming ecosystem-based climate change adaptation for buffering rural communities against climate change impacts into policy, planning and relevant projects. <p>Initial National Communication (INC, 2012)</p> <ul style="list-style-type: none"> • Lack of training, information and experience on environmentally sound technologies information systems. • A need of integrating climate change concerns into national long-term socio-economic and environmental planning.
Thailand	
Component 1 of the project is aligned with:	<p>Climate Change Master Plan 2015-2050</p> <ul style="list-style-type: none"> • Measure 1.1 (1) Water, flood and drought management: Integrated water management. • Measure 1.1 (2) Water, flood and drought management: Preparedness to deal with and to reduce damages from flood and drought. • Measure 1.1 (3) Water, flood and drought management: Flood and drought risk management • Measure 1.2 (1) Agriculture and food security: Natural disaster risk management. • Measure 1.2 (2) Agriculture and food security: Preparedness to deal with and to adapt to climate change. • Measure 1.2 (3) Agriculture and food security: Food security and maintenance. • Measure 1.5 (1) Natural resources management: Conservation and restoration of healthy natural resources and ecosystems. • Measure 1.5 (2) Natural resources management: Regulation and control on

	<p>sustainable use of natural resources.</p> <ul style="list-style-type: none"> • Measure 1.6 (1) Human settlement and security: Reduction of risk and damages from natural disasters. • Measure 1.6 (2) Human settlement and security: Preparedness and capacity of communities to adapt. • Measure 3.1 (1) Information, research and technology development: Development of information and research. • Measure 3.1 (2) Information, research and technology development: Development of technology. • Measure 3.3 (1) Awareness raising and capacity building on climate change: Academic and research groups. • Measure 3.3 (3) Awareness raising and capacity building on climate change: Governmental officials and agencies. <p>Thailand’s First Nationally Determined Contribution (2015) Thailand’s prioritised adaptation efforts include:</p> <ul style="list-style-type: none"> • Promote and strengthen Integrated Water Resources Management (IWRM) practices to achieve water security, effective water resource management to mitigate flood and drought. • Safeguard food security through the guidance of Sufficiency Economy Philosophy e.g. an application of the New Theory in agriculture and land management to promote appropriate resource allocation and economic diversification at the household level and sustainable management of community forests to promote food security at the community level, for instance. • Promote sustainable agriculture and Good Agricultural Practice. • Increase national forest cover to 40% through local community participation, including in particular headwater and mangrove forests to enhance adaptive capacities of the related ecosystem. • Safeguard biodiversity and restore ecological integrity in protected areas and important landscapes from the adverse impacts of climate change, with the emphasis on vulnerable ecosystems and red list species. • Strengthen disaster risk reduction and reduce population’s vulnerability to climate risk and extreme weather events through enhanced awareness, coordination and adaptive capacity of local communities, especially in the disaster risk-prone areas. <p>12th National Economic and Social Development Plan 2017-2021</p> <ul style="list-style-type: none"> • Strategy 4, guideline 3.1.1 Conserve and restore forest resources for ecological balance. • Strategy 4, guideline 3.1.2 Conserve and sustainably utilise biodiversity. • Strategy 4, guideline 3.2.4 Improve efficiency of water storage and water distribution systems. • Strategy 4, guideline 3.4.2 Support agricultural production sector to become sustainable agriculture. • Strategy 4, guideline 3.4.5 Build knowledge, understanding, awareness, and participation of the public and different sectors to deal with climate change • Strategy 4, guideline 3.6.2 Build capacity in disaster preparedness.
<p>Component 2 of the project is aligned with:</p>	<p>Climate Change Master Plan 2015-2050</p> <ul style="list-style-type: none"> • Measure 3.1 (1) Information, research and technology development: Development of information and research. • Measure 3.1 (2) Information, research and technology development: Development of technology. • Measure 3.2 (1) Development of mechanisms to support climate change management: Mechanisms to support climate change adaptation. • Measure 3.2 (3) Development of mechanisms to support climate change management: Mechanisms to support related development sectors. • Measure 3.3 (1) Awareness raising and capacity building on climate change:

	<p>Academic and research groups.</p> <ul style="list-style-type: none"> • Measure 3.3 (3) Awareness raising and capacity building on climate change: Governmental officials and agencies. <p>Thailand’s First Nationally Determined Contribution (2015)</p> <ul style="list-style-type: none"> • Thailand’s prioritised adaptation efforts include: Build regional climate resilience by serving as a knowledge hub to foster regional cooperation and exchange experiences on adaptation. <p>Second National Communication (SNC, 2011)</p> <ul style="list-style-type: none"> • Needs identified include: developing climate change scenarios at the sub-regional level; developing socio-economic scenarios for use in vulnerability analyses; analysing climate change effects on major sectors such as agriculture and water; prioritising adaptation options within and across various sectors; developing regional information exchanges and communication. <p>12th National Economic and Social Development Plan 2017-2021</p> <ul style="list-style-type: none"> • Strategy 4, guideline 3.5.1 Enact and improve the laws related to climate change in order to support international agreements on climate change. • Strategy 4, guideline 3.5.4 Increase capacity on research and development related to science, technology and innovation to support climate change adaptation. • Strategy 4, guideline 3.4.5 Build knowledge, understanding, awareness, and participation of the public and different sectors to deal with climate change • Strategy 4, guideline 3.6.2 Build capacity in disaster preparedness.
<p>Component 3 of the project is aligned with:</p>	<p>Climate Change Master Plan 2015-2050</p> <ul style="list-style-type: none"> • Measure 3.2 (1) Development of mechanisms to support climate change management: Mechanisms to support climate change adaptation. • Measure 3.2 (3) Development of mechanisms to support climate change management: Mechanisms to support related development sectors. • Measure 3.3 (1) Awareness raising and capacity building on climate change: Academic and research groups. • Measure 3.3 (3) Awareness raising and capacity building on climate change: Governmental officials and agencies. <p>Thailand’s First Nationally Determined Contribution (2015)</p> <ul style="list-style-type: none"> • Thailand’s prioritised adaptation efforts include: Build regional climate resilience by serving as a knowledge hub to foster regional cooperation and exchange experiences on adaptation. <p>Second National Communication (SNC, 2011)</p> <ul style="list-style-type: none"> • Needs identified include: Develop regional information exchanges and communication. <p>12th National Economic and Social Development Plan 2017-2021</p> <ul style="list-style-type: none"> • Strategy 4, guideline 3.5.1 Enact and improve the laws related to climate change in order to support international agreements on climate change. • Strategy 4, guideline 3.5.4 Increase capacity on research and development related to science, technology and innovation to support climate change adaptation. • Strategy 4, guideline 3.4.5 Build knowledge, understanding, awareness, and participation of the public and different sectors to deal with climate change. • Strategy 4, guideline 3.6.2 Build capacity in disaster preparedness. • Strategy 4, guideline 3.8 Develop international cooperation on environment. • Strategy 10, guideline 3.6.1 Increase the roles and participation of Thailand in international organisations.
<p>Vietnam</p>	

<p>Component 1 of the project is aligned with:</p>	<p>National Climate Change Strategy 2011-2020</p> <ul style="list-style-type: none"> • Task 1.b/ Proactive disaster response and climate monitoring: Reduction of damage due to disaster risks. • Task 2.a/ Food and water resource security assurance: Food security. • Task 2.b/ Food and water resource security assurance: Water resource security. • Task 3. Suitable proactive response to sea level rise in vulnerable areas • Task 4. Protection and sustainable development of forests, increase of GHG absorption and biodiversity conservation. • Task 7.a/ Building of communities to effectively respond to climate change: Communities responding to climate change. • Task 7.c/ Building of communities to effectively respond to climate change: Raising awareness, intensifying education and training. <p>Vietnam’s First Nationally Determined Contribution (2015)</p> <ul style="list-style-type: none"> • There is a need for international assistance as well as cooperation with other developing countries on: tools to assess climate change impacts, vulnerability, exposure and climate change adaptation measures; as well as to strengthen the capacity to adapt to climate change at national and local level. • Adaptation priority actions for the period 2021-2030 include: Implement ecosystem-based adaptation through the development of ecosystem services and biodiversity conservation, with a focus on the preservation of genetic resources, species at risk of extinction, and important ecosystems. <p>Plan for Implementation of the Paris Agreement (2016)</p> <p>Implementation of climate change adaptation activities 2016-2020 include:</p> <ul style="list-style-type: none"> • Assessing the level of risk and vulnerability to climate change, identify the needs for climate change adaptation, loss and damage caused by climate change. • Developing and implementing effective projects to prevent and control natural disasters, respond to climate change in each sector. • Implementation of other activities to adapt to climate change to increase resilience, protect people’s livelihoods and create the conditions for greater contributions in GHG emissions, including programs and projects underway or have been approved or are being developed in accordance with the priorities of the Government, Ministries, sectors and localities which have secured resources or can mobilize resources to implement. <p>The Initial Biennial Updated Report (BUR, 2014)</p> <ul style="list-style-type: none"> • The four criteria to evaluate and select priority adaptation technologies: (i) economic benefits; (ii) social benefits; (iii) environmental benefits and (iv) reduction of vulnerability to climate change. <p>National Target Program to Respond to Climate Change (NTP-RCC, 2008)</p> <ul style="list-style-type: none"> • Activity 2: identify measures to respond to climate change based on results of climate change results and vulnerability assessment for sector/areas and localities. <p>Socio-Economic Development Plan 2016-2020</p> <ul style="list-style-type: none"> • Strengthen management of natural resources, minerals and environmental protection. • Protect water sources, build infrastructure system to encourage the effective and thrifty use of water resources, ensure sufficient supply of water for production and consumption by businesses and citizens.
<p>Component 2 of the project is aligned with:</p>	<p>National Climate Change Strategy 2011-2020</p> <ul style="list-style-type: none"> • Task 6.a/ Increasing the decisive role of the State in climate change response: Adjusting, and integrating climate change issues into, strategies, master plans and plans. • Task 6.b/ Increasing the decisive role of the State in climate change response: Improving and strengthening institutions. • Task 7.c/ Building of communities to effectively respond to climate change: Raising awareness, intensifying education and training. • Task 8. Development of advanced sciences and technologies for climate change

	<p>response.</p> <ul style="list-style-type: none"> • Task 9. Promotion of international cooperation and integration to enhance the country's status in climate change issues. <p>Vietnam's First Nationally Determined Contribution (2015)</p> <ul style="list-style-type: none"> • There is a need for international assistance as well as cooperation with other developing countries on: tools to assess climate change impacts, vulnerability, exposure and climate change adaptation measures; as well as to strengthen the capacity to adapt to climate change at national and local level. <p>Plan for Implementation of the Paris Agreement (2016) Implementation of climate change adaptation activities 2016-2020 include:</p> <ul style="list-style-type: none"> • Reviewing the existing database on adaption to climate change, propose additional research and management, data sharing practices to update reports of national contribution to climate change adaptation. <p>The Initial Biennial Updated Report (BUR, 2014)</p> <ul style="list-style-type: none"> • Capacity needs in the areas of (i) improving capacity and effectiveness of early warning and disaster prevention, and (ii) assessment of water resources, climate resource, climate change and climate change impacts. <p>Second National Communication (SNC, 2010)</p> <ul style="list-style-type: none"> • Capacity building needs in the areas of (i) assessment of vulnerability for ecosystems, economic and social impacts of climate change, and development of appropriate adaptation measure, and (ii) application of cost-benefit analysis to assess climate change response measures and solutions. <p>Socio-Economic Development Plan 2016-2020</p> <ul style="list-style-type: none"> • Strengthen organisational structure, forces, operating mechanisms associated with the synchronous deployment of measures to protect and develop forests, especially coastal protection forests, watershed forests, and special-use forests.
<p>Component 3 of the project is aligned with:</p>	<p>National Climate Change Strategy 2011-2020</p> <ul style="list-style-type: none"> • Task 6.a/ Increasing the decisive role of the State in climate change response: Adjusting, and integrating climate change issues into, strategies, master plans and plans. • Task 6.b/ Increasing the decisive role of the State in climate change response: Improving and strengthening institutions. • Task 7.c/ Building of communities to effectively respond to climate change: Raising awareness, intensifying education and training. • Task 9. Promotion of international cooperation and integration to enhance the country's status in climate change issues. • Task 10. Diversification of financial resources and effective concentrated investment. <p>Vietnam's First Nationally Determined Contribution (2015)</p> <ul style="list-style-type: none"> • There is a need for international assistance as well as cooperation with other developing countries on: tools to assess climate change impacts, vulnerability, exposure and climate change adaptation measures; as well as to strengthen the capacity to adapt to climate change at national and local level. • Adaptation priority actions for the period 2021-2030 include: implement integrated water resources management in river basin systems; strengthen international cooperation in addressing transboundary water issues; and ensure water security. <p>Plan for Implementation of the Paris Agreement (2016) Implementation of climate change adaptation activities 2016-2020 include:</p> <ul style="list-style-type: none"> • Strengthening international cooperation and mobilize investment resources to effectively prevent and control natural disasters, respond to climate change, prevent flood in urban area, search and rescue; with special focus on completing projects to overcome drought, salinization, sea level rise in Central Region, Central Highlands and Mekong Delta, urgent projects against salinization, preserve fresh water for production and daily life of the people living in the Mekong Delta area. <p>National Target Program to Respond to Climate Change (NTP-RCC, 2008)</p>

	<ul style="list-style-type: none"> • Activity 4: strengthen the capacity of the organisation, institution and policy on climate change. • Activity 7: mainstreaming the NTP in strategies, plans, socio-economic development planning and other sectoral/local development plans. <p>Second National Communication (SNC, 2010)</p> <ul style="list-style-type: none"> • Capacity building needs in the area of technology development and transfer where technical experts and professional need to be trained in order to facilitate the prompt and successful adoption of new technologies. <p>Socio-Economic Development Plan 2016-2020</p> <ul style="list-style-type: none"> • Strengthen organisational structure, forces, operating mechanisms associated with the synchronous deployment of measures to protect and develop forests, especially coastal protection forests, watershed forests, and special-use forests.
--	---

F. Technical standards

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 aligned with the requirements of the Environmental and Social Policy (ESP) of the Adaptation Fund (see Part II: L). The Adaptation Fund-accredited Implementing Agency, UNEP, together with the UNEP-IEMP and relevant national partners, will ensure that the project follows procedures outlined in the ESP. This includes the requirement that project activities funded by the Adaptation Fund reflect local circumstances and needs and draw upon national actors and capabilities.

The proposed project’s activities have been validated by national project partners to ensure that they are in line with the relevant technical standards within each country. These project partners include *inter alia*:

- Ministry of Natural Resources and Environment (Thailand); and
- Ministry of Natural Resources and Environment (Vietnam).

Given the small scale of the project’s interventions as well as their focus on environmental protection, Environmental Impact Assessments (EIAs) are not expected to be necessary for any of the planned interventions. In addition, the proposed project’s activities are in line with national social norms, including gender equality and equal access.

G. Project duplication

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

With the GMS recognised as being highly vulnerable to the effects of climate change, particularly droughts and floods, the livelihoods of the ~75 million people reliant on the Mekong River and its associated ecosystems are at risk. Consequently, there are many past and ongoing climate change adaptation initiatives in the sub-region. Because of the large area covered by the GMS and its high number of vulnerable inhabitants, the reach and impact of past and previous initiatives have been limited. Most past and ongoing initiatives have focused on individual countries, particularly Least Developed Countries (including Cambodia, Myanmar and Lao PDR), while few have been implemented at a regional level. Furthermore, adaptation initiatives with a regional scope, have been primarily implemented across the Lower Mekong – Cambodia, Lao PDR, Thailand and Vietnam. Such regional climate change adaptation initiatives, especially those implementing concrete EbA interventions are uncommon throughout the GMS. Those that have been implemented in the past have mainly involved in research and

policy-related dialogues, with limited emphasis on regional cooperation and knowledge sharing, particularly between China and other GMS countries.

The proposed project will focus on the concrete implementation of on-the-ground climate change adaptation interventions, with an emphasis on flood and drought management, in the upper (China), middle (Thailand) and lower (Vietnam) GMS. Through these interventions and the knowledge generated from them, regional cooperation and transboundary water management will be enhanced. Additionally, this project will complement other national and regional initiatives within the GMS., incorporating input from and collaborating with a broad range of stakeholders. Brief outlines of the most relevant of these initiatives are provided below.

The **Mekong River Commission** (MRC) has generated a large variety of information on lower Mekong countries (Cambodia, Lao PDR, Thailand and Vietnam), which are signatories of the commission. The proposed project will build on the activities of the MRC, particularly those related to climate change adaptation, including the: i) ongoing assessment of climate change impacts on ecosystems; ii) design of the Mekong Adaptation Strategy and Action Plan; and iii) formulation of the Basin Development Strategy. The MRC implemented a climate change adaptation project at the Young River Basin between 2011 and 2015. This project installed climate early warning systems and established a climate change adaptation learning centre, but did not implement concrete on-the-ground EbA interventions related to droughts and floods. The proposed project, therefore, will use the knowledge produced and skills available from the previous project as a foundation which can be added to, especially in terms of the concrete implementation of EbA interventions.

To date, there has yet to be a climate change adaptation initiative implemented in or around Tram Chim National Park in Vietnam¹¹⁴. However, previous studies and projects conducted in the Park will be assessed for any relevant baseline information. Such initiatives include the **Mekong Wetlands Biodiversity Programme** (2004 to 2009, UNDP-IUCN-MRC, funded by the GEF) and a **wetland restoration project** undertaken by WWF (2007–2011 and 2013–2014). The main themes of these initiatives include: i) water and fire management; ii) sustainable use of ecosystem goods and services; iii) biodiversity monitoring; iv) habitat restoration; v) ecosystem rehabilitation; and vi) the conservation of the Sarus crane (*Antigone antigone*), which is listed as endangered by the IUCN Red List of Threatened Species^{TM115}.

At the Nabanhe Nature Reserve in China, the World Agroforestry Centre conducted a **Climate Impact Assessment on Biodiversity** in 2014. Other initiatives conducted in the reserve include the: i) ADB's Biodiversity Conservation Corridors Initiative (funded by the Yunnan Environmental Protection Department); ii) Xishuangbanna Tropical Forest Restoration Guideline (developed by the Kunming Institute of Botany in 2016); and iii) Sustainable Rubber Cultivation in the Mekong Region project (supported by the German BMZ). The proposed project, with its risk and vulnerability assessments, and concrete climate change adaptation interventions under Component 1 is the first of its kind in the reserve, but will still integrate and upscale some of the work from past initiatives (such as natural vegetation restoration, rubber agroforestry, and integrated watershed management) into its implementation.

¹¹⁴ According to information gathered during consultations with local stakeholders in Vietnam, May 2017.

¹¹⁵ BirdLife International. 2016. *Antigone antigone*. The IUCN Red List of Threatened Species 2016: eT22692064A93335364. <http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22692064A93335364.en>. Downloaded on 22 June 2017.

The Lancang-Mekong Environmental Cooperation Centre, established under the LMC mechanism aims to *inter alia*: i) promote sustainable development in the six GMS countries; ii) encourage cooperation with regards to environmental protection across the sub-region; iii) provide a platform for environmental policy development and dialogue between member countries; and iv) facilitate the transfer environmental technologies and information across the GMS. The centre has previously collaborated with UNEP, through UNEP-IEMP, in the implementation of several activities in the sub-region. These include the **Lancang-Mekong ecosystem management seminar** in China's Yunnan Province (May 2016) and the **High-level Workshop on Ecosystem Management Capacity Building for Lancang-Mekong Cooperation** in Beijing (September 2016). The proposed project's collaboration with the centre (facilitated by UNEP-IEMP) falls under Components 2 and 3, and will include the promotion of dialogue between the upper and lower Mekong countries.

The **South-South Capacity Building for Ecosystem Management in the Greater Mekong Sub-region** project funded by the Chinese Ministry of Environmental Protection (MEP) focuses on capacity building for ecosystem management across the GMS. This project's outputs include: i) the provision of tools to enhance the integration of an ecosystem-based approach into national policy planning; and ii) an assessment report on ecosystem management requirements for national development planning. This project was implemented from 2015 to 2016 by UNEP-IEMP at sites including Nabanhe Nature Reserve and Tram Chim National Park. Knowledge and lessons learned (for example, gaps and opportunities in transboundary ecosystem management), as well as problems encountered regarding ecosystem services areas in the GMS, have been generated by this project. They will be used to advise planning and implementation of the proposed project, particularly at the demonstration sites in China and Vietnam.

In terms of initiatives concerning EbA in the GMS, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH is implementing EbA interventions in Thailand and Vietnam. Such initiatives include **Improved Management of Extreme Events through Ecosystem-based Adaptation in Watersheds Project** in Thailand and **Strategic Mainstreaming of Ecosystem-based Adaptation and Integrated Coastal Management Programmes** in Vietnam. The proposed project has exchanged ideas and information with the GIZ regarding the vulnerability assessment, EbA implementation and the mainstreaming EbA into policy frameworks. Furthermore, the proposed project may have the capacity to implement the activities that the GIZ initiatives were unable to complete.

The World Bank's **Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project**¹¹⁶ in Vietnam (US\$ 387 million, 2016–2022) aims to enhance tools for climate-smart planning and improve the climate resilience of land and water management practices. The proposed project plans to complement the work being done by the World Bank project both in Vietnam and across the GMS, and use the information generated by the project to advise its implementation.

The ADB's GMS Environment Operations Centre's Core Environment Programme implemented its **climate change adaptation initiative** from 2012 to 2016. This initiative focuses on: i) vulnerability assessments in key GMS transboundary landscapes; ii) the integration of EbA into transboundary landscape conservation strategies; iii) community-level pilot projects; and iv) knowledge exchange. The proposed project will build on the knowledge generated under this

¹¹⁶ Available at: <http://projects.worldbank.org/P153544/?lang=en&tab=overview>

initiative, especially with regards to climate change adaptation.

The USAID's **Mekong Adaptation and Resilience to Climate Change (Mekong ARCC) Project** (2011–2016) identified various environmental, economic and social effects of climate change in the Lower Mekong Basin (LMB). Additionally, the project assisted vulnerable rural communities in ecologically sensitive areas in strengthening their adaptive capacity and resilience to climate change-related threats. Mekong ARCC has generated a vast amount of climate change information at both regional and national levels within the GMS. The proposed project will incorporate this information into its planning and implementation arrangements, and add to using knowledge generated and lessons learned.

Within the National Natural Science Foundation of China (NSFC) – UN Environment cooperation framework, a research project titled: **Water resources change and adaptive management in the Greater Mekong River drainage basin** (2016–2020, US\$ 600,000), has been launched. Under this project, a detailed assessment of the potential impacts of future climate change and socio-economic development on regional water resources is being conducted. The findings of this project will be used to determine how best to allocate water resources to maintain the health of various ecosystems in the GMS. This information will be used to advise the implementation of EbA interventions at the proposed project's demonstration sites.

The **Asia-Pacific Adaptation Network (APAN)**, which is part of UN Environment's Global Adaptation Network (GAN), is a regional programme for managing and applying knowledge regarding adaptation. APAN supports adaptation initiatives of governments and other organisations, with an emphasis on the management of knowledge and capacity building. Its mission is to assist in the building of resilient and sustainable social systems, ecosystems and economies in countries across the Asia-Pacific region under the conditions climate change. The proposed project will support APAN by strengthening the knowledge base and institutional capacity for climate change adaptation in the GMS.

UNESCO's proposed project in the GMS, **Groundwater Resources in the Greater Mekong Sub-region: Collaborative Management to Increase Resilience**¹¹⁷ plans to develop and implement targeted groundwater vulnerability reduction measures (VRM). These VRMs will promote the sustainable use of groundwater resources as an adaptation response to increasing the resilience of people, food security, health, livelihoods and ecosystems in the GMS. Furthermore, the project aims to improve the regional capacity and information base regarding VRMs to support the sub-region's sustainable development goals (SDGs). The proposed AF project will explore the possibility of working alongside and complementing the work of the UNESCO project.

H. Learning and knowledge management

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

The proposed project's substantial learning and knowledge management dimensions are integrated into several outputs of Component 2: Regional knowledge base on climate change adaptation expanded in the GMS.

¹¹⁷ To be implemented in Cambodia, Lao PDR, Myanmar, Thailand and Vietnam.

Under Output 2.1, the proposed project will collect and assimilate information derived from a cost-effectiveness analysis of climate change adaptation interventions that reduce the impacts of floods and droughts and implications for transboundary river basin management. This information (including knowledge, best practices and lessons learned) will be generated through the implementation of adaptation interventions at project demonstration sites in China, Thailand and Vietnam. Furthermore, information will be obtained from a literature review on past and ongoing adaptation projects in the GMS, as well as through interviews and consultations with stakeholders who were involved in these projects.

Output 2.2 covers the development of three policy briefs using information generated by the project including: i) knowledge and lessons learned from the demonstration sites of the proposed project; ii) collated information from other projects, programmes and strategies in the GMS; and iii) the results of the cost-effectiveness analysis (Output 2.1.). These policy briefs will be shared with relevant stakeholders across the GMS (Output 2.3.).

Under Output 2.3, knowledge on EbA that has been generated and collated through the project will be shared on the main regional knowledge platforms, including the inter alia: i) ADB GMS CEP data portal; ii) MRC data portal; and iii) Lancang-Mekong Information Sharing Platforms (currently being developed). Furthermore, project knowledge will be presented at three regional adaptation forums, such as the CGIAR-WLE Greater Mekong Forum, the Sida regional workshop and the Asian Pacific Adaptation Network. Through the use of the regional platforms and forums mentioned above, the best practices of and lessons learned generated by the proposed project will not only assist beneficiary countries, but also the other countries within the GMS.

Output 2.4 covers the design and implementation of national level knowledge-sharing strategies in Thailand and Vietnam. Such strategies may include: i) exchange visits; ii) awareness raising at pagodas and schools; iii) the establishment of climate change adaptation learning centres; and iv) awareness raising using media such as posters, radio and television. Under these strategies, best practices and lessons learnt from project adaptation interventions will be shared between beneficiaries and surrounding communities. This knowledge sharing will contribute to the autonomous upscaling and replication of project interventions beyond demonstration sites, thereby enhancing the climate resilience of non-beneficiary communities.

Under Output 3.3, participants from China, Thailand and Vietnam will be sent on study tours of the project demonstration sites. Participants may include representatives of: i) national government institutions; ii) country offices of regional institutions like the MRC and ADB; iii) national project teams; and iv) national research institutions. These tours will enhance knowledge sharing, encourage relationship building, will promote regional (South-South) cooperation on climate change adaptation, as well as highlight the importance of transboundary river basin management and shared climate impacts in the GMS.

I. Consultative process

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

The first round of preliminary consultations with participating countries took place between March and July 2016. The purposes of the consultations were to: i) introduce the project

overview; ii) receive preliminary comments and advice; iii) consult on the site selection for demonstration of adaptation interventions; and iv) consult on the engagement of potential national, sub-national and local partners. The consultations consisted of: i) three formal meetings in Bangkok and Hanoi with representatives from focal agencies of the AF and potential national partners; ii) bilateral discussions with governmental agencies responsible for ecosystem management and climate change adaptation on the ground in China and Vietnam; and iii) field visits to the proposed demonstration sites in China and Vietnam. The agencies that took part in the consultation process included: i) the National Development and Reform Commission of China; ii) the Chinese Academy of Sciences and its institutes; iii) the Naban River Watershed Nature Reserve management unit in China; iv) the Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment of Thailand; v) the Department of Water Resources, Ministry of Natural Resources and Environment of Thailand; vi) the Department of Legal Affairs, Ministry of Natural Resources and Environment of Vietnam; vii) the Biodiversity Conservation Agency, Ministry of Natural Resources and Environment of Vietnam; and viii) GIZ teams involved in 'Strategic Mainstreaming of Ecosystem-based Adaptation Project' and 'Integrated Coastal Management Programme' in Vietnam.

During the consultations, the participating countries expressed strong interest and support for the proposed project. Valuable comments were received and have been incorporated into this concept. These comments related to: i) project design; ii) the selection of demonstration sites; iii) ownership, benefits and capacity building opportunities for national partners; iv) relevant national policies; v) climate change adaptation and EbA activities within the country and the region; and vi) transboundary/upstream-downstream cooperation. Preliminary consultations and internal discussions with stakeholders from China and Vietnam were sufficient to select demonstration sites in these two countries. However, further consultations were required to select a demonstration site in Thailand.

From September to October 2016, the second round of preliminary consultations was conducted with participating countries. The primary objective of the consultations was to collect information regarding climate change impacts observed by the local stakeholders. Additionally, initial discussions on concrete adaptation interventions to be implemented at the demonstration sites were conducted.

The focal point for the implementation of the proposed project in Thailand, the Department of Water Resources (DWR), led an in-country consultation process on site selection. Through this process, the Young River Basin in the Roi-et and Kalasin provinces was selected as an appropriate demonstration site. The sub-national agency under the DWR, the Water Resources Regional Office 4, has consulted with local stakeholders and collected information about the Young River Basin, including: i) general information; ii) climate change impacts in the area; iii) potential local project implementing partners; iv) beneficiaries; and v) potential on-the-ground climate change adaptation interventions to be implemented at the site. In October 2016, a formal meeting was subsequently conducted in Bangkok among the Office of Natural Resources and Environmental Policy and Planning, DWR, UN Environment and UN Environment-IEEMP to discuss next steps.

In China, a small workshop was conducted at the Administrative Office of Nabanhe Nature Reserve, in Jinghong City of Xishuangbanna Prefecture in Yunnan Province. Participants included representatives from forestry, agriculture, land reclamation, bio-resources agencies and Xishuangbanna Nature Reserve. Potential adaptation and ecological restoration interventions that could be implemented under the proposed project at the Nabanhe Nature

Reserve were discussed.

Moreover, in both China and Vietnam, information about the selected demonstration sites was collected through informal consultations with local stakeholders conducted by local partners, including: i) the Kunming Institute of Botany in China; ii) staff of Tram Chim National Park in Vietnam; and iii) the Institute of Ecological Geography and Environment in Vietnam. The collected information included: i) climate change impacts on the local communities; and ii) proposed adaptation interventions. Additionally, general and specific information about the sites on ecosystems, livelihoods, ecosystem services and management in both China and Vietnam was extracted from the reports of the previous UN Environment-IEMP's meetings at the sites¹¹⁸.

In December 2016, several consultations with the Chinese counterparts took place to discuss their engagement with the proposed project. It was found that China is in a good position to support the project. Those organisations consulted with include: i) the Kunming Institute of Botany; ii) the Chinese Ecosystem Research Network; iii) various institutes under the Chinese Academy of Sciences; and iv) the China-ASEAN Environmental Cooperation Center. It was confirmed that Chinese participation would be in the form of: i) establishing the demonstration site at the Nabanhe Nature Reserve; and ii) the provision of data and information available from the upper reach of the GMS.

A summary of the formal meetings in Thailand and Vietnam (in June and October 2016) is enclosed as Annex III.



Figure 4: Site visit to the Nabanhe Nature Reserve (upper row, May 2016) and Tram Chim National Park (lower row, March 2016).

In May 2017, a consultative mission was undertaken by representatives from UN Environment and UN Environment–IEMP. The objective of the mission was to gather the information required

¹¹⁸ These two meetings were 'Capacity Building and Consultative Meeting with Stakeholders on Tram Chim National Park' (18 March 2016 in Dong Thap province of Vietnam) and 'Ecosystem Management Capacity Building and Consultation Workshop on Protected Areas in Xishuangbanna Prefecture' (12 May 2016 in Yunnan province of China) under the project 'South-South Capacity Building for Ecosystem Management in the Greater Mekong Sub-region' implemented by UNEnvironment-IEMP.

to address the comments received from the AF on a previously submitted version of the concept note. Various meetings and consultations were conducted with community, national and regional stakeholders in Vietnam, Lao PDR and Thailand to gather the information required to revise the concept note. Additionally, field visits were undertaken to selected implementation sites in Vietnam and Thailand to identify potential on-the-ground implementation technologies for the project. In Vietnam, consultations were held with: i) various high-level government agencies; ii) managers of Tram Chim National Park; and iii) community members living around Tram Chim National Park. After consultations in Vietnam, a meeting was held with the Mekong River Commission (MRC) Secretariat in Lao PDR. In Thailand, meetings involved representatives from: i) the UN Environment Asia Pacific Regional Office; ii) the Climate Change Management and Coordination Division of the Office of Natural Resources and Environmental Policy and Planning; iii) the Department of Water Resources and the Water Resources Regional Office; iv) communities in the Young River Basin; v) the Core Environment Program (CEP) of the Asian Development Bank's Greater Mekong Sub-region (ADB GMS); vi) GIZ; vii) the EU; and viii) Sida. A mission report for the consultations in Lao PDR, Thailand and Vietnam in May 2017 is enclosed as Annex IV.

All the information from consultations with local, national and regional stakeholders has been integrated into the concept note to ensure that the proposed project is a nationally- and regionally-driven effort.

J. Justification for funding request

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

Component 1: Demonstration of climate change adaptation interventions, with a focus on drought and flood management, in vulnerable communities and different ecosystems.

Baseline scenario (without AF resources)

National governments and regional bodies in the GMS are aware of the threats that climate change poses to the people of the region. Accordingly, governments of countries like Thailand and Vietnam have developed or are developing comprehensive adaptation strategies¹¹⁹ to guide efforts to enhance the climate resilience of their citizens. Likewise, regional cooperation mechanisms like the LMC and MRC are in the process of developing regional strategies for adaptation¹²⁰. Although governments and regional bodies in the GMS have experience in developing these high-level, conceptual adaptation plans, they have less expertise in implementing concrete adaptation solutions across diverse socioecological contexts. Additionally, national governments in the GMS have limited experience in integrating regional climate and transboundary resource concerns into national adaptation strategies. With limited knowledge on implementing concrete interventions that address national and regional climate impacts, it is unlikely that governments will be able to transform national and regional strategies into effective on-the-ground adaptation actions. Therefore, people in the GMS who are vulnerable to the impacts of climate change are likely to remain vulnerable in the future.

Additionality (with AF resources)

¹¹⁹ A National Adaptation Plan (NAP) in Thailand and National Climate Change Strategy in Vietnam.

¹²⁰ The LMCM is developing the Lancang-Mekong Environmental Cooperation Strategic Framework, and the MRC is developing the Mekong Adaptation Strategy and Action Plan (MASAP).

AF resources will be used to implement concrete climate change adaptation interventions in the GMS. A suite of interventions – including EbA – will be demonstrated in communities to reduce their vulnerability to the impacts of floods and droughts. Through a comprehensive M&E system, the project will generate knowledge on the cost-effectiveness of different concrete interventions in diverse socioecological contexts. This knowledge will be shared within and among GMS countries, enabling national governments and regional bodies to integrate concrete adaptation knowledge that is nationally and regionally appropriate into their climate change strategies. This will facilitate the effective conversion of conceptual adaptation strategies into on-the-ground actions, increasing the resilience of vulnerable people across the GMS.

Component 2: Regional knowledge base on climate change adaptation expanded in the GMS and

Component 3: Regional cooperation on climate change adaptation.

Baseline scenario (without AF resources)

Millions of people in GMS countries are threatened by a shared suite of climate impacts. As rainfall becomes more variable, temperatures rise and the flow dynamics of the Mekong River are altered, droughts and floods will continue to increase in frequency and intensity across the region. These climate impacts threaten the natural resource-based livelihoods of people from diverse socioecological contexts in the GMS. With people from six unique countries unified in their exposure to climate impacts and shared reliance on a transboundary resource (i.e. the Mekong River), there is an opportunity for South-South cooperation on adaptation among the countries of the GMS. However, previous and ongoing projects, plans and strategies to adapt to climate change have been mostly unsuccessful in capitalising on this opportunity. Most adaptation initiatives in the GMS have been national efforts with limited regional buy-in, coordination or knowledge transfer. This limits the effectiveness of such initiatives as climate threats impacting important transboundary water resources are, fundamentally, regional problems which require regional adaptation solutions. If climate change adaptation approaches continue to be isolated to individual countries in the GMS, it is likely that people will remain vulnerable to climate change in the future.

Additionality (with AF resources)

Through the proposed project, AF resources will be used to expand the regional knowledge base on climate change adaptation. Knowledge and lessons-learned relevant to GMS countries will be generated by implementing and monitoring concrete adaptation interventions in different socioecological contexts across the region. Additionally, thorough reviews and assessments of past and ongoing adaptation initiatives will be undertaken to complement the on-the-ground generation of knowledge. To ensure that knowledge on concrete adaptation solutions and transboundary water management is shared effectively among GMS countries, the proposed project will integrate generated information into appropriate national and regional institutions, cooperation mechanisms, forums and knowledge platforms. Through these knowledge-sharing events, the proposed project will also encourage relationship-building between GMS countries and institutions. In doing so, the proposed project will encourage a cooperative approach to adaptation and transboundary water management in the region, which will enhance the effectiveness of future climate change adaptation initiatives across the GMS, including China.

K. Sustainability

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

Project sustainability will be achieved by: i) building the capacity of institutions and communities at the regional, national and local scales to integrate climate-resilient practices into policies and strategies; ii) engaging vulnerable communities to ensure buy-in and the implementation of project interventions; iii) using a participatory approach to build capacity and strengthen the regional knowledge base surrounding the implementation of concrete EbA interventions; iv) encouraging the exchange of climate change adaptation knowledge at a local, national and regional level; and v) institutionalising climate change adaptation – particularly EbA – into government and community structures.

Under **Outcome 1**, long-term sustainability will be achieved by: i) building the technical capacity of vulnerable communities and local government agencies; ii) raising awareness and knowledge of EbA interventions; and iii) facilitating participatory stakeholder engagement and knowledge exchange between local communities and government agencies. In addition, the EbA interventions that are implemented by beneficiary communities will ameliorate the impacts of climate change upon livelihoods, ecosystems and biodiversity. Local communities will, therefore, be incentivised to continue implementing and maintaining the various EbA interventions upon which their livelihoods depend. This will encourage project sustainability at both the community and government levels.

Under **Outcome 2**, knowledge of EbA intervention implementation will be generated, collated and shared using existing forums, workshops and networks. The proposed project will also build upon existing knowledge exchange platforms and databases that are both functional and that have relevant stakeholder support at the national and regional level. Sharing knowledge using existing mechanisms that are independently organised and funded will ensure that the knowledge products generated by the proposed project remain available after the project has finished. In addition, the long-term sustainability of the proposed project will be enhanced through the development of policy briefs that seek to institutionalise the lessons learned from the implementation of project interventions and climate change adaptation during the lifespan of the project. This will ensure that the sustainability of the proposed project is institutionalised at both a national and regional level. Furthermore, the cost-effectiveness monitoring and analysis performed under Component 2 will be used to expand the local, national and regional knowledge base on climate change adaptation in all six countries of the GMS. A thorough understanding of the cost-effectiveness of EbA will further justify and sustain its implementation across the region in communities and ecosystems vulnerable to the effects of climate change.

Under **Outcome 3**, the regional approach to addressing climate change impacts – particularly floods and droughts – will be strengthened through the linking of the science, experience with the political processes for transboundary water and river basin management in the region. Scaling up the drought and flood risk measures at a Basin scale could reduce the impacts of climate change in the given country and downstream in the Mekong River basin. A strengthened regional approach to climate change adaptation in the GMS will encourage a coordinated approach in the member countries, which is essential for effective and sustainable transboundary water management. Existing regional forums will be used as platforms to disseminate best practices and knowledge generated from the intervention of various adaptation activities. This collaboration will ensure that the sustainability of the project is secured at the regional level, whereby all countries in the GMS are able to share in the knowledge generated through the proposed project.

L. Environmental and social impact risks

Provide an overview of the environmental and social impacts and risks identified as being

relevant to the project / programme.

A preliminary screening of the project's impacts on the AF's Environmental and Social Principles is presented below.

Table 5: 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
<i>Compliance with the Law</i>		<p style="text-align: center;">X</p> <p>The final project design will be compliant with all relevant regional and national laws. To achieve this, during the development of the full project proposal, both regional and national stakeholders will be consulted to ensure that all relevant legal requirements are met.</p>
<i>Access and Equity</i>		<p style="text-align: center;">X</p> <p>The final project design will ensure that project activities will not reduce or prevent communities at project sites from accessing basic health services, clean water and sanitation, energy, education, housing, safe and decent working conditions and land rights. Beneficiary communities will be further engaged during the development of the full proposal to ensure that interventions adhere to these principles.</p>
<i>Marginalised and Vulnerable Groups</i>		<p style="text-align: center;">X</p> <p>The project design will ensure that marginalised and vulnerable groups - especially women, indigenous people, youth, and people living with disabilities – will not be adversely affected by, but instead benefit from, climate change adaptation interventions. To avoid the exclusion of marginalised communities, these groups will be involved in the community consultations carried out during the preparation of the full project proposal to ensure equal participation and that social impacts do not unjustly impact on marginalised and vulnerable groups.</p>
<i>Human Rights</i>	<p style="text-align: center;">X</p> <p>No activities are or will be included in the design of the proposed project that are not in line with established international human rights. Moreover, the proposed project will promote the</p>	

	basic human rights of access to food, water and information.	
<i>Gender Equity and Women's Empowerment</i>		X The project will adhere to this principle throughout the project design and implementation. During the development of the full proposal and further stakeholder consultations, gender equality and women's empowerment will be considered. For technical assessments as well as capacity building activities, women will be strongly encouraged to participate, both as part of the team and as participants.
<i>Core Labour Rights</i>		X Core labour rights will be respected and considered in project design and implementation. National and regional stakeholders will be involved in the design of project activities to ensure that labour legislation is adhered to.
<i>Indigenous Peoples</i>		X The proposed project will ensure that indigenous peoples will be properly included in the project design and implementation, particularly those living in and around demonstration sites. The inclusion of indigenous people is seen as essential and beneficial since they possess traditional knowledge related to EbA that will contribute to the inclusive identification of EbA options as well as implementation. Therefore, they will be included in the local-level assessments, demonstration of EbA interventions, capacity
<i>Involuntary Resettlement</i>	X No activities are or will be included in the project design that will result in involuntary resettlement.	
<i>Protection of Natural Habitats</i>		X On-the-ground interventions will include planting of species for enrichment and/or restoration of ecosystems. This could lead to long-term environmental impacts on natural habitats. By implementing climate resilient water conservation and EbA activities, the project will promote the improvement of natural habitats and the enhancement of ecosystem functioning in the long-term.
<i>Conservation of Biological Diversity</i>		X The project will ensure that the conservation and sustainable use of biodiversity factors into the process of

		site selection. Project sites will be considered using a participatory approach to ensure that project activities do not cause significant loss of biodiversity or the introduction of known invasive species.
<i>Climate Change</i>	X No climate change impact is anticipated for the project. Project activities will contribute to climate change adaptation efforts in the GMS. The EbA approach adopted for the proposed project is unlikely to result in maladaptation or contribute to climate change threats.	
<i>Pollution Prevention and Resource Efficiency</i>	X Project activities are not expected to result in any significant pollution. Project design will ensure that all applicable international standards are met for maximising resource efficiency and minimising waste production and the release of pollutants, including carbon emissions.	
<i>Public Health</i>	X Project activities will have no foreseeable negative effect on public health. Activities under Component 1 will likely improve public health through the improvement of water quality and the provision of medicinal plants.	
<i>Physical and Cultural Heritage</i>		X The participatory approach to project design will use local knowledge to ensure that physical and cultural heritage is not negatively affected by on-the-ground activities. The location of physical and cultural heritage sites will be considered during site selection to reduce the likelihood of negative impacts of project intervention on local heritage.
<i>Lands and Soil Conservation</i>	X Project activities will promote land and soil conservation across the demonstration sites. Furthermore, activities under Outputs 2 and 3 will promote land and soil conservation on a regional scale through knowledge sharing and recommendations for national and regional strategies and policy frameworks.	

PART III: IMPLEMENTATION ARRANGEMENTS

A. Management arrangements

Describe the arrangements for project / programme management at the regional and national level, including coordination arrangements within countries and among them. Describe how the potential to partner with national institutions, and when possible, national implementing entities (NIEs), has been considered, and included in the management arrangements.

The proposed project will be implemented during 2018-2022. UN Environment will be the Multilateral Implementing Entity and will be responsible for project supervision to ensure consistency with AF policies and procedures. The project will be executed by the Department of Water Resources of Thailand, the Ministry of Natural Resources and Environment of Vietnam and the Institute of Geographic Sciences and Natural Resources Research (IGSNRR) under the Chinese Academy of Sciences (CAS), with support from the UN Environment-International Ecosystem Management Partnership (IEMP) in Beijing. UN Environment-IEMP is a collaborating centre of UN Environment and is co-hosted by the CAS and UN Environment. As legally separate entities, UN Environment will ensure adequate segregation of reporting between its roles in line with the differentiation between UN Environment and UN Environment-IEMP. In addition, collaboration with China will be built through Kunming Institute of Botany, Chinese Ecosystem Research Network, various institutes under CAS and China-ASEAN Environmental Cooperation Center, among others.

The planned project management structure is shown in the figure below. Please note that during project document formulation stage the implementation arrangements will be discussed further and finalised along with specific roles and responsibilities.

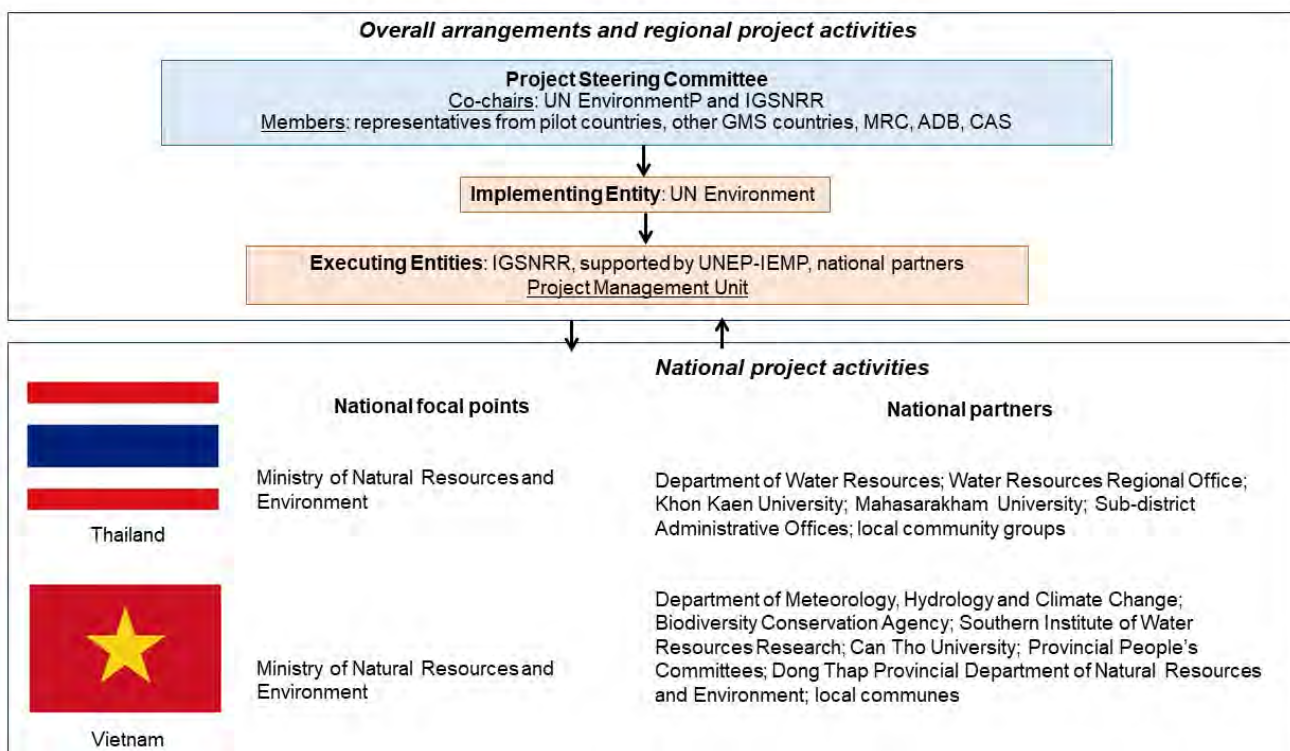


Figure 5: Proposed implementation arrangements.

PART IV: ENDORSEMENT BY GOVERNMENTS AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government¹²¹


Provide the name and position of the government official and indicate date of endorsement for each country participating in the proposed project / programme. Add more lines as necessary. The endorsement letters should be attached as an annex to the project/programme proposal. Please attach the endorsement letters with this template; add as many participating governments if a regional project/programme:

Dr Wijam Simachayer, Permanent Secretary Ministry of Natural Resources and Environment, Thailand	Date: 1 August 2017
Dr Tran Hong Ha, Minister of Natural Resources and Environment, Socialist Republic of Vietnam	Date: 26 July 2017
Professor Xu Jianchu, Director of Mountain Ecosystem Studies, Kuming Institute of Botany, Chinese Academy of Sciences, China	Date: 23 June 2017

i. 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 guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
<u>Implementing Entity Coordinator</u> Monika G. Macdevette (PhD) Deputy Director, Ecosystems Division Chief, Operations and Programme Delivery Branch, Ecosystems Division UN Environment 	
Date: 7 August 2017	Tel. and email: + 254 20 762 4595; monika.macdevette@unep.org
Project Contact Person: Jessica Troni	
Tel. And Email: +254 20762 3794 Jessica.Troni@unep.org	