

# ECOSYSTEM-BASED APPROACHES TO ADDRESS CLIMATE CHANGE CHALLENGES IN THE GREATER MEKONG SUBREGION



To safeguard the region's natural wealth and development gains in the face of climate change challenges, the Greater Mekong Subregion (GMS) countries need to strengthen the resilience of their natural and human systems.

The GMS must also harness opportunities to reduce its contribution to climate change. Ecosystem-based approaches can help GMS countries address these challenges by making use of ecosystems and biodiversity to reduce greenhouse gas emissions and to assist people to adapt to a changing climate.

The brief summarizes the current state of GMS knowledge and experience on ecosystem-based approaches. It draws upon work of the GMS Core Environment Program and partner institutions, including findings from the regional workshop "Mainstreaming an Ecosystem-based Approach to Climate Change into Biodiversity Conservation Planning," which took place 15–16 October 2013 in Ha Noi, Viet Nam.

## Key Messages

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1. Ecosystem-based approaches are considered cost effective due to the multiple environmental, economic, and social benefits they can provide for human well-being and economic development.
2. Ecosystem-based approaches can strengthen the management of transboundary biodiversity landscapes in the GMS, but will require stronger transboundary collaboration for effective implementation.
3. Information gaps remain for spatial, temporal, policy, and cost–benefit conditions for effective ecosystem-based approaches.
4. The technical and institutional capacity of GMS countries must be strengthened to apply ecosystem-based interventions.
5. Ecosystem-based approaches need to be mainstreamed into development and conservation policies.
6. Sustainable financing, utilizing public and private resources, is needed for effective implementation.

## Climate Change in the Greater Mekong Subregion

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Climate change presents considerable risks to the people, natural capital, and economies of the GMS. More frequent extreme weather events and shifting rainfall patterns are among the major threats. Rural people—comprising nearly 67% of the GMS population—are particularly vulnerable due to their dependence on climate-sensitive agriculture and forest resources. Major GMS investments in energy and transport, particularly in the Mekong Delta and along other coastal areas, are vulnerable to sea-level rise and storm surges.

Climate change also adds challenges to maintaining natural capital in key biodiversity landscapes in the GMS. With more extreme weather events, watersheds—particularly those already degraded—become more vulnerable to increased runoff, erosion, and landslides. Climate change could see biodiversity in these landscapes further decline, contributing to species extinction and malfunctioning ecosystems (CEPF 2012). Climate change could also worsen human impacts on landscapes and biodiversity. For example, communities may cope with income loss from climate shocks by overharvesting forest products or clearing more forests for crops.

In terms of contributing to climate change, the GMS, which has 3.9% of the world's population, produces around 4.5% of global CO<sub>2</sub> emissions annually. Forest degradation and loss is a major cause. In 2011, land use change and forestry in Myanmar contributed 32% of the country's greenhouse gas emissions, 46% in Cambodia, and 55% in the Lao People's Democratic Republic (Lao PDR) (CAIT 2014).

## Ecosystem-based Approaches

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An ecosystem-based approach (also known as an ecosystem approach) is “the integrated management of land, water, and living resources that promotes conservation and sustainable use in an equitable way.”<sup>1</sup> Since 1995, the approach has been applied as the primary framework for action under the United Nations Convention on Biological Diversity. The Convention has three main objectives: conservation, sustainable use, and fair and equitable sharing of the benefits derived from natural resources.<sup>2</sup> Examples of ecosystem-based approaches include the conservation and restoration of forests, wetlands, and peatlands; marine conservation; improved grassland management; and environmentally friendly agricultural practices.

While ecosystem-based approaches are not new, their potential to reduce greenhouse gas emissions and lessen climate change impacts on society has gained increased attention in recent years.



There are two broad types of interventions in this context:

- i) Ecosystem-based adaptation makes use of ecosystems and biodiversity to help people adapt to the impacts of climate change. An example intervention is the protection of coastal ecosystems such as mangroves, salt marshes, and barrier beaches to provide natural protection from storms and flooding due to sea level rise. Such ecosystem-based interventions complement and can enhance the effectiveness of infrastructure such as sea walls and dikes. Improving the management of forests and wetlands for better groundwater storage and food security is another example.
- ii) Ecosystem-based mitigation makes use of ecosystems and biodiversity to reduce greenhouse gas emissions. Natural systems such as forests, mangroves, peats, and wetlands act as “carbon sinks” and reduced emissions can be achieved through interventions that maintain or enhance these ecosystems.

Given the uncertainties associated with climate change impacts, ecosystem-based approaches are considered “low-regret” or “no-regret,” meaning they are not likely to cause any harm. Ecosystem-based approaches are potentially more cost-effective than technology- and infrastructure-based measures because they provide multiple economic, social, and environmental benefits. For example, ensuring rural communities have secure and adequate access to food, water, and energy (e.g., firewood).

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<sup>1</sup> Definition from the Convention on Biodiversity (<http://www.cbd.int/ecosystem/>)

<sup>2</sup> <http://www.cbd.int/ecosystem/description.shtml>



## Global Experience

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Substantial knowledge and action is emerging from international experience using ecosystem-based approaches in both developed and developing countries. These experiences cover many ecosystem types, although not all initiatives use the ecosystem-based approach terminology.

### Ecosystem-based Adaptation

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Many countries use ecosystem-based adaptation to deal with a broad range of climatic hazards and impacts. Some examples include:

- i) Mangrove reforestation and conservation to protect against storms and help control erosion.
- ii) Mixed farming techniques to maintain soil fertility and conserve water.
- iii) Slow-forming terrace farming systems to increase soil moisture and reduce run off.

Positive results from these and many other interventions are being documented using several effectiveness measures including biophysical monitoring, cost-benefit analysis, community perception, and multicriteria scoring. However, as the application of ecosystem-based interventions for adaptation benefits are relatively recent, several knowledge gaps remain.

These include a lack of information on:

- i) Thresholds, capacities, and limits of ecosystems in the context of climate change.
- ii) Costs and negative impacts of ecosystem-based approaches (current literature tends to focus on positive outcomes).
- iii) The comparative costs and benefits of ecosystem versus infrastructure interventions.
- iv) How ecosystem-based adaptation actions have informed policy and how policy supports such work (Doswald et al. 2014; Munroe 2014).

Several efforts are ongoing to address some of these knowledge gaps, for example in guidelines for implementing ecosystem-based adaptation,<sup>3</sup> and a recent comparative cost-benefit analysis of ecosystem and engineering options (Rao et al. 2013).

### Ecosystem-based Mitigation

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Ecosystem-based mitigation approaches relating to forests have long been part of sustainable forest management practices and more recently have gained widespread global attention and investment through international climate change negotiations. Reducing emissions from deforestation and forest degradation in developing countries, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks (REDD+) has emerged as a major global response to climate change.

<sup>3</sup> For example, UNEP-WCMC is developing an EBA guideline as part of the Ecosystem-based Adaptation in Mountain Ecosystems Project. See also the guideline developed for the GMS by the World Wide Fund for Nature and the World Bank (WWF and World Bank 2013).



The forest management interventions under REDD+ are all aligned with ecosystem-based mitigation and the extensive piloting and refining of REDD+ has validated their importance.

The uptake of ecosystem-based mitigation approaches has begun to extend beyond the forestry sector to include agriculture and other types of land use. Commonly referred to as the Agriculture, Forestry and Other Land Use (AFOLU), interventions under this approach can generate multiple benefits, such as peatland conservation and restoration that provides climate change mitigation, livelihoods benefits for local communities, biodiversity conservation, and water regulation (Doswald and Osti 2011).

Despite the emergence of REDD+ and AFOLU, key challenges remain for ecosystem-based mitigation, including:

- i) The need for stronger political and policy support and implementation capacity.
- ii) Means to ensure multistakeholder approaches and community participation and support.
- iii) Addressing the underlying drivers of deforestation and land degradation.

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**Ecosystem-based mitigation has begun to extend beyond forestry to include agriculture and other land uses.**

## Greater Mekong Subregion Experience

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Ecosystem-based approaches are emerging in the subregion. Viet Nam has led the way conducting considerable research and pilot implementation since the late 1990s. Other GMS countries are also starting to develop ecosystem-based strategies.

### Examples of Ecosystem-based Adaptation

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Between 2012 and 2013 and with the support of the Government of Sweden, Viet Nam assessed how the sustainable use of biodiversity and ecosystems services could be integrated into biodiversity conservation planning. This resulted in technical guidelines approved by the Ministry of Natural Resources and Environment for mainstreaming ecosystem-based approaches into national and provincial biodiversity conservation planning.

Also in Viet Nam, along the coastline of Soc Trang Province in the Mekong Delta, a GIZ-funded project on mangrove rehabilitation and management demonstrated the cost effectiveness of a coastal protection system combining floodplains, mangrove forests, and appropriate dyke work, while generating additional benefits to communities.

In 2012, the World Wide Fund for Nature, the World Bank, and the GMS Core Environment Program collaborated to develop an ecosystem-based adaptation framework for the GMS. The framework was subsequently field tested and adapted by national and local agencies in the Lao PDR and Viet Nam.



As part of the field testing in Ben Tre, Viet Nam, a comparative cost effectiveness analysis showed the potential cost savings from ecosystem-based adaptation versus “hard” adaptation measures. It revealed that to effectively adapt to a 12-centimeter sea-level rise by 2020, coastal reforestation and forest conservation would cost an estimated 1.7 million Viet Nam dong per capita, compared to 38.8 million dong per capita for a sea dike system.

### Examples of Ecosystem-based Mitigation

Viet Nam is currently collaborating with the USAID-funded Lowering Emissions in Asia’s Forests (LEAF) program and UN-REDD to develop provincial REDD+ Action Plans, which include policies and measures, reporting mechanisms, a reference emissions level, a financing plan, and safeguard mechanisms. The REDD+ Action Plan developed for Lam Dong Province is its key guiding document to achieve its 2020 goal of reducing greenhouse gas emissions from its forests by 27%.

Building on existing work under initiatives including the GMS Core Environment Program and LEAF, the Forest Investment Program and ADB recently approved additional financing of \$12.84 million for REDD+ readiness of the subregion’s Biodiversity Conservation Corridors Project in the Lao PDR.

Cambodia, the Lao PDR, and Thailand have moved quickly in recent years to develop REDD+ strategies and access international financing. To support these efforts, enabling conditions such as improved forest monitoring systems and clear policy frameworks, including provisions for prior consent and benefit distribution, are still evolving.



**A comparative analysis indicated ecosystem-based adaptation is a cost-effective strategy for sea level rise.**

## Opportunities and Challenges

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Ecosystem-based approaches present an opportunity for more effectively managing transboundary biodiversity landscapes in the GMS. Much of the rich natural capital of the GMS is located in seven transboundary biodiversity landscapes that face simultaneous threats from increasing development pressures, environmental degradation, and climate change. These seven landscapes are as follows:

- i) Mekong Headwaters—the People’s Republic of China, the Lao PDR, and Myanmar
- ii) Sino–Viet Nam Karst—the People’s Republic of China and Viet Nam
- iii) Central Annamites—the Lao PDR and Viet Nam
- iv) Tri-border Forest—Cambodia, the Lao PDR, and Viet Nam
- v) Eastern Plains Dry Forest—Cambodia and Viet Nam
- vi) Cardamom Mountains—Cambodia and Thailand
- vii) Tennasserim—Myanmar and Thailand

Applying ecosystem-based approaches in these landscapes could contribute significantly to strengthening the climate resilience of their natural ecosystems and resident forest-dependent communities. For example, climate change may cause species to change their migration routes, and this could require countries to design new or strengthen existing transboundary biodiversity conservation corridors. With support from the GMS Core Environment Program, landscape managers (forest and environment officials) from across borders are increasingly working together on aspects of landscape management. Building on this existing bilateral and subregional collaboration would be essential for effectively scaling up ecosystem-based approaches in the landscapes.

Both nationally and regionally, capacity and knowledge gaps need to be bridged to realize the potential of ecosystem-based approaches. National Biodiversity Strategy and Action Plans and National Adaptation Programs of Action provide a basis for the uptake of ecosystem-based adaptation, however, technical and institutional capacity for their implementation needs strengthening. A challenge lies in applying existing operational frameworks for ecosystem-based interventions (such as the World Wide Fund for Nature and World Bank framework), establishing pilot projects to demonstrate the effectiveness of these approaches in different settings, and effective monitoring and evaluation frameworks.

Two other key challenges are mainstreaming ecosystem-based approaches into development and conservation policies and securing sustainable financing for implementation. Questions also remain about implementing ecosystem-based approaches in combination with infrastructure planning, for example, how coastal roads can be planned to allow mangroves and other coastal ecosystems to retreat as sea levels rise. Capacity must also be strengthened to conduct cost–benefit analyses of different ecosystem-based options versus hard adaptation options.

Meanwhile, financial tools are essential for maintaining and enhancing ecosystem services in the GMS countries and their transboundary landscapes. Apart from Payments for Ecosystem Services and REDD+ mechanisms, resources from international climate funds as well as private investments, could complement public resources to increase investments in ecosystem-based approaches to achieve climate and development co-benefits.





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## About the Core Environment Program (CEP)

The Core Environment Program (CEP) supports the Greater Mekong Subregion (GMS) in delivering environmentally friendly economic growth. Anchored on the Asian Development Bank's (ADB) GMS Economic Cooperation Program, CEP promotes regional cooperation to improve development planning, safeguards, biodiversity conservation, and resilience to climate change—all of which are underpinned by building capacity. CEP is overseen by the environment ministries of the six GMS countries and implemented by the ADB-administered Environment Operations Center.

Cofinancing is provided by ADB, the governments of Finland and Sweden, the Global Environment Facility, the People's Republic of China Regional Cooperation and Poverty Reduction Fund, and the Nordic Development Fund.

Find out more: [www.gms-eoc.org](http://www.gms-eoc.org)

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**GREATER MEKONG  
SUBREGION  
CORE ENVIRONMENT  
PROGRAM**

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