

Building Capacity for Land Use Change Modeling

Concept Note

1. Introduction

In 1992, the six countries of the GMS (Cambodia, the People's Republic of China, the Lao People's Democratic Republic, Myanmar, Thailand and Viet Nam) – with assistance from the ADB – launched a subregional economic cooperation program (GMS Program). The GMS Program aims to strengthen economic growth by focusing on three Cs – 'connectivity', 'competitiveness' and 'community' – as building blocks for subregional cooperation. Over the past two decades, the GMS Program has helped increase prosperity in the subregion through investments of more than US\$15 billion for roads, airports, railways, hydropower, tourism infrastructure, and urban development.

In 2005, the GMS countries responded to growing concern about the environmental impacts of rapid economic development by launching the Core Environment Program and Biodiversity Conservation Corridors Initiative – hereafter referred to as the Core Environment Program (CEP). Administered by ADB and overseen by the environment ministries of the six countries which form the Working Group on Environment (WGE), CEP aims to achieve “an environmentally friendly and climate resilient GMS Program.” The Environment Operations Center (EOC), as secretariat to the WGE, provides coordination and technical support. CEP is co-financed by ADB, the governments of Finland and Sweden, and the Nordic Development Fund.

Phase I of CEP (2006–2012) helped improve environmental management in the GMS by strengthening strategic planning processes, supporting enhanced biodiversity and livelihoods in key conservation landscapes, and improving national monitoring systems. In recognition of the program's achievements and continued relevance, a new five-year phase was approved in 2011 and implementation began in 2012.¹

CEP comprises of the following four components:

Component 1: Environmental Monitoring, Planning and Safeguards

Output: Environmental planning systems, methods, and safeguards improved.

Component 2: Biodiversity Landscapes and Livelihoods

Output: Management of transboundary biodiversity conservation landscapes and local livelihoods improved.

Component 3: Climate Change

Output: Climate-resilient and low-carbon strategies developed.

Component 4: Institutions and Financing

Output: Institutions and financing for sustainable environmental management improved.

¹ For more information about CEP, visit www.gms-eoc.org

The scope of work under this assignment is related to Component 1: Environmental Monitoring, Planning and Safeguards.

2. Activity Rationale

The integration of geographic analysis and quantification tools into strategic planning processes was actively promoted during CEP Phase I to improve planning outcomes. From 2006, EOC has trained national government agencies in the use of scenario-based land use change simulation modeling. The method was also successfully applied in two strategic environmental assessments (SEA), one for the North-South Economic Corridor Strategy and Action Plan and the other for the Quang Nam Province Land Use Plan 2011–2020, in Viet Nam. A major lesson from these SEAs was that land use change modeling can help development planners and decision makers better predict the spatial impacts of different development priorities, and support them to identify sustainable development options.

However the capacity of GMS governments to integrate land use change simulation modeling into their planning processes remains limited due to three core challenges: thematic data and data quality requirements, a steep learning curve of the model concept and software, and the limitations of government institutions to maintain, utilize and nurture modeling capacity without regular external support.

Despite these challenges GMS governments have repeatedly emphasized the importance of operationalizing sustainable land allocation in their strategic planning, and have identified capacity building and institutional development on land use change simulation modeling as an important area for CEP support.

3. Objectives

The key objective of the proposed activity is to establish national capacity on land use change simulation modeling to improve environmental impact assessment and cost/benefit analysis of sector development plans. This will be achieved through a two-pronged approach, involving:

- developing land use change simulation software that addresses requirements of GMS planners; and
- establishing science-policy partnerships whereby national academic institutions provide land use change modeling support to government agencies and planning processes.

This activity is closely aligned to another CEP activity that will produce a GMS forest cover and land use map. The map is expected to contribute to improving the outcome of land use change simulation modeling activity by helping address a key data gap. The land use change modeling activity itself is expected to strengthen other CEP activities, namely:

- Component 1.1: Economic Assessment of Natural Capital and Ecosystem Services; and
- Component 3.2: Development of REDD+ Reference Emission Levels (REL) and Monitoring, Reporting and Verification (MRV) activities.

Maps developed from the land use change modeling activity will be made available on the CEP website's Map Portal.

4. Main Activities

In order to fulfill the objectives, the following main activities will be undertaken:

Develop an easy-to-use and license free land use change simulation model

- review present land use change simulation model functionality and identify challenges and gaps for GMS planning needs;
- research and develop an ecosystem service demand module;
- implement model functions without requiring licensed software, ideally all integrated directly into the model user interface;
- design a user interface that is intuitive and easy-to-use; and
- design and publish a practical self-teaching manual in the six GMS languages.

Train national academic institutions on land use change simulation modeling

- identify national academic institutions (one per country) that are committed to research on land use and related issues and that have a proven record of previous cooperation with government agencies in related fields; and
- deliver training to academic staff (at least three per selected institutions) on land use change modeling with a particular focus on application in national planning processes.

Develop an academic curriculum to maintain GMS land use change modeling capacity

- design of a student training course on land use change simulation modeling to be delivered by suitable national faculty members in at least three of the involved academic institutions;
- supervise at least two national M.Sc. or Ph.Ds. on land use change modeling related topics (technical development or application in GMS context);
- publish at least one peer-reviewed scientific paper; and
- present on the activity lessons and experiences at least one relevant regional or international symposia.

Foster policy-science linkages to operationalize land use change modeling capacity in national planning

- hold awareness raising events for government agencies, delivered by individual national academic institutions;
- review and identify national planning entry points and demand for land use change simulation application; and
- provide land use change simulation technical inputs (joint consulting firm and academic partner) to at least two national planning processes.

5. Outputs and Deliverables

In line with the objectives, it is expected that each of the main activities will generate the following outputs:

Development a land use change simulation model

- new or improved land use change simulation software (including ES demand module, license-free, and improved user interface); and
- documentation of the approach and software design (new or upgrades).

Training of national academic institutions

- network of seven national academic institutions formed and focal academic staff and national academic coordinators identified;
- detailed, annotated outline of training of trainers;
- training of trainers (at least one per GMS country); and
- self-teaching land use change simulation modeling manuals in English and six GMS languages.

Academic curriculum

- detailed, annotated outline of student training course
- student training course (in at least three institutions, for at least one semester);
- one peer-reviewed academic paper on improved model and its use in a GMS context; and
- participation and presentation of results in at least one relevant regional and/or international symposium.

Use of future land use maps in planning processes

- awareness raising strategy;
- knowledge product (brochure) explaining value of land use change simulation model results to government institutions and planning processes;
- awareness raising events (at least one per country); and
- land use change simulation model used in two planning processes.

Other outputs/deliverables

- inception workshop;
- semi-annual progress and financial reports;
- one land use change simulation model network meeting; and
- mission reports (as required).