



AFOLU WORKING GROUP TECHNICAL WORKSHOP Advancing the mapping and monitoring of mangrove ecosystems

Date: 09-12 August, 2016

Place: Novotel, Ho Chi Minh City, Viet Nam

Background

Mangrove forests are recognized for their biological diversity and wide-range of ecosystem services, including high carbon storage capacity, estimated at some 20 Pg Carbon, globally¹. Sustainable management of mangroves thus plays an important role in global climate change mitigation and adaptation efforts.

Southeast Asia mangroves are considered the world's most diverse mangrove forests². However, over much of their current and former distribution, they have been in flux due to both natural and anthropogenic forces. A recent study by National University of Singapore estimates that the rate of loss of mangrove ecosystems in Southeast Asia averaged 0.18% per year between 2000-2012 resulting in a cumulative loss of some 100,000 ha³. Accurate observation and timely monitoring with remote sensing technology can significantly increase our understanding of mangrove forest distribution, variability, and flux, thus supporting informed decision making for coastal zone management.

Mangrove forests are complex and often highly fragmented ecosystems, the spectral signal of which is significantly influenced by tidal effect and soil properties. While traditional pixel-based classification of Landsat, SPOT, and ASTER optical data has been widely applied for mapping mangrove forests, the increased availability of other types of data such as RADAR and LiDAR and development of new analysis and modeling methods offer an expanded range of options for monitoring mangrove forests⁴. These methods are currently being refined for applications ranging from identifying detailed characteristics of mangrove forests to increasing the scale and accuracy of mangrove distribution and change.

This workshop aims to share the latest advances in mangrove forest mapping and monitoring and to encourage discussion on how to best apply available methods for diverse range of national objectives.

The workshop organizers are dedicated to supporting improvements in the capacity of countries in the Mekong region to detect and monitor change in their dynamic landscapes. Regional needs assessment by SERVIR-Mekong identified better understanding of the changes in mangrove

¹ Donato et al., 2011

² World Atlas of Mangroves, 2011

³ Richards and Friess, 2016

⁴ Heumann, 2011

forests among the priorities for ecosystem valuation and for reporting to international climate change conventions. Similarly, SilvaCarbon counterparts have highlighted the need for knowledge transfer on operational methods for improved mangrove mapping in order to advance with their REDD+ MRV at national level.

In order to address these priorities and knowledge gaps, the workshop will take a closer look at existing methods that integrate remote sensing and field data and discuss the challenges and opportunities with upscaling such approaches at national and regional level.

The workshop findings will be shared with the wider international community and considered in related upcoming activities such as a regional workshop on mangrove restoration and the SWAMP global mangrove conference.

Workshop Objectives

The workshop is designed to bridge the gap between latest technological advances and current decision-making for coastal zone management.

Specific objectives of the workshop include:

- Review remote sensing methods and approaches for improved and cost-effective mapping of mangrove ecosystems in the Southeast Asia region;
- Present and discuss models for integrating ground data for biomass estimation;
- Discuss and identify the different levels of accuracy/data quality necessary to meet countries' mangrove mapping needs;
- Identify current technical capacity needs and support required for improving the creation and use of mangrove data in the region.

Expected Outputs

- A short synthesis paper targeting coastal zone decision-makers outlining the rationale for investing time and resources into improved mapping of mangroves and highlighting some readily available approaches to be integrated in the current work.
- A technical review, targeting technical staff, summarizing the different approaches discussed at the workshop and providing references and sources for further learning (e.g. open source data portals available through the Global Forest Observation Initiative, USFS Remote Sensing Application Centre, Boston University, etc.)

Participation

Participants from Southeast Asia countries will represent:

- Government institutions responsible for coastal zone management
- Research and civil society stakeholders involved in mangrove forest conservation
- Remote sensing and ground inventory experts from the region and beyond, working on improved mapping of mangrove forests

Workshop Organizers

The workshop is organized under the umbrella of the **Agriculture, Forestry and Other Land Use (AFOLU) Working Group, part of LEDS Global Partnership**, focused on providing technical assistance, tools, training and platforms to support low-emission development across the agriculture, forestry and other land use sectors.

SERVIR-Mekong - The SERVIR-Global network of regional geospatial support hubs is an initiative of the U.S. National Aeronautics and Space Administration (NASA) and the United States Agency for International Development (USAID). SERVIR-Mekong, the newest hub in the

network is a geospatial data for development program designed to respond to the needs of the Lower Mekong countries. It builds the capacity of governments and other key stakeholders in the Lower Mekong countries to employ publicly available satellite imagery and geospatial technologies for decision making related to climate change, environmental management, and disaster risk management. SERVIR-Mekong is implemented by the Asian Disaster Preparedness Center (ADPC) and its technical partners Spatial Informatics Group (SIG), Stockholm Environment Institute (SEI), and Deltares.

SilvaCarbon is a US Interagency initiative to build capacity for measuring and monitoring tropical forest and terrestrial carbon. The program utilizes the expertise of the different US agencies that contribute to the program and of a wide network of universities and development partners. SilvaCarbon Regional South and Southeast Asia program was initiated in 2013 and includes Bangladesh, Cambodia, Indonesia, Lao PDR, Nepal, the Philippines, Thailand and Viet Nam.

The Sustainable Wetlands Adaptation and Mitigation Program (SWAMP) is a collaborative effort by the Center for International Forestry Research (CIFOR), the USDA Forest Service (USFS) and Oregon State University with support from the US Agency for International Development (USAID). SWAMP is focused on generating knowledge that is relevant to policymakers and practitioners regarding the sustainable management of wetlands in the face of changing global climate and livelihoods of local community.

The USAID Low Emissions Asian Development (LEAD) program supports developing countries in Asia to achieve long-term, transformative development and accelerate sustainable, climate-resilient economic growth while slowing the growth of greenhouse gas emissions. The program supports and enhances country-led development programs, plans, and policies, and complements efforts of other international donors and organizations to support low emission development strategies (LEDS).

TENTATIVE AGENDA OUTLINE:

	Topics	Resource Person
Day 1: Relevance of measuring and monitoring the status of mangrove forests in Southeast Asia		
Opening / Introduction		
08.00 - 08.30	Registration	
08.30 – 09.00	Opening / Keynote Remarks	VN Government USAID Viet Nam
09.00 – 09.15	Objectives /outcomes and structure of the workshop	Organizers
09.15 - 09.30	Participants introduction	Includes short intro for all the organizers
09.30 – 10.00	Why is high quality mangrove data important?	Senior decision maker
10.00 – 10.20	The role of mangrove forests in climate change mitigation and adaptation	Daniel Murdiyarso, CIFOR
10.20 – 10.50	Coastal vulnerability and adaptation to sea level rise and sedimentation	Richard MacKenzie, CIFOR/SWAMP
10.50 – 11.15	<i>Coffee break</i>	
11.15 – 12.30	International guidance: IPCC GPG for reporting emissions and removals from mangrove ecosystems <ul style="list-style-type: none"> Survey exercise for mapping needs related to IPCC GPG use 	Daniel Murdiyarso, CIFOR
12.30 – 14.00	<i>Lunch</i>	
Overview of current status: Current policies and management challenges related to coastal zone management		
14.00 – 14.30	Rates and drivers of mangrove deforestation in Southeast Asia	Dan Friess, National University of Singapore (NUS)
14.30 – 15.30	Presentations: National objectives for mangrove management	
15.30 – 15.45	<i>Coffee break</i>	
15.45 – 16.00	Presentations (continued): National objectives for mangrove management	

16.00 – 16.15	Summary of regional land cover monitoring system and links to mangrove mapping efforts	
16.15 – 17.00	Wrap up discussion – regional and national mangrove management objectives	
Day 2: Matching methods and tools with management objectives		
Overview of operational and emerging methods		
08.30 – 09.30	Overview of remote sensing methods for mapping mangrove forests	Chandra Giri, USGS
09.30 – 10.15	Estimating carbon stocks in mangroves – SWAMP protocol overview	SWAMP
10.15 – 10.45	<i>Coffee break</i>	
Case studies and examples: Two parallel streams		
10.45 – 11.15	Uncertainty of previous mangrove estimates	NUS Mangrove Lab
11.15 – 12.30	The group will split in two parallel streams to take a closer look at some examples of mapping and carbon measuring and emission factors	
	Stream 1: <i>Mapping / Activity Data</i>	Stream 2: <i>Emission factors</i>
	Estimating 3D mangrove forest structures from airborne lidar, TanDEM-X (radar) and high-resolution satellite images, Seung Kuk, NASA Goddard	
	Using active and passive remote sensing data and a ground-based inventory to map the mangroves of southern Papua, Indonesia, USFS	Carbon stocks in artificially and naturally regenerated mangrove ecosystems in the Mekong Delta (Vietnam), CIFOR/SWAMP
	Mekong mapping example, TBD	Cambodia example, Government of Cambodia
12.30 – 14.00	<i>Lunch</i>	
Applying different methods and tools to the Mekong context		
14.00 – 14.30	Challenges and opportunities with mangrove mapping in the Mekong	Vietnam Academy of Science and Technology
14.30 – 15.00	<i>Coffee break</i>	
15.00 – 16.30	Group discussion (group composition TBD): With reference to management priorities identified on day 1, identify:	

	1) Appropriate tools and approaches 2) Types and structures of data needed	
16.30 – 17.00	Sharing discussion outputs in plenary and wrap up discussion	
17.00 – 17.30	Preparing for the field trip	
Day 3: Field trip – Agenda will be provided additionally		
Day 4: The way forward / Next steps		
08.30 – 09.30	Reflection on the field trip	Participants/Organizer
09.30 - 10.30	<p>Considerations for Operationalizing Mangrove Mapping / Monitoring</p> <ul style="list-style-type: none"> • Inter-agency coordination / cooperation/ data sharing • Budget considerations / human resources • Capacity needs/frequency of updates/platforms for collaboration 	Seafood café
10.30 – 11.00	<i>Coffee Break</i>	
11.00 - 12.30	Technical Q&A Session: In-depth discussion with the resource people. We plan 3 broad thematic stations for participants to choose and ask questions/seek further guidance.	
	Station 1: PES Approaches	NUS Mangrove Lab
	Station 2: Data Integration	USGS
	Station 3: Carbon measurements and GHG reporting	SWAMP
12.30 – 13.30	<i>Lunch</i>	
13.30 – 14.30	Discussing next steps and available resources/support	SERVIR/Mekong/SilvaCarbon/CIFOR/ other resource persons
14.30 – 15.00	Closing Remarks	Participants/Organizer