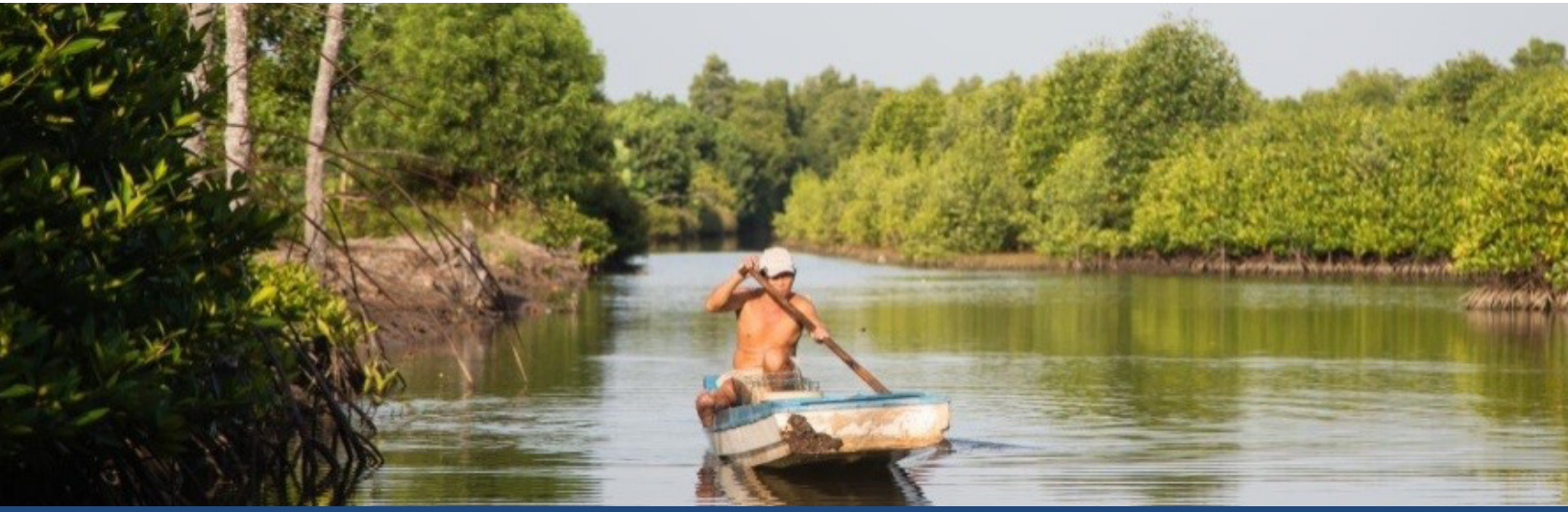


# TECHNICAL REPORT



## Ecosystem Based Adaptation Approach for Sustainable Management and Governance of Coastal Ecosystems (ENGAGE)

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Project Reference Number: CBA2016 – 09SY

## **“Ecosystem Based Adaptation Approach for Sustainable Management and Governance of Coastal Ecosystems (ENGAGE)”**

**Final Report submitted to APN**

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# OVERVIEW OF PROJECT WORK AND OUTCOMES

## Project Information

**Project Duration:** One year (August 2016 – August 2017)

**Funding Awarded:** USD 55,000 (APN funding request USD35,000 + UNU/ AITCV contribution USD20,000)

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## Project Summary

The ENGAGE programme was jointly organised by the Asian Institute of Technology Center in Vietnam (AITCV) and the United Nations University Institute for Water, Environment and Health (UNU-INWEH) to identify an innovative approach for capacity development by employing a training-cum-workshop (Tcw) model. The key goal of the programme was to create an enabling platform for the sustainable management of coastal ecosystems in the South East Asia Region (SEAR) that would connect researchers, development workers and governmental officials working in the coastal regions of the SEAR.

The twin-framework included a three-day training course and a day of multi-stakeholder's dialogue workshop. The training course focused on the theoretical understanding and practical approaches to address and the understand characteristics, ecology, functions of coastal ecosystems and ecosystem-based adaptation (hereafter referred to as EBA) as a management tool. The training comprised a mixture of lectures, seminars and field visits. The Stakeholder Dialogue Workshop brought together regional- level experts and key stakeholders and initiated a dialogue on barriers and opportunities for regional cooperation on Integrated Coastal Zone Management; Ecosystem- Based Management; Climate Change Adaptation in Coastal Zones (with special focus on Risk Assessment), Vulnerability Mapping, and Disaster Risk Reduction. It was anticipated that the dialogue workshop will lead to setting priorities to address challenges of ecological conservation and sustainable management of coastal systems, with specific focus on mangroves and specific outputs and outcomes outlined (listed in the table below).

### Outputs

**Training:** Discussion and case-study based approaches focused on understanding the functions of coastal ecosystems and the potential of EBA as a management tool (mix of lectures, seminars and field visits). Expert talks and case-study based discussions on EBA, ICZM, CC, SDG14, DRR, Mangrove in SEAR

**Workshop:** The dialogue emphasised needs and gaps, critical analysis of conceptual translation of policy and practice, and the requirement of a regional dialogue platform- project based or web wbased for concerned experts as well as specialists and policy makers for long-term interaction and exchange

### Outcomes

- Strengthened the capacity of professionals
- Gained knowledge and network building
- Promoted and encouraged exchanges of experiences
- Mainstreaming Conservation of Biodiversity agenda
- Raised awareness in varied groups of stakeholders
- Application of theoretical concepts in the real planning process and action strategies

**Keywords:** ENGAGE, SDG, Coastal Ecosystem Management, EBA, Climate Change, Risk Assessment and Disaster Risk Reduction, Mangrove, Nature Based Solutions, and Coastal Zone

## Activities Undertaken

The ENGAGE programme supported training and workshops for scientists to develop skills and techniques in providing science-based tools to support policy development; and encourage stakeholder involvement for discussion and interaction. This programme consisted of a three-day training course and one day of multi-stakeholder's dialogue workshop from 21- 24 November, 2016 Can Tho, Vietnam.

### The Training Session

- Focused discussions on theoretical understanding and practical approaches to address and understand the characteristics, ecology, functions of coastal ecosystems and Ecosystem– Based Adaptation as a management tool were delivered through a mix of lectures, seminars and field visit.
- Role playing and exercise– based approaches to strengthen the capacity of professionals and institutions in the SEAR to undertake monitoring, research and conservation of mangrove forests especially in mangrove conservation.

### The Multi-Stakeholder Dialogue Workshop

ENGAGE brought together more than 25 regional– level experts and key stakeholders and initiated an open dialogue on barriers and opportunities for regional cooperation in relation to ICZM, Ecosystem– Based Management, Climate Change Adaptation in Coastal Zones, Risk Assessment, Vulnerability Mapping, and Disaster Risk Reduction. The group was asked to set priorities to address challenges of ecological conservation and sustainable management of coastal systems, with specific focus on mangroves. Moreover, selected experts from the training session presented on the current state of affairs of coastal ecosystems and mangroves in the SEAR region.

## Key Facts/Figures

The innovative model of TcW supports the case for the capacity development need analysis for early-career researchers providing for a discussion platform to exchange data, information and knowledge on global change issues and the sustainable development agenda. The multi–stakeholder group comprised of policy makers, community leaders and resource managers, among others. There was a total of 31 participants from 6 countries (Vietnam, Thailand, Philippine, Indonesia, Malaysia, and Myanmar) in attendance at the programme in November 2016 in Vietnam. The overarching goal was to create an enabling environment for the sustainable management of coastal ecosystems in the region (SEAR).

## Potential for Further Work

- Create a Regional database of solutions for sustainable management of coastal ecosystems
- Create an active Community of Practice – (EBA - SEAR)
- Establish ENGAGE as a flagship programme of the region – (ENGAGE-SEAR)
- Provide an up to date account of regional scale policy synthesis for SEAR in relation to coastal zone management and climate change adaptation

- Long-term Regional R&D proposals, and Programme Development
- Capacity Development on real challenges faced by scientists, practitioners, resource managers and, policy experts

## Awards and Honours

*Briefly describe any important awards and honours received by or as a result of your outputs.*

*“EbA and ICZM are the two programs which require great human resources to be widespread and implemented. There should be a number of specialists and technical staff in each coastal region to help local people understand these programs thoroughly and apply them in an appropriate way. It is essential to strengthen the capacity of young, professionals, academics, government officials.” (Vu Tran Ngoc Cam, Vietnamese participant)*

“Ecosystem– Based Adaptation Approach for Sustainable Management and Governance of Coastal Ecosystems (ENGAGE),” APN E-Lib, accessed March 26, 2017, <http://www.apn-gcr.org/resources/items/show/2044>.

## Publications

The publication of this document was made possible by funding support of the Asia Pacific Network, Japan

## Acknowledgments

This report is the outcome of collaborative partnerships and the efforts of dedicated individuals. We would like to mention the contribution of Dr Fredric W. Swierczek – AITCV Director – who has reviewed and approved the report in his role as the authorised representative of the Grantee for ENGAGE Project (CBA2016-09SY-Ngo). In addition, we would like to thank, Dr. Chu Thai Hoanh, Emeritus Scientist – Former Principal Researcher, International Water Management Institute (IWMI) who is a key contributor to the APN training. Furthermore, Mangrove for Future Initiative -MFF and UNEP IEMP are also supporting partners. We would also like to thank Ms. Juliet Dhanraj, Ryerson University, Toronto (Canada) for providing comments and serving as an external reviewer for this technical report. The ENGAGE team is extremely thankful to Ms Kelsey Anderson, from UNU-INWEH for the assistance in layout and formatting of this report.

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## List of Acronyms

**AITCV:** Asian Institute of Technology Center in Vietnam

**BES:** Biodiversity and Ecosystem Services

**COP:** Community of Practice

**DDC:** Data Distribution Center

**DDR:** Disaster Risk Reduction

**EBA:** Ecosystem– Based Adaptation

**ENGAGE:** Ecosystem– Based Adaptation Approach for sustainable Management and Governance of Coastal Ecosystems

**GIS:** Geographic Information System

**ICZM:** Integrated Coastal Zone Management

**IPCC:** Intergovernmental Panel on Climate Change

**MFF:** Mangroves for Future

**NGO:** Non-Governmental Organization

**SEAR:** South East Asia Region

**SDG:** Sustainable Development Goals

**UNEP:** United Nations Environment Programme

**UNU:** United Nations University

**INWEH:** Institute for Water, Environment and Health

**VRA:** Vulnerability Risk Assessment



# CHAPTER I: ENGAGE INTRODUCTION

**Ngo Tho Hung<sup>1</sup>, Nidhi Nagabhatla<sup>2</sup>, Vu Tran Ngoc Cam<sup>1</sup>, Lee Eunjung<sup>2</sup>**

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***This chapter presents the introduction of ecosystem based adaptation approach for sustainable management and governance of coastal ecosystems (ENGAGE) in SEAR and the support of ENGAGE project in sustainable development and green growth objectives related to the Sustainable Development Goals 6, 14 and 17.***

## 1.1. ENGAGE Project- Content and Context

Healthy coasts provide effective in erosion reduction, wave attenuation and sediment accretion, which are important for shoreline protection against sea levels rise and extreme weather events, while also supporting a variety of livelihoods. These ecosystems serve as the spinal cord of the economy for the SEAR via fisheries production, provision of timber and fuel wood, coastal zone protection, biodiversity habitat, and a variety of recreational and cultural benefits. In recent times, as concerns related to climate change are escalating, coastal and marine ecosystems are being valued for their role in carbon sequestration. However, they are constantly subjected to overexploitation, land-use change, pollution and more recently, climate change that alters their composition, structure and ecological function and their capacity to provide ecosystem services that are essential for livelihoods. Effective management strategies for conserving habitat and biodiversity while maintaining livelihood opportunities and system resilience remains a crucial issue for resource managers and planners. Multilateral environmental agreements including the Ramsar Convention, Convention of Biological Diversity and now the IPBES have stressed the need to strengthen the capacity of regional stakeholders as a priority that should be addressed, in order to realise targets and goals named in sustainable management frameworks. The ENGAGE programme with AITCV and UNU-INWEH as key partners, conducted a training-cum-workshop (TcW) capacity development activity with an aim to create an enabling environment for the sustainable management of coastal ecosystems in SEAR. The target group included researchers, development workers and governmental officials working in the coastal regions of SEAR. The training course focused on the theoretical understanding and practical approaches to address and understand the characteristics, ecology, functions of coastal ecosystems, and Ecosystem –Based Adaptation as a management tool.

Vietnam provides a good case to examine the complexity and interconnectivity in sustainable resource management while balancing ecological sustainability and economic opportunity. While focusing on issues from Vietnam, a regional dialogue on similar issues faced by other countries in the SEAR was initiated. With more than 3,200 km of coast line and lagoons that provides large fishing grounds, the fishery sector in Vietnam is pivotal for economic growth and livelihood opportunities. The relevance of the coastal and marine ecosystems' biodiversity (about 11000 marine species, including 6000 bottom species and 2000 fishes) is equally important for the country and the region. More than 100 fish species are regularly harvested from the ecosystems as commodities of high economic value; 63% of them are exploited. Mollusks and seaweed add to the coastal ecosystems' resource and diversity, with a high economic value (2500 species of mollusks and 600 species of seaweed). The aquaculture industry in the country and the region is yet another significant user of coastal and marine ecosystems as is the energy sector with the extraction of oil and gas in the continental shelf of Vietnam. Recent attempts to explore the tidal, wave and wind energy in the Vietnamese sea and islands to accomplish the renewable energy commitment is increasing. The policy makers and resource managers in the region are making an

effort to understand the multiple dimensions of integrated resources management or ecosystems based management.

The project contributes to the scientific knowledge development, regional capacity building and science-policy interactions, and activities relevant to APN's goals. A wide regional participation and co-operation effort among APN member countries as well as local institutions was established. Capacity development is integral to the implementation of this objective. International and regional institutions with a mandate to catalyze technical and knowledge support for capacity development, should work together to undertake relevant capacity-building activities that facilitate both short- term activities as well as long- term strategic alignments of interest. The proposal is scientifically sound and could contribute to increasing awareness and building consensus on global change issues among policy-makers and civil society in the region. In addition, the activity improved communications, publications and dissemination of regional data, information and knowledge. UNU-INWEH is willing to support a long-term mobilization and alignment of technical and human resources for addressing priority needs in applying an Ecosystem- Based Adaptation Approach in partnership with AITCV. Such an initiative could facilitate stakeholder engagement process to address the sustainable management and governance issues of coastal and marine wetlands ecosystems of SEAR. In the extended phase, the partner consortium is expected to work with countries and organizations to identify a number of specific examples of capacity needs. There is the possibility to replicate the training course at a national level with technical support for professionals at the regional level. The principal objective is to promote and facilitate dialogue around needs and gaps in regional expertise and the available data, information and knowledge base.

## **1.2. ENGAGE project and the APN 4th strategic plan**

The capacity development approach presented in this proposal supports the goal of APN to strengthen capacity building and facilitate knowledge generation (APN Goal 3). The TcW approach is designed to advance the understanding of Ecosystem- Based Adaptation with focus on coastal ecosystems (mangroves, in particular). The overarching objective was: to underline regional priorities; to discuss the role of up-to-date geospatial data and information in understanding and applying ecosystem-based approaches in problem solving and; to identify needs and gaps in existing policy support tools and experiential learning for young professionals and regional level stakeholders. In line with APN Goal 4, the project created a regional level community of practice for trained professionals who can advance the Ecosystem- Based Adaptation as a policy support tool in achieving the Integrated Coastal Zone Management agenda. The outcomes will feed into a 'Policy Brief' on Ecosystem- Based Adaptation for Wetland Management— Barriers and Opportunities (a global scale knowledge synthesis led by UNU-INWEH). This goals of project support APN Goal 2. In alignment with APN Goal 1- a key outcome from the set of activities from this programme is to create a platform (community of practice) for academics/ researchers and other stakeholders and participants in the South East Asian Region (SEAR) to stimulate regional cooperation in Integrated Coastal Zone Management and mechanisms to ENGAGE with key partners: CASMB, CTU/CENRes and other potential partners such as Dr. Min Jet Loo - UNEP-IEMP, MCD Vietnam, GIZ Vietnam, MFF (Mangroves for Future) Asia and RAMSAR focal points, APCC and other international resource actors.

The overarching aim of the project was to establish mechanisms to significantly link biodiversity and ecosystem services for the implementation of these sustainable development and green growth objectives, with efforts to implement the Sustainable Development Goals 6, 14 and 17.

# CHAPTER II: OVERVIEW OF COASTAL MANAGEMENT IN SEAR

Syed Mohazri Bin Syed Harari<sup>3</sup>, Vu Tran Ngoc Cam<sup>1</sup>, Nidhi Nagabhatla<sup>2</sup>, Ngo Tho Hung<sup>1</sup>, Lee Eunjung<sup>2</sup>; Luong Thi Tuyen<sup>4</sup>; Phusit Horpet<sup>5</sup>; Sakib Arsalan<sup>6</sup>, Than Than Htay<sup>7</sup>, Eunice M. Becira<sup>8</sup>, Nathawadee Bantiwatkul<sup>9</sup>

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**This chapter analyses the current situation of ENGAGE in SEAR. The objective of this chapter is to provide the review of Coastal Management as well as highlight the needs and gaps in the Coastal Management System in SEAR.**

## 2.1. Regional Review of Coastal Management

The South East Asian Region (SEAR) is a biodiversity hotspot comprising of a variety of ecosystems ranging from terrestrial to marine. With approximately 150,981 km of shoreline, the regions have both a large spread of sensitive and biodiversity rich coastal ecosystems and issues with competing uses viz. tourism, fisheries, transportation, mining and communication. More than 600 million people living in the SEAR and dependent on coastal and marine ecosystems for their income, livelihood and well-being. (Alice, 2017)

The systems often face conflict owing to contradictory interests and gaps in enforcement of sustainable management policies, particularly for the common coastal resource systems. The threatening impacts of climate change exacerbates existing pressures the coastal ecosystems have to endure. The regional review outlines and explains challenges, institutions and policies on coastal management in the SEAR states, (Indonesia, Malaysia, Myanmar, the Philippines and Thailand) to understand the similarities and differences in science, policy and practices in each country report. For this objective the country section are divided into the following sub-themes: coastal characteristics and current threats; status of coastal management; and an overview on climate change governance with focus on coasts and Ecosystem-Based Adaptation (EBA) initiatives as a strategy for sustainable management. Cross cutting aspects in EBA embeds the nature-based solutions perspective that aims to reduce the vulnerability of people and simultaneously generating a range of social, economic, and environmental co-benefits. These are explained at the regional scale and to some extent at national level.

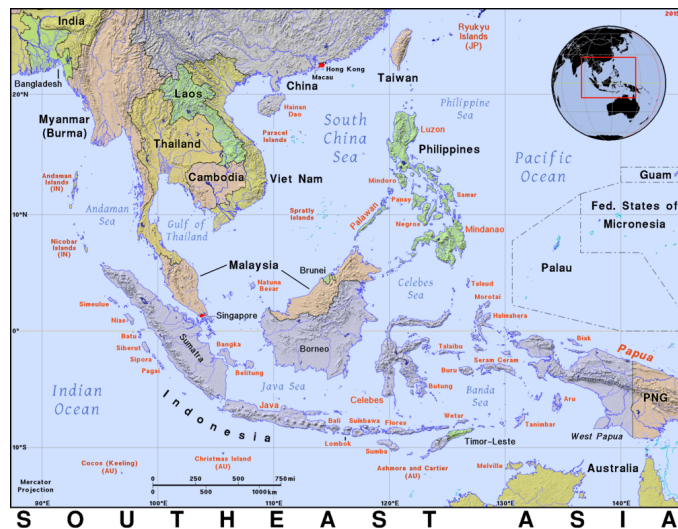


Figure 2.1: The map of Southeast Asia Region  
(Source: <http://ian.macky.net/pat/map/seas/seasblu.gif>)

## 2.1.1. Indonesia

### Coastal Conditions and Current Threats

Indonesia is an archipelagic state with 17,508 islands and more than 81,000 km of coastline (Sukardjo, 2002). It covers 3,257,483 km<sup>2</sup> at the sea and spread out 13,466 km<sup>2</sup> of coastal area and small islands. As the largest archipelagic state in the world, Indonesia has an immense diversity of coastal and marine resources and significant dependence of communities on natural resources for livelihood and income (Hendra, 2011).

### Coastal and Climate Change Governance

In terms of coastal governance, the country has allocated resources, both human and financial, to manage its coastal ecosystems and communities. Integrated management for the coastal areas and small islands, known locally as Wilayah Pesisir dan Pulau-Pulau Kecil (WP-3-K), is regulated under Act No. 27/2007 and Act No.1/2014. These laws regulate the management of coastal areas and small islands starting from the planning, utilization and supervision (all three of which involve the local community). Other than this legislation, the other main legal instruments for coastal areas are outlined in Table 2.1 below.

In order to support and strengthen the coastal areas management in Indonesia, the country established the 'Mitra Bahari' system consisting of marine and fisheries experts from universities. In addition, the Association of Indonesian Coastal Management Specialist, locally known as Himpunan Ahli Pengelolaan Pesisir Indonesia (HAPPI), is another example of institutional reform to tackle issues related to sustainable management of coastal ecosystems. HAPPI is a professional organization that consults and involves a wide range of experts from multi-disciplines related to integrated management of coastal areas and small islands.

In terms of climate change governance, Indonesia ratified the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol in 1994 and 2004, respectively. Since then, Indonesia has legislated several federal climate change legislations such as Law 31/2009 concerning meteorology, climatology and geophysics and more recently, adaptation.

Indonesia initiated a legislation on climate change viz. the Presidential Regulation 71/2011 on the Implementation of a National GHG Inventory and the Presidential Decree 61/2011 National Action Plan to Reduce GHG Emissions (RAN-GRK). Both of them focus on current legislation remains primarily on mitigation issues, whilst adaptation challenges, especially for people living in coastal ecosystems, needs further emphasis in the planning processes. Currently, some plans are being developed to address climate change issues and embed the 'sustainable coasts' agenda. These



Photo 2.1. Sakib Arsalan, participant from Indonesia

#### Box 1: Regulation in Indonesia on Coastal Zone Management and Climate Change Adaptation

- Law No. 5/1990 (Conservation of Natural Resources and Ecosystem Act)
- Law No. 24/1992 (Spatial Planning Act)
- Law No. 23/1997 (Environmental Management Act)
- Law No. 32/2009 (Environmental Protection and Management)
- Presidential Decree No. 32/1990 on the management of protected area

includes: National Action Plan Addressing Climate Change (Republic of Indonesia, 2007); the UN REDD+ National Programme in Indonesia (Ministry of Forestry) and Indonesia Climate Change Sectoral Roadmap. Other governance activities and initiatives are highlighted in Table 2.1 below:

**Table 2.1: Governance Activities and Initiatives in context of Coastal Zone Management and Climate Change Adaptation**

| Year         | Policy/ Measure  | Agency   |
|--------------|--|--|
| 2007         | National Action Plan for Climate Change Mitigation and Adaptation                                | Ministry of Environment  |
| 4 July 2008  | National Council on Climate Change, NCCC (or Dewan Nasional Perubahan Iklim, DNPI)               | The Presidential Regulation 46/2008, chaired by the President was established to act as a national focal point on climate change policy, strategy and programme formulation, and to play a coordinative role among sectorial agencies (NCCC, 2009) |
| 2010         | Climate Change Sectoral Roadmap  | Bappenas   |
| 2011         | Indonesia Adaptation Strategy  | Bappenas   |
| 2011         | National Action Plan for Adaptation to Climate Change  | National Council on Climate Change (DNPI)  |
| 2013         | National Action Plan for Climate Change Adaptation (RAN-API)                                     | Ministry of Marine Affairs and Fisheries   |
| January 2015 | National Council of Climate Change (DNPI) dissolving the and the REDD++ programme (Badan REDD++) | Directorate general of Climate Change in the Ministry of Forestry and Environment  |

## 2.1.2. Malaysia

### Coastal Conditions and Current Threats

Malaysia is a federation consisting of 13 states with three (3) federal territories (FT) and a total shoreline of 4,809 km. Physically, Malaysia is divided into two (2) main regions, namely the Peninsular Malaysia which has a shoreline of 2,031 km and is characterised as being muddy on the western shoreline and sandy on the eastern shoreline. East Malaysia (Borneo Island), with a shoreline of 2,788 km, is characterised as muddy and sandy with rocks. Eleven (11) states and two (2) FT are located within the Peninsular Malaysia while two (2) states and one (1) FT are at East Malaysia. Malaysia is entirely surrounded by coastal water bodies: Straits of Malacca, Straits of Singapore, South China Sea, Sulu Sea and Sulawesi Sea. (Ministry of Natural Resources and Environment, 2014)

### Coastal and Climate Change Governance

Coastal governance is significantly affected by Malaysia's governance system. It comprises of (a) Federal government, (b) State government, and (c) Local government (which is an extension of the State government). The Federal and State governments have specific legislative and executive authority provided by Part VI of the Federal Constitution. The coastal jurisdiction is interpreted to be: (a) land and coastal area up to 3 nautical miles that are within the State's jurisdiction, and (b) coastal and marine area beyond 3 nautical miles which covers the Exclusive Economic Zone (EEZ) and the continental shelf which is within the Federal's jurisdiction. The matters related to natural resources management

generally fall within the legislative purview of the State Government, matters related to international conventions are strictly within the purview of the Federal Government.

The “top-down” approach with respect to policy issues was applied (by the Government of Malaysia) in those related to the coastal and marine areas, natural resources and climate change. The current management framework for coastal and marine areas is sectorial in nature, with different components jurisdictionally allocated to different governmental agencies. For instance, mangrove ecosystems (which fall under the forestry sector) is within the purview of the State as mandated by the Federal Constitution, although it is not stated explicitly. The legislation and policy for mangrove management is coordinated by the central (federal) authority. The provincial authorities design and implement legislation and policy goals. Currently, the “Malaysia Plan” that is at its 11th reinstatement (2016 to 2020) maps the policy and, developmental and environmental-related projects and activities to be adopted by the government agencies and managers. For example, the Integrated Coastal Zone Management (ICZM) was included in the ninth and tenth Malaysia Plans



Photo 2.2. Syed Mohazri Syed Hazari, participant from Malaysia

The Government of Malaysia ratified UNFCCC on 13 July, 1994 and became a Non-Annex 1 Party. The state does not have specific Federal or State legislation on climate change, and climate change is not explicitly mentioned in the constitutional reforms. In contrast, responsibilities related to climate change (particularly, climate change adaptation) are allocated to the state (provincial) government. In the existing governance systems at the national level, the institutions and agenda on climate change is coordinated by national authority- Ministry of Natural Resources and Environment (NRE) and executed by the Department of Environmental Management and Climate Change. The National Policy on Climate Change was endorsed in 2009 by the Cabinet. The policy emphasises the use of the “no regret approach” implying that actions taken would still prove useful regardless of whether future climate change impacts do indeed occur. The second National Physical Plan (NPP2) and The National Physical Plan - Coastal Zone (NPP-CZ) addresses climate change issues with elements of the ecosystem services framework highlighted within the context of the Environmental Sensitive Areas (ESA) concept.

### 2.1.3. Myanmar

#### Coastal Conditions and Current Threats

Myanmar has a coastline of nearly 3,000 km, which is divided into three (3) parts:

- The Rakhine coastal area borders the Bay of Bengal in the west creating a 740 km long shoreline composed of shallow and deltaic parts in the north and is rocky in the southern section.
- The 900 km long Tanintharyi coastal area to the south borders the Andaman Sea.
- The Central delta region lies in the middle, extends 460 km and consists of three (3) river mouths of the Ayeyarwaddy, Sittaung and Thanklwin River.

As per the periodic survey of living resources in Myanmar, the coastal and marine living resources of Myanmar is the fourth largest source of foreign exchange earnings after timber, minerals and rice. Surveys from the 1980's detected that the maximum sustainable yield could be safely estimated at a little over 1 million metric tons. Of which, mangrove forest is one of the beneficial resources with nearly 24 mangroves species inhabiting the coastal zone, with the most extensive mangroves located in the

Ayeyarwaddy Delta. One of the increased threats to mangrove forests is their shrinking area. With 250,000 ha in 1980s, by 2001 the area of mangroves in the Ayeyarwaddy Delta shrunk to only 110,000 ha and to 83,400 ha as noted in the Myanmar's Forest Resource Assessment (FRA) and the decline is continuing. According to a Forest Resource Environment Development and Conservation Association (FREDA) report (2012), another 30% of the remaining mangroves disappeared between 2003 and 2008. An estimated 60,000 ha in the aftermath of Cyclone Nargis in May, 2008 with huge losses of life and livelihoods, leaving the densely-populated delta area extremely vulnerable to future storm. Restoration efforts had already started before Cyclone Nargis but have intensified since and are now becoming more successful. In addition to mangroves in Ayeyarwaddy Delta, fifty-seven (57) hectares of mangrove forest in Meinmahlakyun Wildlife Sanctuary has been devastated. Fortunately, some areas of the mangroves in the Ayeyarwaddy Delta have been improved to some extent by the forestry department's rehabilitation programmes for fuel from the mangrove forests. (Christoph, et al, 2013)



Photo 2.3. Ms. Than Than Htay, participant from Myanmar

Another threat to mangroves is the overuse of natural resources. The speed and frequency of unsustainable development is jeopardizing the fragile relationship between these crucial habitats and the livelihoods of rural people, thereby compromising most of the country's population. The main challenge is poverty and anthropogenic activities viz., the extraction of timber for housing and charcoals. Mangroves have been transformed into aquaculture and human settlements. Due to over exploitation, mangrove forest areas are decreasing at a rapid rate because of rising seas levels and the increasing frequency of extreme weather. Coastal resilience is a development issue which means environmental problems cannot be addressed by managers. Myanmar needs international collaboration and technology transfer to support the protection of coastal ecosystems (NAPA, 2016).

## Coastal and Climate Change Governance

Myanmar ratified the UNFCCC in 1994 and the Kyoto Protocol in 2003. At present, the country does not specify national climate change legislations, although climate change is directly or indirectly addressed through various sectors of the national strategies and plans. In 2011, the National Environmental Conservation Committee (NECC) was formed to guide national activities to tackle climate change related issues. In 2012, the National Adaptation Programme of Action to Climate Change was published by the NECC. In the same year, the Ministry of Environmental Conservation and Forestry (MOECA), which is responsible for all national environmental policy, was established. Cyclone Nargis, which hit the lower part of the country in 2008, highlighted the need to address adaptation preparedness. In 2012, the National Adaptation Programme of Action (NAPA) to Climate Change was published. The government is currently involved in the Bay of Bengal Large Marine Ecosystem (BOBLME) Programme which promotes sustainable marine ecosystem management and sustainable coastal livelihood development. The programme aims to improve the lives of coastal populations through effective regional management of coastal and marine biodiversity and fisheries. A number of different agencies and organizations, including Japan International Cooperation Agency (JICA), Forest Resource Environment Development and Conservation Association (FREDA) and UNDP's Mangrove Environmental Rehabilitation Network (MERN) are undertaking mangrove and coastal forest restoration efforts following damage from recent cyclone events in the country's coastal areas.

## 2.1.4. Philippines

### Coastal Conditions and Current Threats

The Philippines is spread out across 7,641 islands and has a coastline of 36,289 km; it has the fifth longest coastline in the world. Also, the country is one of the ten most biologically mega-diverse countries with corals (around 500 species) and coastal/marine biodiversity (marine fish species 2,400) habitats (WB, 2006). The environmental regulations in this state has made advancements with the adoption of Republic Act (R.A.) 7160, also known as 'The Local Government Code of 1991'.

Some functions of the national government were devolved to the local government unit especially those with concerns of the use conservation/protection and management of natural resources particularly granting of permits and the use of their revenue. To empower the LGUs for the implementation of Republic Act 7160, Republic Act 8550 (or the Fisheries Code of 1998) was developed and adopted. Embodied in this Republic Act are the ways and means of utilizing The Philippines' coastal resources and, conserving and protecting existing and/or the remaining coastal and fishery resources.



Photo 2.4: Becira Eunice, participant from Philippines

### Coastal and Climate Change Governance

The Philippines ratified the UNFCCC in 1994 and the Kyoto Protocol in 2003. The government's efforts on climate change were established long before the UNFCCC ratification. In 1991, The Philippines established the Interagency Committee on Climate Change (IACCC) led by the Environmental Management Bureau of the Department of Environment and Natural Resources and the Department of Science and Technology. In 2007, a presidential task force on climate change was established, following the creation of the Climate Change Act in 2009, as a legal framework to mainstream climate change into all levels of decision-making. The country also established the Climate Change Commission, an independent and autonomous body with the status of a national agency. This Commission created a National Framework Strategy on Climate Change for 2010-2022. In 2011, a Cabinet Cluster on Climate Change Adaptation and Mitigation was established and also a National Climate Change Action Plan (NCCAP) was adopted that identified seven (7) strategic priorities to address climate change effects between 2011 and 2028.

Some coves and bays in the Philippines are used for mariculture (fish pens and cages) and sea ranching in which fishery laws, rules and regulations were revised and strengthened under the Fisheries Code of 1998 (R.A. 8550) implemented by the Bureau of Fisheries and Aquatic Resources (BFAR). Under R.A. 8550, the local government units have to organise a council (Fisheries and Aquatic Resource Management Council) responsible for crafting management policies in utilizing, conserving, protecting, and managing fisheries and other aquatic resources.

## 2.1.5. Thailand

### Coastal Conditions and Current Threats

The Kingdom of Thailand is located in South East Asia, and has a population of over 68 million. The country covers 513,000 km<sup>2</sup> of land and 322,280 km<sup>2</sup> of water. Thailand has a total coastline of 2,880



km; 1,920 km of which is on the Gulf of Thailand and the other 960 km is on the Andaman Sea. The coastline covers 24 provinces. The coasts are rich with marine and natural resources and ecosystems which include coral reefs, mangrove forests, sea grasses, karst limestone islands and beautiful sandy beaches. (Pornsook et al, 2003). Of which, mangrove resources are especially rich, with seventy-eight (78) mangrove species with thirty-three (33) true mangrove species reported; dominated by Rhizophoraceae, Sonneratiaceae, Avicenniaceae and Meliaceae.

Rapid loss of mangrove and other coastal ecosystems and resources are occurring due to coastal development, land reclamations, coastal aquaculture, in particular shrimp farming and tourism activities.

In 1961 mangroves covered an area of 368,000 ha and by 1993 this area has decreased to 169,000 ha. There has been some recovery, for example, in 2014 mangrove area reported an increase to 245,000 ha attributed to effective restoration policy such as mangrove rehabilitation programmes and reduction of mangrove encroachment; however, challenges like coastal erosion and pollution threatens mangroves in Thailand (Thampanya et al, 2003).



Photo 2.5. Phusit Horpet, participant from Thailand

## Coastal and Climate Change Governance

The Kingdom of Thailand ratified the UNFCCC and the Kyoto Protocol in 1994 and 2002, respectively. In 2007, the National Committee on Climate Change, the Office of Climate Change Coordination and the Greenhouse Gas Management Organization (TGO) were established to serve as an important forum for discussing and formulating climate policy. The Strategic Plan on Climate Change was approved by the Cabinet in 2008 and provided a framework for national responses to climate change. In 2009, the Office of Natural Resources and Environmental Policy Planning (ONEP) developed a draft policy titled the National Master Plan on Climate Change (2010-2019), which was later replaced by the Climate Change Master Plan (2012-2050).

The Department of Marine and Coastal Resources (DMCR) under the Ministry of Natural Resources and Environment (MoNRE) is the main organization responsible for marine and coastal resources protection, conservation rehabilitation, and integrated management of the sea and the coastal resources. The organization is mandated to create balance and wellness between society and the economy in Thailand. There are also various organizations that support coastal management, like the Department of Fisheries, Department of National Park Wildlife and Plant Conservation, among others.

Recently, there were new laws and enforcement enacted to support the DMCR and other involving agencies' roles. The Marine and Coastal Resources Management Promotion (MCRMP) Act B.E. 2558 (A.D. 2015), enabled strong leadership by the DMCR, and provided local governments with the authority to act. The support of central agencies provided both the legal basis as well as the required leadership to bring about an integrated and participatory approach to coastal and marine resources management. In addition, regular monitoring and reporting of results, as well as raising awareness of the general public remain central to the success of any natural resources' manage-



Photo 2.6. Vu Tran Ngoc Cam, participant from Vietnam

ment approach. In this context, a new fisheries law, the Royal Ordinance on Fisheries B.E. 2558 (2015), and a new National Maritime Security Plan (2015-2021) regulation procedures were outlined.

## **2.1.6. Vietnam**

### **Coastal Conditions and Current Threats**

Vietnam is one of 25 countries considered to possess a uniquely high level of biodiversity. It is ranked 16th worldwide in biological diversity (MONRE, 2015). Furthermore, because of its' 3,444 km coastline, Vietnam is home to 1,438 species of freshwater microalgae, 794 aquatic invertebrates and 2,438 species of sea fish (MONRE, 2015). The coastal area accounts for 17% of the total area of the country, and is inhabited by more than 20 million people, with an average population density of about 267 people per km<sup>2</sup> which is 1.2 times higher than average density of the country (Nguyen et al, 2014). Coastal provinces enact legal documents which are used to guide and give direction to municipal level governments. The Decision, Protocol, Resolution and other documents support the legal documents for better management of coastal regions. The establishment and approval progress of coastal management activities take place mainly in the processes in Thai Binh, Hai Phong, Quang Ninh, Nam Dinh, Soc Trang and Kien Giang.

### **Coastal and Climate Change Governance**

Vietnam ratified the UNFCCC in 1994, and in 2005, after three years of ratifying the Kyoto Protocol, Prime Minister Phan Van Khai issued a Directive on Organizing the Implementation of the Kyoto Protocol and approved the Plan to implement the Kyoto Protocol from 2007 to 2010. Climate change issues are under the responsibility of the Ministry of Natural Resources and Environment (MONRE), which is the focal point to implement the UNFCCC and the Kyoto Protocol. Within MONRE, the Department of Meteorology, Hydrology and Climate Change (DMHCC) is assigned to coordinate climate change related activities while the Department of Legal Affairs (DLA) advises on the legal aspects of climate change including legislation development, review and implementation. The National Committee on Climate Change, which is the key institutional body for overseeing climate change policy was established as an advisory agency for the Prime Minister. Other notable initiatives by the government are included in Table 2.2:

**Table 2.2: Notable initiatives by the Government of Vietnam**

| Year | Legislation  |
|------|--|
| 2008 | The Action Plan Framework for Adaptation and Mitigation of Climate Change of the Agriculture and Rural Development covering the period from 2008 to 2020 was issued by the Ministry of Agriculture and Rural Development<br><br>The National Target Programme to Respond to Climate Change |
| 2011 | The National Strategy on Climate Change was approved by the Prime Minister   |
| 2012 | The National Action Plan on Climate Change, Period 2012-2020, was issued to implement the National Strategy on Climate Change<br><br>The National Strategy on Environment Protection to 2020 With Visions to 2030 and the National Green Growth Strategy were also approved                |
| 2014 | The revised Law on Environmental Protection was passed requiring activities relating to environmental protection to be harmonised with the responses to climate change   |

## 2.2. Ecosystem-Based Adaptation (EBA) – Synthesis from SEAR

The concept of Ecosystem Services is slowly being implemented and mainstreamed in the Malaysian natural resources management. Malaysia has active participation in the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). Although Ecosystem-Based Adaptation (EBA) has not been actively implemented, elements of EBA can be found in the activities and programmes under the Malaysia Plans, as follows:

- Sustainable water management in the form of ICZM and Integrated Water Resource Management (IWRM)
- Disaster risk reduction (i.e. restoration of degraded coastal ecosystems, particularly mangrove ecosystem)
- Establishment of marine and coastal protected areas (MCPA) of different types of ecosystems
- The “Coral Triangle Initiative (CTI)” consisting of six (6) countries

Vulnerability assessment was carried out along the shorelines of the West Coast of Peninsular Malaysia and East Malaysia (i.e. Sabah and Sarawak). In responding to Viet Nam’s need for a detailed guidance to assess and implement EBA, the World Bank, the World Wide Fund for Nature (WWF), and the Institute of Strategy and Policy on Natural Resources and Environment (ISPONRE) under the Ministry of Natural Resources and Environment (MONRE) jointly developed a framework for EBA and field-tested it in the coastal districts of the Ben Tre province in Viet Nam under the guidance of key line ministries, which formed a stakeholder working group in Viet Nam.

Additionally, non-governmental organization such as the Centre for Marinelife Conservation and Community Development are now trying to implement the concept of EBA in coastal provinces, Nam Dinh, Quang Binh, Ha Long, for example. They believe that with the help of technical and environmental specialists, EBA and more modern livelihood would raise the income and life quality of coastal region without harm to the environment. So far, they have developed some livelihood models for local people which have high economical effectiveness. The local people are also learning about methods to minimise damages cause by natural disasters. The efforts by municipal and the provincial government

authorities of Puerto Princesa and the Province of Palawan (Philippines) in protecting coastal resources, an annual celebration of the "Love Affair with Nature" is held every 14th day of February, a good example of local scale initiative to generate awareness. This entailed mangrove planting after the mass wedding ceremony that was held. The Municipal and the Provincial governments of Puerto Princesa and Palawan also led and participated in the annual international coastal clean-up day. To protect the coastal resources from erosion and siltation, the governments of the City of Puerto Princesa and the Province of Palawan organise a celebration of the Pista Yang Kagueban each year (Feast of the Forest), during which all agencies together with the academic institutions are obliged to join the celebration by planting trees (2 or more seedlings per person).

Climate change issues are addressed in both development plans with elements of ecosystem services being highlighted within the context of Environmental Sensitive Areas (ESA) concept. Although the concept of ecosystem services is still in its infancy in Malaysia, it is currently slowly being implemented in the management system and development plans. Malaysia is also playing a significant role in the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES) where the 4th Plenary was conducted in Kuala Lumpur, Malaysia in 2016.

**On a global and regional scale, EBA is gaining attention in international dialogue on coastal management. Although EBA has concrete theoretical background, its practical application still remains in the developmental stage with few examples available that demonstrate effective implementation.**

### **2.3. Needs and gaps in Coastal Management System in SEAR**

The states in the region have long shorelines with a range of coastal and marine resources. A loss in resources due to human activities has been observed in all the reporting countries. Coastal management and climate change governance in these countries are robust and are a strong indication that these countries are committed towards achieving sustainable development. Ecosystem-Based Adaptation is slowly being adopted by these countries as a means to adapt to climate change. Each country in the SEAR needs to consider coastal management seriously since marine resources have great social and economic benefit. However, they are facing major challenges in achieving sustainable management.

For example, in Indonesia, spatial data and information that are important for management planning (WP-3-K) are quite hard to access and understand. It forms the basis of all decision-making in sustainable management and also as a tool in evaluating the planning interventions. Accurate and reliable data is indispensable for realizing WP-3-K and incorrect data will lead to faulty decision-making and unbeneficial planning management. One of the documents that must be prepared is the Zoning Plan of coastal areas and small islands compiled by the province. The plan divides the coast into conservation areas, common use area, groove area, and national strategic area. Spatial data and information needed for the preparation of the Zoning Plan include 12 datasets consisting of: terrestrial datasets, bathymetry, geology and geomorphology of the sea (seabed substrate), oceanography, ecosystems, land use, the existing use of marine areas, infrastructure, the suitability of land/marine waters, social and demographic, economic regions and disaster risks and pollution. Each dataset consists of one or several types of thematic maps with a scale of 1:25,000-1:250,000. It seems these kinds of information may be hard to understand and access.

Malaysia has the same problem as Indonesia, with respect to accessing data. Coastal management is guided by the NPP2 and NPP-CZ, in reality though the policies within these documents are not fully implemented. Most of the time politicians play a major role in most of decision-making related to the

coastal zone. Meanwhile, data are scarce, especially data that shows seasonality. Even if data is available, getting access to the data is sometimes close to impossible. Consequently, the reliability of assessments depends on budgetary constraints. Data acquisition is not complete.

In Myanmar, information on existing or planned development projects has been compiled, providing a basis for future planning. However, human, financial and technical resources available for coastal resource management, particularly enforcement and monitoring of activities, are overburdened by multiple responsibilities. They are also insufficient to support a more coordinated framework for coastal zone management. The Municipal and Federal governments, NGOs and private investors are looking for reports that will also raise awareness of the need for sustainability in all aspects of coastal and infrastructural development, and partners and alliances are being sought. The country needs to focus on establishing a Mangrove Management Committee and also needs to formulate the Policy on Conservation and Management of Mangrove and related ecosystems and Plan of Action to improve conservation and the management of Myanmar's mangroves. Concurrently, raising awareness on wetland ecosystem should be developed among various sectors and community with the assistance of local and international NGOs. Establishment of mangrove plantations, consisting of suitable mangrove and other forest growing species, should be launched in degraded and abandoned land to meet the local and regional needs, and environmental conservation. The community forestry activities should be generated, especially in Ayeyarwady mangroves, by the establishment of plantation and effective protection of natural forests.

In the Philippines, especially in Puerto Princesa City, for students and researchers in coastal fields, data are being presented at various conferences, conventions, and symposia that are held at local, national or international level. To obtain more data and or information on the existing coast of West Philippines and its adjacent areas, the Western Philippines University is organizing and hosting the West Philippines Sea Conference every two years. To centralise information, the Palawan Council for Sustainable Development, in partnership with higher education institutions in Palawan (Western Philippines University, Palawan State University and Holy Trinity University) established a knowledge platform wherein studies and/or researches conducted in the Palawan Island and islets presented at a yearly symposium are being downloaded and made available to all needing agencies.

Despite various kinds of coastal management activities and the increased level of awareness in Thailand, there is still a necessity for basic data, information and knowledge on vulnerability assessments, implementation and monitoring of adaptation activities from the local upto higher levels. It is good cooperation and collaboration that minimises the data gaps among all stakeholders including scholars, experts, ministries and related personnel. Combining traditional and contemporary scientific sources, by engaging community-based knowledge holders, as well as natural and social scientists is highly needed. Knowledge and capacity building programmes on the concept of EA with continue participation from all members of a community (in particular women), local schools and university students are significantly required.

When EBA, Sustainable Management and Coastal Ecosystem Protection are discussed in Vietnam, it is important to highlight the need for data, information and knowledge required for project assessments and efficiency; integration and input of accurate databases will result in high quality outcomes. To be successful in implementation, the EBA and sustainable projects in coastal regions of Vietnam needs to increase the awareness and capacity of adaptation methods (including EBA). This would entail the development of a framework for assessing, implementing and mainstreaming EBA measures to empirically show how EBA projects will reduce vulnerability. There has been a significant gap between documents and the real-world situation, which is the reason why EBA has still not been widely applied as yet. There are also problems with overlap between different legal documents which created difficulties

in implementing projects. EBA and sustainable management can only be a success if only those gaps are filled and when researchers and policy makers understand one another. In conclusion, the coastal regions are very important for managers, researchers, or policy makers and the people who live in the region since they are directly affected by these problems. However, all countries in the SEAR are believed to have gaps in accessing coastal data and information and need great attention placed of finding suitable solutions.

## **2.4. Need to Strengthen EBA and ICZM Capacity in SEAR**

In order to support the management of coastal areas, youth and students in Indonesia are involved in activities such as "Let us plant the mangrove!", group beach clean-up, Indonesia Coastal Education, and mentoring activities for youth and students in the outermost small islands.

### ***Reflections from ENGAGE project***

Malaysia recognised the imminent need to strengthen the capacity of young professionals, academics and government officials. They also encourage young people to become more actively involved since their generation will inherit the Earth, therefore they should be given priority when the opportunity for capacity building in EBA and ICZM arises. For Malaysia, communication is rather important to ensure that connectivity is established.

Meanwhile, Myanmar is concerned about EbA and ICZM. Therefore, it is necessary to promote and encourage exchanges of knowledge between different stakeholders incorporating both, traditional practices and new methodologies. They believe that this will help strengthen the capacity of young professionals, academics, managers and institutions in Myanmar on EBA and ICZM.

Learning new things, ways or means, strategies, and or methods, approaches and others, are the challenges for an individual and community in The Philippines. Currently, researchers, community workers, academicians, and government officials have different approaches to EBA and ICZM. As this happens, there is a need to strengthen and change their perception into team work for better and more consistent outcomes. This means all human resources should get together to have a common understanding and concept in the near future.

In Vietnam, EBA and ICZM programmes require significant human resources to be implemented throughout Vietnam. There should be a number of specialists and technical staff in each coastal region to help local people understand these programmes thoroughly and apply them in an appropriate way. It is essential to strengthen the capacity of the young, professionals, academics, government officials, this includes;

- Departments having state management functions advising in developing policies and guidelines for adaptation and mitigation measures under Ministry of Natural Resources and Environment (MONRE); Ministry of Agriculture and Rural Development (MARD); Ministry of Planning and Investment (MPI) and others
- Departments of Natural Resources and Environment (DONRE), Ministry of Agriculture and Rural Development (DARD, Ministry of Planning and Investment (MPI) and others that are responsible for policy management and implementation at provincial level
- Non-government organizations working on conservation and development; and
- Research institutes, universities and consultancy firms working on and interested in climate change in Vietnam

## 2.5. Need for a Platform for Climate Change Preparedness

Climate change is a severe challenge not only in the SEAR but also throughout the world because of its unpredictable features. To prepare, the Ministry of Marine Affairs and Fisheries (MMAF) in Indonesia created a community-based programme that is called by Coastal Climate Resilience Village/Area (CCRV/A) or locally known as Pengebangan Kawasan Pesisir Tangguh (PKPT). This programme aims to prepare communities in coastal areas and to enhance their resilience disaster management and adapting to climate change. In 2016, many community groups from 16 agencies participated in this (PKPT).

In Malaysia, climate change has been a main concern of the government. In 1994, the National Steering Committee on Climate Change (NSCCC) was established to guide and endorse operational matters regarding climate change. The NSCCC falls under the Environmental Management and Climate Change Division of the Ministry of Natural Resources and Environment (NRE), which is Malaysia's focal point to the UNFCCC. The National Policy on Climate Change was endorsed by the Cabinet in 2009. These policy, The National Physical Plan 2 (NPP2) and the National Physical Plan for Coastal Zone (NPP-CZ), are the main development plans for the management of the coastal zone, although both only cover the Peninsular Malaysia. Climate change issues are addressed in both development plans with elements of ecosystem services being highlighted within the context of Environmental Sensitive Areas (ESA) concept. Although the concept of ecosystem services is still in its infancy in Malaysia, it is currently slowly being implemented in the management system and development plans. Malaysia is also playing a significant role with respect to the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES) - the 4th Plenary was conducted in Kuala Lumpur, Malaysia in 2016.

In order to protect the coastline and the diverse ecosystem, Myanmar is trying its best to solve the climate problem but it will be more effective if climate preparedness is integrated with the county's existing coastal management practices for better results. For this regional level training, dialogue and other necessary activities are important to implement this requirement:

- The National Level Management Committee should integrate climate preparedness in the county's existing coastal management practices;
- Good cooperation to minimise the data gaps among experts, specialists, scholars, scientists, all ministries and related personnel is needed; and
- There are requirements for national and international level database including all related information about the climate condition and coastal management systems.

Developing information system platforms are effective approaches. In The Philippines, information uploaded in the platform can be made available through direct viewing or even made available to other individuals by downloading such information. Data on areas that are related to climate change sensitiveness can be posted and made available to coastal management planners for consideration on the projects they are planning to put up. For wide dissemination on payments for any ecosystem services, establishing a platform would be beneficial. This also guides vacationers in choosing places to visit based on their financial restrictions. In 2011, the National Government established The Philippine National Aquaculture Project (PNAP) with Palawan as a beneficiary. This project was implemented by two universities, Western Philippines University and Palawan State University, with the intent to alleviate poverty, to attain food security for the direct beneficiaries and the rehabilitation of denuded mangrove areas. The project includes planting mangrove seedlings and aquaculture. In planting mangroves, the beneficiary receives payment from the collection of propagules to use for planting until the propagules are in their full-grown seedlings stage. While on the aqua-siviculture part, a selected community has been divided into groups with each group being given twenty thousand pesos (P20,000) or approximately USD 430 for growing crabs and shrimps.

It is pertinent to set up a platform to examine and understand connectivity in climate change and coastal management. Vietnam is a country that suffers great damage from climate change, especially in coastal regions where both the intensity and frequency of storms are becoming greater. In order to prevent such damage and maintain the quality of life for local people, there should be some integrated climate change preparedness programs conducted in coastal region so that the people can adapt and even take advantage of climate change. The management system could also be more effective if local people understand and are aware of the importance of ecosystem services. Openings for integrating climate change preparedness into the existing coastal management system should be identified including: technical support projects on mainstreaming climate change into coastal management system. Workshops, conferences and courses on Ecosystem-based Adaptation, Integrated Spatial Planning (ISP) and Integrated Coastal Zone Management (ICZM) should be held to strengthen the platform.



## CHAPTER III: MAPPING REGIONAL CAPACITY GAPS AND NEEDS

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**Expectation and opinions from participants were collected and analyzed in this chapter in order to show the outcome of ENGAGE program.**

Rising temperatures and climate change, rapid urbanization and random development patterns are having enormous ecological, economic and social impacts on coastal ecosystems and these are expected to intensify in the future. Increasingly, we need experts actively contributing to innovative solutions. For communities to acclimatise and sustain themselves, they need capacity building, knowledge and collaboration across sectors, geographies and peers. We need to strengthen the capacity of the next generation of researchers, the private sector and government agencies to update the knowledge and catalyze those across sectorial partnerships in integrated coastal zone management. In SEAR, up-to-date data and information on coastal dynamics is limited. At the national level, the states and experts are examining interconnectivities in coastal dynamics using a suite of information and communication tools such as internet and freely available geospatial data sets. Leveraging these tools further can also have huge influence on analysis and partnership building to support the ENGAGE programme to create a platform could facilitate such an exchange.

### 3.1. Structure, Design, Implementation and Expectations – The ENGAGE experience

Two main collaborators of the ENGAGE program, UNU-INWEH and Asian Institute of Technology, in Vietnam structured the ENGAGE programme to test an innovative training-cum-workshop (tcw) capacity development model with the objective to create an enabling environment and a discussion platform for sustainable management of coastal ecosystems in SEAR (Figure 3.1). The twin-framework included a three-day training and one day of multi-stakeholder's dialogue workshop. With 25 participants from 6 countries; researchers, development workers and governmental officials were involved with coastal issues in SEAR. They deliberated on various topics, interactive seminars and field visits. A key highlight of the programme was the exchange of experiences on the theoretical understanding and practical approaches to address and understand the characteristics, ecology, and functions of coastal ecosystems and Ecosystem-Based Adaptation as a management tool. According to the design, during the first session of the training participants were invited to list their expectations. Based on their responses, we ascertained four dimensions: gaining knowledge; sharing and learning; networking, and application in Climate Change Mitigation and Risk Assessment. Most participants expressed interest in gaining deep knowledge and wider understanding of coastal issues (see Figure 3.1 and 3.2).

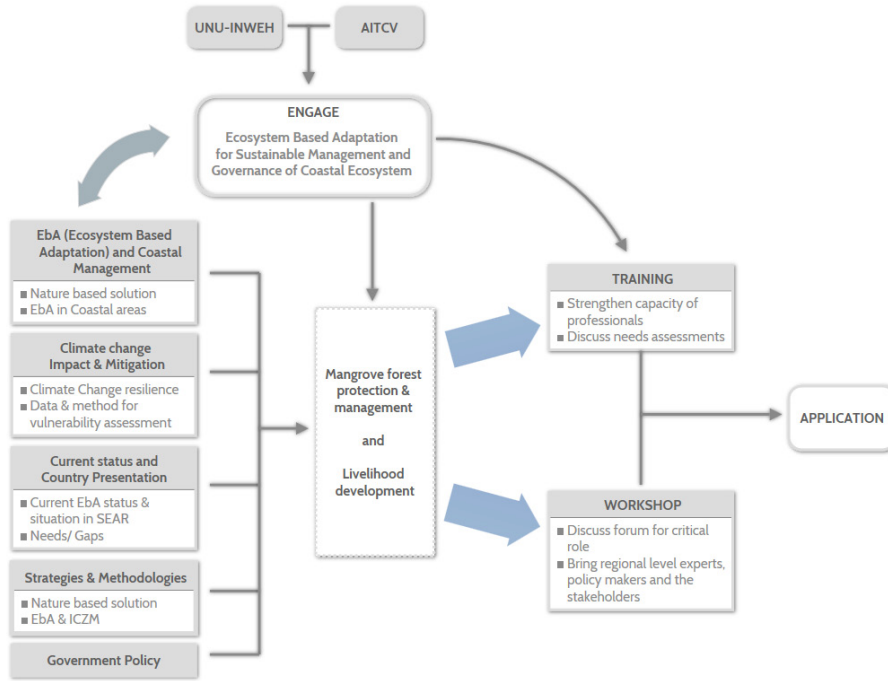


Figure 3.1 The Conceptual Framework applied in the ENGAGE Programme

The main content in the programme focused on practical solutions for sustainable coastal ecosystem management and community based approach models for sustainable coastal zone management, and joint development of a 'plan of action' for improving research, training and management in the SEAR region. The ENGAGE programme focused on developing in the wider adoption of 'Ecosystem- Based Management' since it is a cost-effective intervention that generates social, economic and cultural co-benefits, and contributes to the conservation of biodiversity, habitats and ecosystems. The group also discussed how this approach could provide practical knowledge to achieve the Sustainable Developments Goals., In this case- SDG14 (conserve and sustainably use the oceans, seas and marine resources). SDG 14 divided into 10 targets, which all promote the conservation and careful management of coastal and marine resources as a key feature of a sustainable future. To further explain this argument, the representative from UNU, discussed the Policy Brief on Seaweeds (Cottier-Cook, et al 2016) that presented 'policy recommendations' pertaining to this rapidly expanding enterprise.

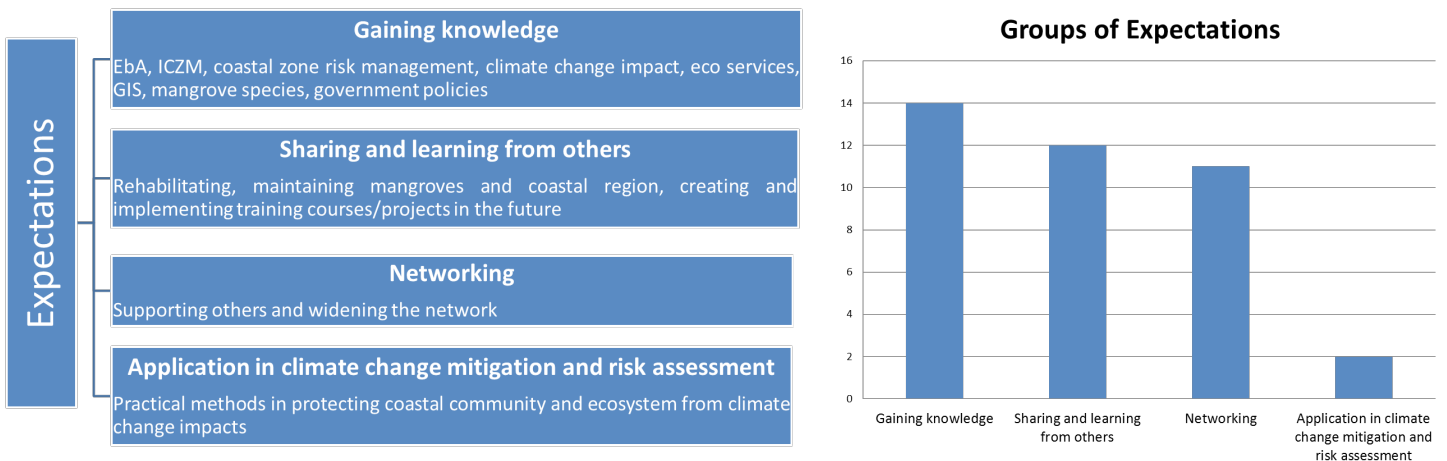


Figure 3.2 Expectation profiling mapping based on open discussion during the ENGAGE Programme



Photo 3.1 Training board of ENGAGE project (from left to right: Dr. Chu Thai Hoanh, Dr. Ngo Tho Hung, Dr. Nidhi Nagabhatla and Prof. Kathiresan Kandasamy)

Most stakeholders' current association's role and tasks are highlighted in Figure 3.3. Participation in the ENGAGE programme was of importance for them given their role in teaching and research on ecosystem services (EBA, ICZM, natural resource management, mangrove protection etc), economics, fisheries and climate change or starting a new programme about ICZM or leading a national /regional project on EBA. Most felt that by using this experience they could start their own capacity building activity linking coastal issues and climate change issues (also including, climate change mitigation and adaptation in urban area). The representatives from government agencies considered the ENGAGE programme in the context of policy discourse. A case study on the illustration of constructing clay models for aquaculture provided practical solutions (example) as to how technological interventions that are ecologically friendly can help to increase the production of coastal water by using. The complete list of case studies is shown in Table 1. Overall, the regional focus of the ENGAGE programme was captured both by the participants and the media as an important event that strengthened scientific cooperation regional partners and stakeholders.

- Officers and Assistants of officers
- PhD and Master Scholars
- Lecturers
- Researchers
- Directors or Head of Institutions
- Staff of University and Ministry
- Sustainable Development Managers

Figure 3.3: Affiliation chart of stakeholders

### Regional Representatives share about their role in their countries and how that links with the ENGAGE Objectives

- "I am currently a Senior Environmental Consultant with DHI Water and Environment in Malaysia. At the same time, I am a PhD candidate at the Dept. of Geography, University of Malaya (UM), and Malaysia. My PhD research is on environmental policy, focusing on ecosystem services and vulnerability of Ramsar sites in the straits of Malacca, which are mangrove ecosystems. Professionally, my responsibilities are leading EbA studies, advice business and governmental agencies on BMPs for environmental protection and conservation in Malaysia."
- "Lecturer/researcher in the University of Agriculture and Forestry, work tasks: teach Rural development, Natural resources management, research in Rural development (new rural), Community management, Environment and natural resources management, Water governance"
- "Private sector: Chiva-som international health resorts Co, LTD. Sustainable development manager - Corporate social responsibility in the wellness resort industry; Environmental preservation; ecological font print reduction; Integrated stakeholder wellness; Socio-cultural development; Economic sustainability, Mangrove preservation + Science education for community"
- "At present, I am the administrative assistant under the office of the councillor/representative of the indigenous people of the city government of Puerto Princesa. I basically draft resolution and programs suited for the need of the indigenous people off Puerto Princesa. Aside from this, I do part time jobs in mangrove and sea grass researches, whenever there is an opportunity. I am also working on my thesis (MS. Marine Biology) on carbon sequestration potential of mangrove seedlings and saplings in WPN fishpond."

As noted in Chapter 2, coastal ecosystems are not often examined comprehensively with regard to generating up- to- date evidence to support policy decisions. Different conditions in the region attribute these gaps either to the shortage of human resources, and more the lack of financial resources. As such, this ENGAGE programme aimed to fill the knowledge gap and strengthen the capacity of professionals to discuss and outline requirements for ecological services oriented towards integrated coastal zone assessment and opened a dialogue space for experts, specialists and policy makers in SEAR to promote a culture of knowledge exchange. While discussing the ecological services diversity of coastal ecosystems, the experts covered topics viz.: climate change impacts on coastal zones, how disasters such as cyclones, droughts and flood impact livelihoods and income opportunities for coastal communities; building capacity to address increasing incidents of diseases such as malaria, dengue, cholera, influenza, diarrhoea that are triggered by global warming and pose threat to human health and well-being.

As climate induced disasters are rising and with catastrophic impacts, the focus should be protecting and restoring the coastal ecosystems as carbon sink, since coastal vegetation, and mangroves have from 3 to 5 times higher carbon sequestration rate than the tropical forests. Mangroves also prevent soil erosion, control flood and protect ground water from salinization, turbidity of water, etc. It remains pertinent to jointly discuss solutions to tackle loss of coastal diversity. The group shared their experience on the Nature- based Solutions (NbS) approach to disaster risk reduction (DDR) and how an ecosystems approach can provide nature-based solutions that reduce risks and vulnerability of communities while generating a range of ecological benefits. Noting that the dialogue on ecosystems approach is increasingly gaining attention in the international and the local development planning deliberations, the ENGAGE programme was a timely start at a discussion platform.



Photo 3.2 Interactive discussion session of the ENGAGE Programme



Photo 3.3 Discussion on solutions for best approaches in coastal management

In the ENGAGE program, international experts in the field of climate change and coastal ecosystem, government officials, researchers, development workers, and representatives of stakeholders in South East Asian region (SEAR) participated. **The gender ratio was 52 percent female participation and 48 percent by men.** With regards to profession, more than half of the participants were lecturers and researchers in an academic setting and one third were government officers. Overall, the participants (>80 percent) felt satisfied with the structure of the programme and the thematic spread. These included knowledge sessions on policy implementing, opportunities to gain valuable knowledge and for researchers in the region to share experience, and important opportunities to network for future collaboration. A gender balanced group ensured that the discussions captured multiple perspectives (Figure 3.5).

The integrated approach discussed during the programme promoted a multi-scalar, comprehensive analysis that embedded field data, spatial statistics and stakeholder's perceptions. Implementing the targets and indicators (Figure 3.6) developed mainly for SDG 14 and also SDG 6 and 17 can benefit from the Ecosystem- Based Approach design. Considering that the EBA concept embeds multiple data layers and generates scenarios for better assessment and valuation of biodiversity and ecosystem services, understanding of driver and impacts of change, the approach can also advance concepts and research methods to integrate indigenous and local knowledge systems while realizing the development agenda. Developing common indicators related to institutions, governance and other indirect drivers, ecosystems goods and services can help create effective resource management tools and best management practice guidelines that can in turn assist implementation of development goals. For example, we selected a discussion topic on hard versus soft structure for coastal protection to explain the depth of discussion at the program. While most of the participants agreed to the protection of coastal ecosystems, the conventional approach for introducing embankment was quite popular, the cost for construction of hard structure could reach hundreds of billions of Vietnam Dong.

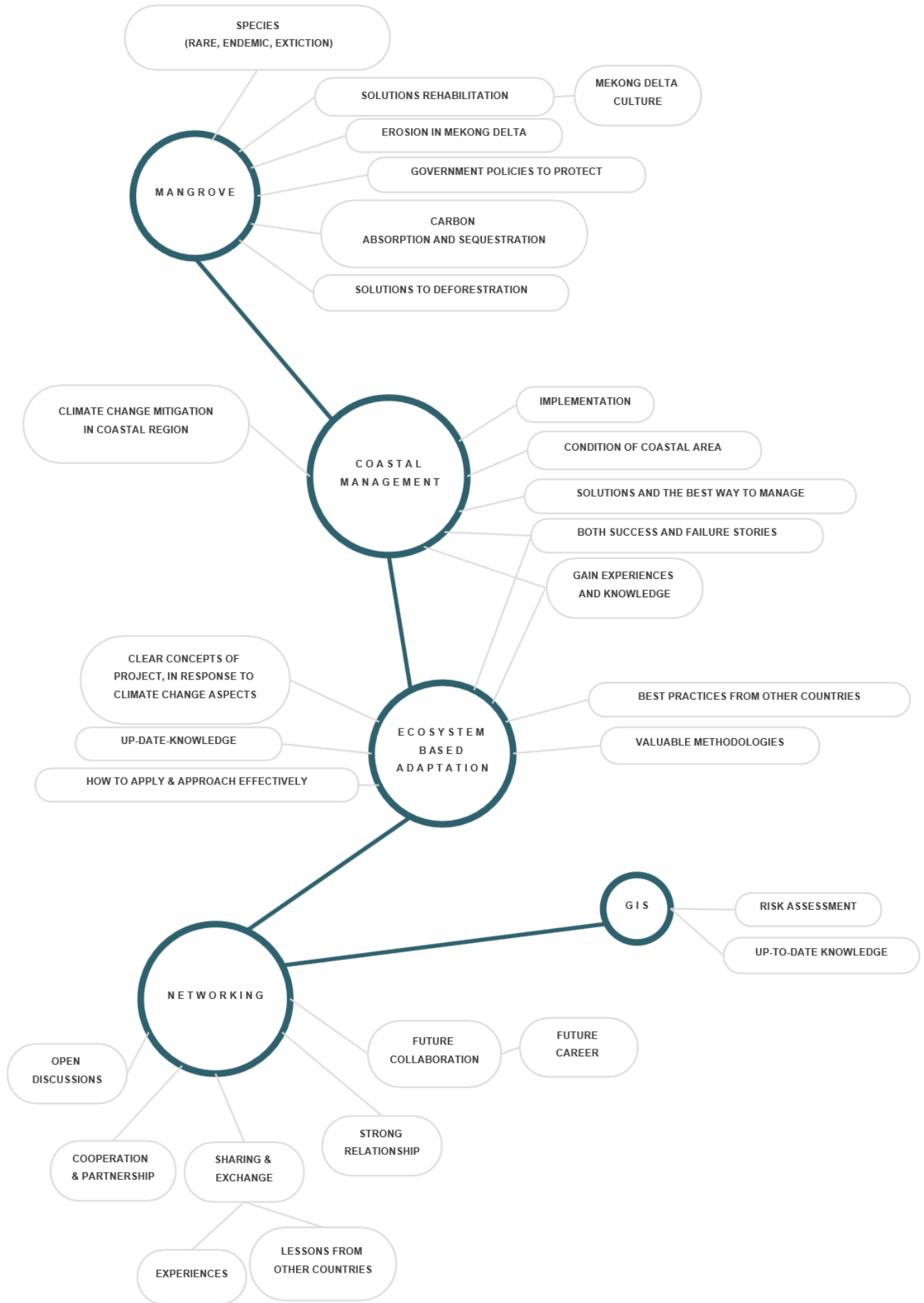
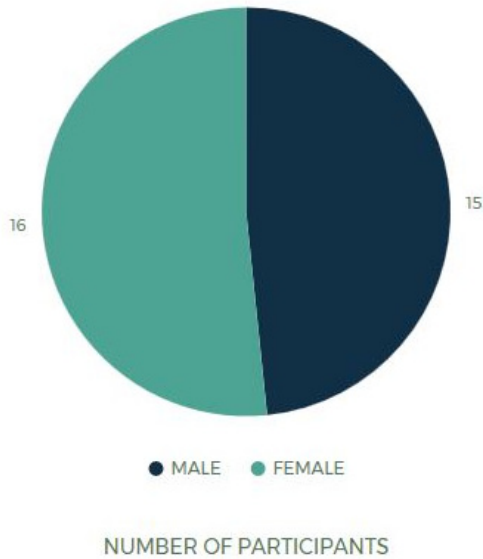


Figure 3.4 Expectation Mapping during the ENGAGE programme

## GENDER BALANCE



## INSTITUTE PARTICIPATION

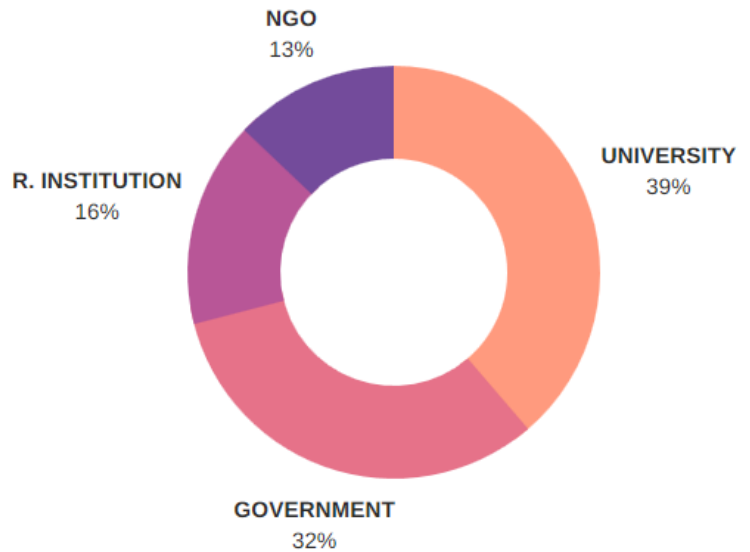


Figure 3.5 Gender balance of participants for the ENGAGE programme and Institutions that have participated

Additionally, the flow and tidal regime is quite hard to predict and lack of comprehensive information on such topics, makes it difficult to argue that construction of hard structures is the only solution. Some countries in the region are discussing the option of soft structures like coastal vegetation including, mangroves as a tool to manage the tidal dynamics at a much lower cost (1/10 to 1/20), compared to a construction of embankments (hard structure approach). Discussions are ongoing on how the government should incentivise management strategies that embed the concept of ecosystem services in discussion with the community. In Vietnam, the coastal regions where there are currently no embankments, the coastal communities are planting and nursing mangroves to create a natural fence to protect the coast while creating sustainable livelihood options. Owing to the advantages, this model could be replicated in the SEAR. The community-based and ecosystem-based approaches are considered to be complimentary.

| TARGETS     |  | INDICATORS    |   |
|-------------|--|---------------|---|
| <b>14.1</b> | By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution  | <b>14.1.1</b> | Index of coastal eutrophication and floating plastic debris density   |
| <b>14.2</b> | By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans   | <b>14.2.1</b> | Proportion of national exclusive economic zones managed using ecosystem-based approaches  |
| <b>14.3</b> | Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels   | <b>14.3.1</b> | Average marine acidity (pH) measured at agreed suite of representative sampling stations  |
| <b>14.4</b> | By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics   | <b>14.4.1</b> | Proportion of fish stocks within biologically sustainable levels  |
| <b>14.5</b> | By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information  | <b>14.5.1</b> | Coverage of protected areas in relation to marine areas   |
| <b>14.6</b> | By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation | <b>14.6.1</b> | Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing   |
| <b>14.7</b> | By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism   | <b>14.7.1</b> | Sustainable fisheries as a percentage of GDP in small island developing States, least developed countries and all countries   |
| <b>14.A</b> | Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries                           | <b>14.A.1</b> | Proportion of total research budget allocated to research in the field of marine technology   |
| <b>14.B</b> | Provide access for small-scale artisanal fishers to marine resources and markets   | <b>14.B.1</b> | Progress by countries in the degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries   |
| <b>14.C</b> | Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of The Future We Want   | <b>14.C.1</b> | Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nation Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources |

Figure 3.6: SDG 14 – targets and indicators (Source: [https://sustainabledevelopment.un.org/sdg14\\_](https://sustainabledevelopment.un.org/sdg14_))



**Table 3.1: Thematic coverage of the topics and themes of the ENGAGE programme – Training Session**

| TOPICS   | DESCRIPTIONS   |
|--|--|
| <p><i>Ecosystem-Based Approach, data and indicators</i></p> <p><b>Presenter: Nidhi Nagabhatla</b></p>  | <ul style="list-style-type: none"> <li>Ecosystem-Based Approach is designed to apply in Applied Spatial Ecology for BES-Biodiversity and Ecosystem Services Assessment (BASE). It is the integrated (field data + spatial models) frameworks for biodiversity and ecosystem services assessment and valuation trends, patterns, driver and impacts of change such as spatial temporal analysis.</li> </ul>   |
| <p><i>Ecosystem-Based Adaptation in the coastal areas of the Mekong river delta, Vietnam (a case study in Ben Tre)</i></p> <p><b>Presenter: Le Anh Tuan Ngo Thuy Diem Trang</b></p>                    | <ul style="list-style-type: none"> <li>The Mekong Delta River in Vietnam: The diversity facilitates people to develop livelihoods such as brackish and saline water aquaculture, capture fisheries, mangrove forest planting and exploiting, and vegetable and upland crops.</li> <li>Purpose: to strengthen the resilience of Ben Tre province to the impacts of climate change through EBA.</li> <li>Due to the pros and cons caused in the implementing of EBA, multiple mechanism and approaches should be integrated when developing adaptation strategies and actions.</li> </ul>                                |
| <p><i>Nature-based solutions to disasters risk reduction and management of coastal ecosystems</i></p> <p><b>Presenter: Kathiresan Kandasamy</b></p>  | <ul style="list-style-type: none"> <li>By protecting and restoring the coastal ecosystems, especially with mangrove forest, can reduce global warming. Mangrove sequesters carbons 10 times greater than tropical forest.</li> <li>Mangrove can reduce the height and speed of storm surges and tidal waves, dissipate wind and wave energy, and acts as a buffer against salt water intrusion. Furthermore, soil erosion, flood, tsunami and salinization are prevented by mangroves.</li> <li>Planting and nursery are now very important to take advantages from it.</li> </ul>                                     |
| <p><i>Ecosystem-Based Approach in the mangrove forest management and livelihood development in Cat Ba Biosphere Reserve, Hai Phong, Vietnam(Case study)</i></p> <p><b>Presenter: Than Thi Hien</b></p> | <ul style="list-style-type: none"> <li>Vulnerability assessment, sustainable livelihood framework and SWOT analysis were used to apply the EBA in Cat Ba Biosphere</li> <li>Within the recent 5 years, 30% of households in Phu Long have been impacted by climate change, the average loss and damage to fisheries and aquaculture</li> <li>The SWOT analysis identified strength, weakness, opportunities and challenges of each side to come up with recommendation for better management in coastal areas so that the ecosystems health is maintained through the community-based adaptation activities</li> </ul> |
| <p><i>Climate change data processing for local use</i></p> <p><b>Presenter: Chu Thai Hoanh</b></p>   | <ul style="list-style-type: none"> <li>Data Distribution Center (DDC) provides observed climate data sets, global climate model data, socio-economic data and scenarios, data and scenarios for other environmental changes in two approaches (sequential and parallel approach)</li> <li>In order to establish an accurate model, it is necessary to collect updated information on CC data, download CC data from DDC and other sources, process data, downscale and use bias correction and analyze statistically</li> </ul>  |
| <p><i>Dimension index method for climate change vulnerability assessment</i></p> <p><b>Presenter: Ngo Tho Hung</b></p>   | <ul style="list-style-type: none"> <li>Vulnerability risk assessment (VRA) framework examines a variety of case studies that seek to characterise the vulnerability of specific populations or spaces (presenting quantitative estimation of the risks caused by climate change at both the regional and local levels)</li> <li>The limitations of this approach are dependent on the quality of information collected.</li> </ul>   |
| <p><i>Tidal regime, flow and water quality in the Mekong River Delta</i></p> <p><b>Presenter: Chu Thai Hoanh</b></p>   | <ul style="list-style-type: none"> <li>The tidal regime, flow and water quality have great effects on productivity in the Mekong River Delta. Annually, Vietnam exported 4 million tons of rice by the end of 1990s, but the price had declined by 30%.</li> <li>Shrimp culture has improved. It is trained to survive under low salinity (2 ppt) and the water quality is monitored and managed carefully to keep the survive rate higher to export shrimp to international markets</li> </ul>  |
| <p><i>Strategic mainstreaming of Ecosystem-Based Adaptation (EBA) in Vietnam</i></p> <p><b>Presenter: Tran Thi Kim Lien</b></p>  | <ul style="list-style-type: none"> <li>EBA in Viet Nam was piloted in terrestrial and coastal ecosystem. (in Ha Tinh and in Quang Nam)</li> <li>Some challenges that need to be solved:             <ol style="list-style-type: none"> <li>Lack of capacity on EBA at both national and provincial level,</li> <li>Identifying the approaches for the mainstreaming of EBA into Planning Processes, and</li> <li>Identifying the appropriate EBA measures: selection dependent on specific conditions of a province/country,</li> </ol> </li> </ul>  |

\* Details of the presenters and presentations from the Agenda listed in the Annexure

### 3.2. Stakeholder Analysis and Evaluation of the ENGAGE Programme

The participants' responses on the programme evaluation (form attached in Annex 2) were collected, assimilated and analyzed. A total of 31 participants from 6 countries (Vietnam, Thailand, The Philippines, Indonesia, Malaysia and Myanmar) attended the training cum workshop (tcw) capacity development activity held in Vietnam. They were from countries in the SEAR that host most of the world's mangroves. This indicates that the ENGAGE programme fairly reached audiences in countries that require the immediate attention to mangrove rehabilitation and protection, and also contributed significantly to implementation of EbA and ICZM. (Figure 3.9) In addition, the representatives from SEAR also evaluated the overall design, structure, approach and implementation of the ENGAGE program. These perspectives are captured in the visual (Figure 3.10) below.

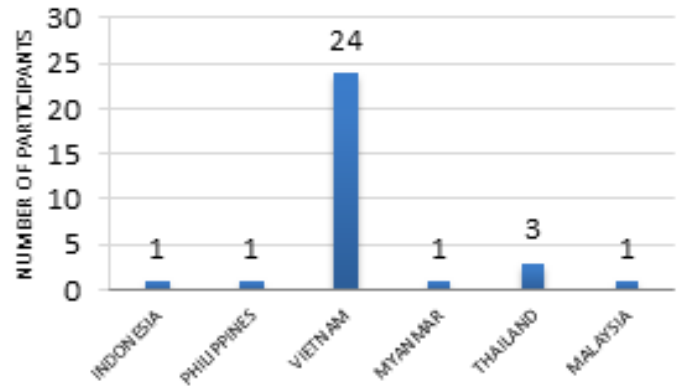
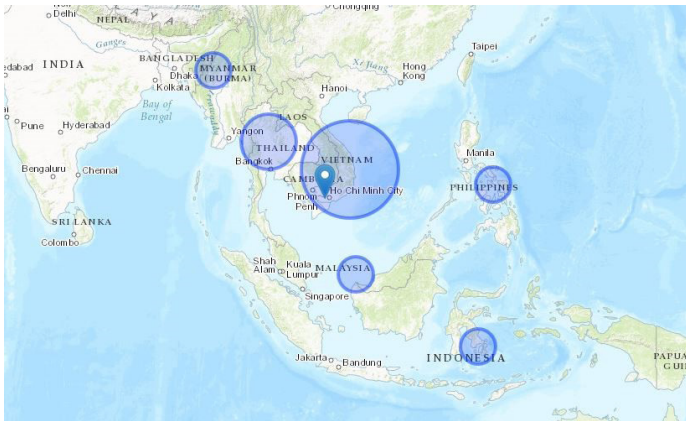


Figure 3.7 Representation by states in SEAR

Commenting on the usefulness of the program, 45 percent of the participants stated that gaining information and knowledge on Ecosystem- Based Management Approach to coastal resources was the most valuable part of the ENGAGE program. In addition, lectures and discussion sessions about knowledge pertaining to the implementation of EBA and coastal management tools, climate change impacts, functions of mangroves, rehabilitation solutions and methodological tools to plan interventions were among most significant contributions of the programme (see Figure 3.9).

#### Regional representative's perspectives on the usefulness of the ENGAGE Programme

- "Most useful: success stories of EbA implementation, mangrove ecosystems rehabilitation techniques, information on the Mekong Delta, least useful: to be honest, none!"
- "Sharing scientific knowledge, Sharing country case studies, Open dialogues/interaction with multi stakeholders"
- "The most useful point of this course is that I can understand coastal management techniques throughout the lecturer and sharing experience of professors"
- "Most useful presentations and exchange of country status of EbA and mangrove information, case studies, meeting and networking of trainers and participants, team building. Least useful part is Can Tho City is 3.5 hours from Ho Chi Minh City"
- "The most useful thing is to build network"
- "For me, anything from this course is useful. Because we can get some information, and exit strategy helps to finish the problem about ICZM condition in my country"

**Table 3.2: Selected thematic coverage of the topics and themes of the ENGAGE programme – Training Session**

| TOPICS /PRESENTER  | DESCRIPTIONS   |
|--|--|
| <p><i>Community- based management in India</i></p> <p><b>Presenter: Kathiresan Kandasamy</b></p> | <ul style="list-style-type: none"> <li>• Community- based management is increasing adopted in the South and the South East of Asia for a successful in a long term with cheaper investment. Thanks to it, mangrove cover has been increasing in India at an annual rate of 1.2% (112km<sup>2</sup> of mangrove in total), when the world losses 0.66% areas with mangrove cover each year.</li> <li>• The strategy for management of mangroves in India is n promontory, regulatory and participatory. Moreover, in 2011, Indian Coastal Regulation Zone Notification (CRZ) was established to ensure livelihood security for coastal people, conserve and protect coastal stretches, and to promote development in a sustainable manner based on scientific principles, considering dangers of natural hazards and sea level rise due to global warming.</li> <li>• The community-based management have helped local community in developing sustainable livelihood such as nursing Polychaete worms, mud crab fattening, seaweed cultivation, mushroom cultivation on marine fish waste, and hygienic tunnel solar dryer, which improve local income and also their life quality.</li> </ul> |
| <p><i>The ENGAGE programme</i></p> <p><b>Presenter: Nidhi Nagabhatla</b></p>                     | <ul style="list-style-type: none"> <li>• The ENGAGE programme is the short for Ecosystem- Based Adaptation for Sustainable Management and Governance of Coastal Ecosystems. It uses training cum workshop model in order to strengthen the capacity of professionals, discuss current status in the SEAR region, open dialogue space for concerned experts, promote and encourage exchanges of knowledge.</li> <li>• The topics it covered are mainly a plan of action for improving research, training and management in the SEAR region, primarily focusing on Ecosystem- Base Adaptation Approach because this approach is cost-effective, generates social, economic and cultural co-benefits and it contributes to the conservation of biodiversity. It also is a great way to achieve the sustainable development goal 14 (SDG14) divided into 10 targets to follow, which are all conserving and sustainably using the oceans, seas and marine resources for sustainable development.</li> <li>• Both opportunities and challenges facing the global seaweed agriculture are highlighted in the Policy Brief of UNU-INWEH.</li> </ul>   |
| <p><i>UNU training course in CAS-MB, India</i></p> <p><b>Presenter: Kathiresan Kandasamy</b></p> | <ul style="list-style-type: none"> <li>• The 15th International Course on Mangrove Ecosystem was held in the Centre of Advanced Studies in Marine Biology, Annamalai University, India.</li> <li>• This two-week training course is supporting by UNU-INWEH with the aim to build the capacity of professionals and institutions in developing countries to undertake monitoring, research and conservation of mangrove forests.</li> <li>• This is achieved through training in the scientific methodology and teaching of the latest research work on related subjects. It also aimed to create a network of professionals working with mangroves.</li> <li>• After the training course with not only professional knowledge but also practical field trips, alumni applied what they gleaned from the course of their work in their own country, especially in mangrove planting and nursery. Owing to the course, participants can contribute more of their work in mangrove conservation to the maintenance and widening of mangrove areas.</li> </ul>  |

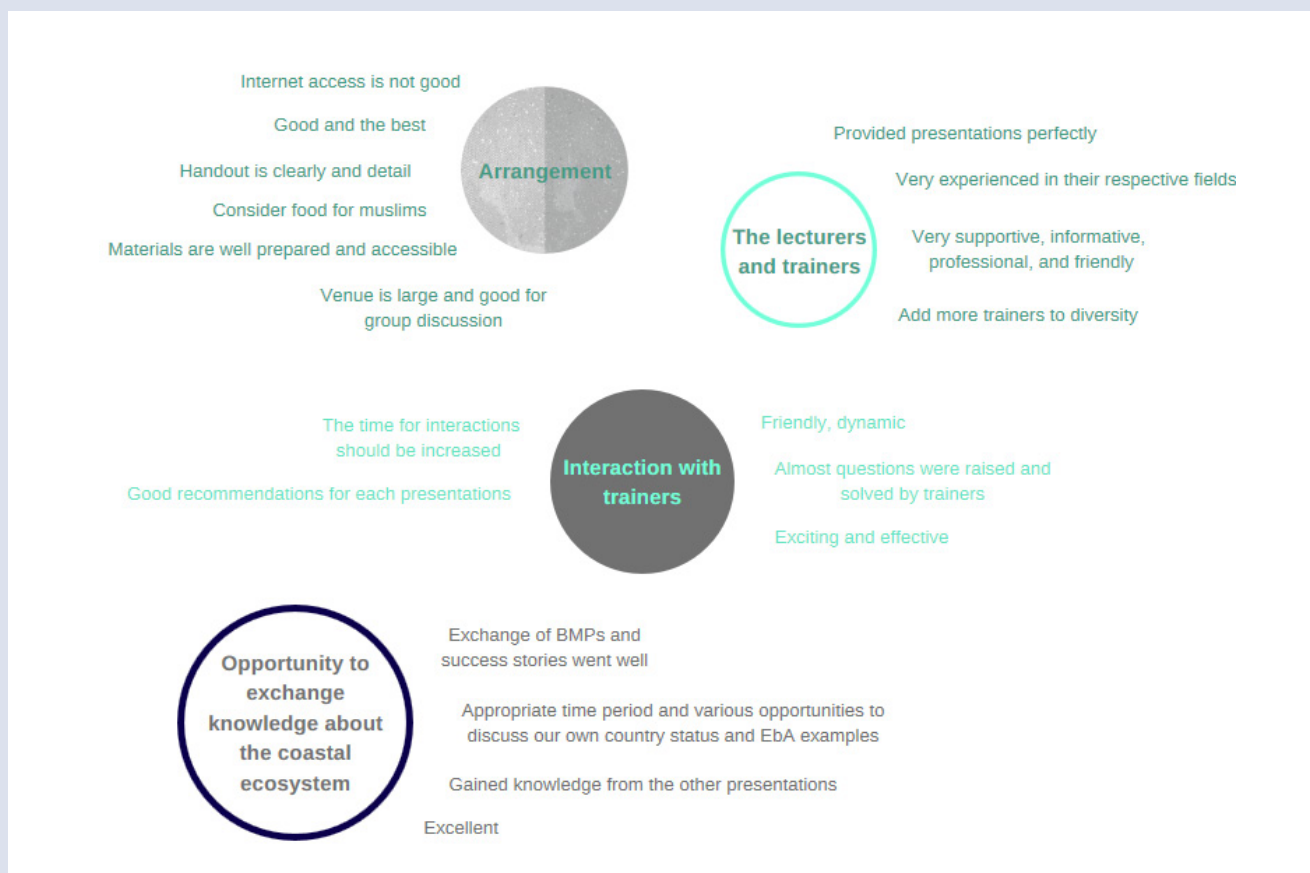
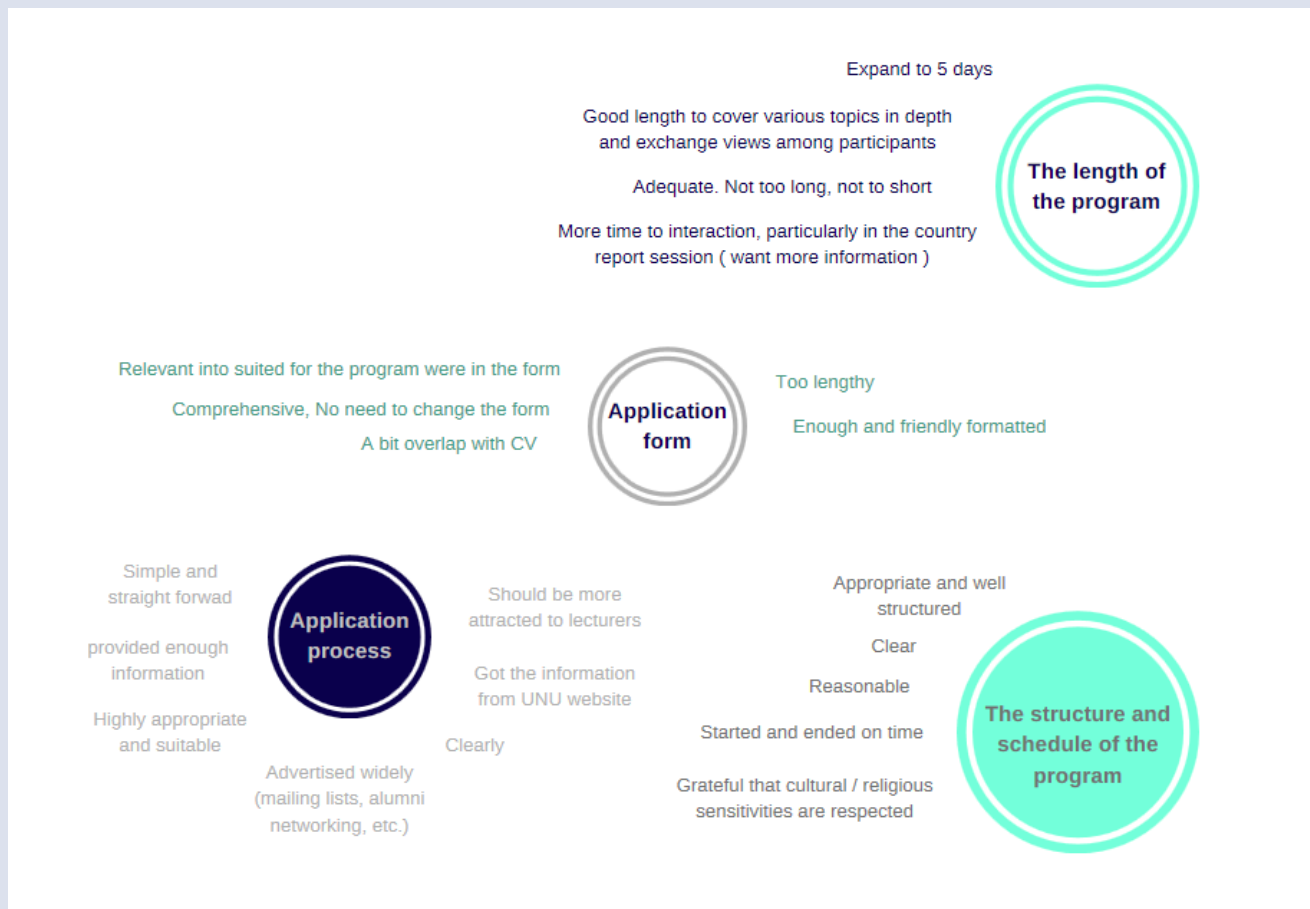


Figure 3.8: Stakeholders' perspectives on the design, structure, approach and implementation of the ENGAGE program

### MOST USEFUL PART OF THE PROGRAMME

### LEAST USEFUL PART OF THE PROGRAMME

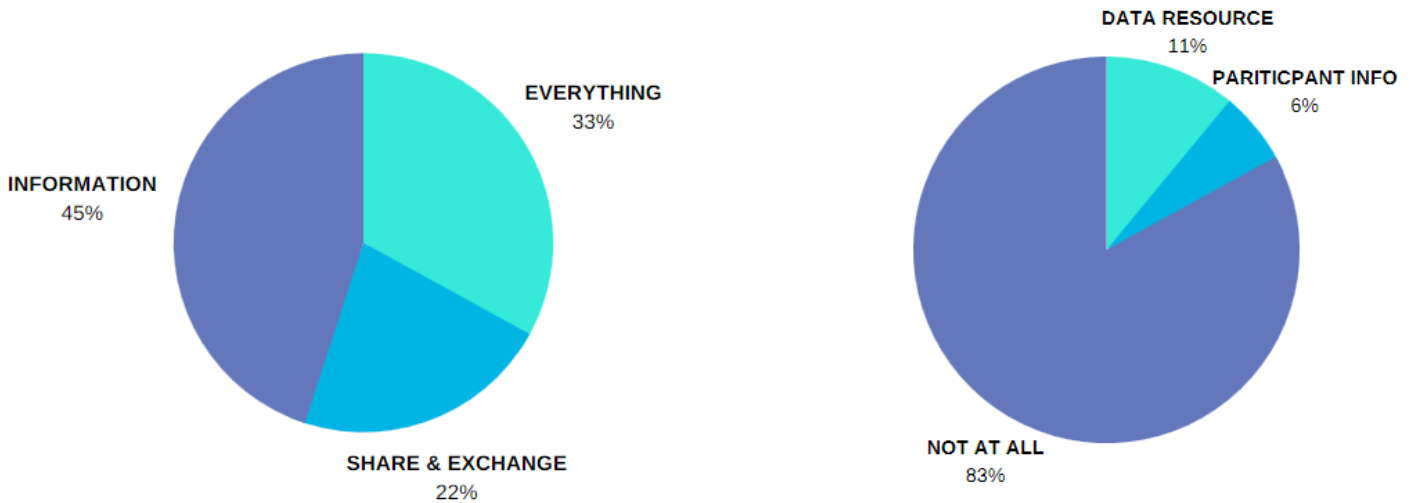


Figure 3.9. Evaluation on most and least useful part of program

Team ENGAGE also found it important to capture the limitations and gaps that the regional representatives discussed so that the feedback could be employed in improving the planning of future ENGAGE programs. About half of the participants felt that they gained sufficient knowledge and the lectures and discussion sessions were very comprehensive. Some of them proposed that clarity around specific aspects of employing the ecosystem services valuation methods and on the role of government and policy in application of ecosystem based approach in the SEAR region should be elaborated in future programs.

Most of the participants responded that the event was significant in highlighting the issues and challenges of coastal ecosystem in SEAR. Moreover, they commented on the need to exchange regular information amongst different countries in the region on how the nations were addressing the different threats to coastal ecosystems, with particular focus on mangrove ecosystems. The response of the participants to the knowledge sharing on different management options and strategies for coastal ecosystems management and governance was mixed. Most of the participants agreed that the existing data and information about these aspects is a good starting point to realise the agenda of ecosystem based management, others felt the need to refer some concrete examples of implementation to be useful. In addition, they highlighted at the same time, the context specific issues in each country that can make adoption of this framework challenging.

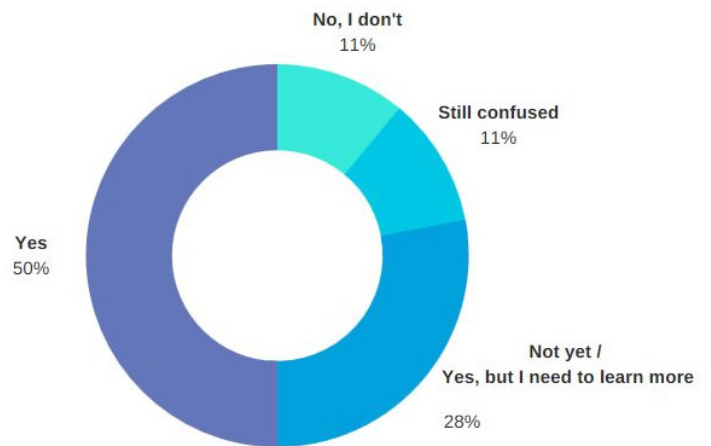


Figure 3.10. Learned enough about different management options and strategies

### Box 3.1:

#### A : Outlooks of regional representatives on state of affairs of Coastal Zone Management in SEAR and learning from ENGAGE Programme

- "I think that this training course is good for me. It is background and basic knowledge I can apply in reality"

- "I think not yet because I must learn about threats to coastal ecosystems for solution in our country"

- "Yes, I learned enough about threats to coastal ecosystems and how to mitigate them"

- "I learned a lot but want to learn more, but learned enough for the 4-day period"

#### B: Regional representative's viewpoints to refine future ENGAGE programme

"I think data spatial must be improved in this course because it is very important to plan and to manage the coastal area"

"Topic on ecosystem services should be put in the agenda. Ecosystem service is interpreted differently depending on location, etc. Having a clear understanding on this concept is important in order to ensure EbA is successfully implemented"

"Could add a few more experts to present topics to increase the diversity experience of trainers from an international perspective"

"Government issues: we need to understand the EbA at the national level, should have some representative from MONRE"

"It should have more group discussion/group activities or competition between groups"

"Provide more the methods to evaluate for protecting the ecosystems"

Half of the participants shared that they have learnt enough about different management options and strategies. Approximately, 28 percent of the participants felt that they learned enough mostly through case study presentations on management system of ecosystems-based approach and specific methodologies and strategies. Participants also commented on the usefulness of exchange with government and private sector representatives. Around 11 percent of participants were new to the ICZM framework, on what the main objectives are and what is needed to integrate ICZM in existing coastal zone management plans. Overall, most of the participants were satisfied and thought that all the presentations were useful for policy knowledge and provided an opportunity to advance valuable knowledge and to exchange information and experience, and most importantly build networks for future collaboration.

The feedback received from the participants stated that the future programs could be longer, up to 1-2 weeks if the availability of funds permitted and some notes in the regional language could also be organised depending on the available resources. The proposal to expand the scope of the ENGAGE programme to be more international was welcomed. In addition, the suggestion to have national scale workshops before the selected representatives meet at the regional platform was proposed. To conclude, the ENGAGE stimulated a regional dialogue to build the capacity of professionals and institutions in SEAR and exchange that can possibly shape undertaking of a joint monitoring, research and coastal ecosystems conservation programs. The network members were willing to create a regional level data base of solutions for sustainable management and further the exchange of policy relevant data, information and knowledge on Ecosystem- Based Adaptation Approach for Sustainable Management and Governance of Coastal Ecosystems.

## What are your overall feelings about this programme?

- "It is very good and useful programme to develop a platform/network of scientist actioners and policy implementers"
- "This programme is very useful because it has provided the participants knowledge about ecosystems and management for conserving them as well as some case studies related this topic in Mekong Delta, Vietnam and other countries in SEAR"
- "In overall, I feel that this programme is a great opportunity for researchers in the region to share knowledge and lessons learnt and to build networks for future collaboration. So I would suggest that this initiative should be done annually. By the end of the training, I believe both organisers and participants are satisfied with the achievements"
- "Thanks to ENGAGE, I gain and exchange valuable knowledge about coastal ecosystems (especially mangrove forests), lessons learnt. It also brings me opportunities to expand my network"
- "I enjoyed it very much and it met my expectations of expanding my knowledge in this area. The trainers and participants were fun to engage with, very interesting overall. I would like to attend other ENGAGE training topics"
- "I really thank you for trainers and lecturers so much. This course is really helpful for me. It helps me enhance my knowledge, in addition, connect to many foreign friends. Knowledge and friend are my future and life"
- "I am happy, satisfied, and well informed"
- "I am satisfied with the programme. At the same time, I could gain more knowledge about EbA to adapt with climate change, while, I could join in the network of ENGAGE programme. I hope that the network will expand in the context of climate change"

# CHAPTER IV: ENGAGE OUTCOMES AND RECOMMENDATION FOR FUTURE DIRECTIONS

**Ngo Tho Hung<sup>1</sup>, Nidhi Nagabhatla<sup>2</sup>, Kathiresan Kandasamy<sup>3</sup>, Chu Thai Hoanh<sup>4</sup>, Le Anh Tuan<sup>5</sup>, Lee Eunjung<sup>2</sup>**

<sup>1</sup> Asian Institute of Technology Center, Vietnam

<sup>2</sup> United Nations University Institute for Water, Environment and Health (UNU-INWEH), Canada

<sup>3</sup> Centre of Advanced Study in Marine Biology, Faculty of Marine Sciences, Annamalai University, India

<sup>4</sup> International Water Management Institute (IWMI), Laos

<sup>5</sup> College of Environment and Natural Resources, Can Tho University, Cantho, Vietnam

*This chapter presented the ENGAGE outcomes that links to the 2030 Agenda and Sustainable Development Goals and reviews the future directions. It also recommends more incentive for initiatives promoting cooperation in the region.*

## 4.1. ENGAGE outcomes

### 4.1.1. Current status and case studies

#### a) Current status

Representative participants were required to write a country report about the current status of coastal management. The country scale synthesis outlined in Chapter II provides an overview of the status of governance of coastal Ecosystems, particularly with regard to EBA and ICZM frameworks and initiative important issues of Sustainable Development goals (SDGs).

Regarding to SDGs, the UN adopted a new set of development goals focusing on improving the sustainability of member states in 2015. The requirement for these goals was discussed at Rio +20 (June 2012 in Rio de Janeiro), and the Sustainable Development Agenda with 17 Goals and 69 targets outlined. The sustainability agenda is anticipated to restore and maintain our natural capital and to address socio-economic issues viz. poverty, unemployment, equity and health amid other challenges that influence human wellbeing. Goal 14 outlines the agenda to “conserve sustainably the oceans, seas and marine resources for sustainable development”. Each country in the SEAR is outlining a plan and identifying priority areas to achieve these goals. Details in each country are:

In Indonesia, SDG 14 aims to achieve the sustainability of coastal and marine resources with emphasis on coral reefs and sea grass. As such, the management of coral reef ecosystems is a high priority area for the country. Indonesia entered into one of the Coral Triangle Initiative (CTI) and they have developed the COREMAP programme (Coral Reef Rehabilitation and Management Program), which has been active from 2014 to 2019 and aimed at rehabilitating and managing coral reefs in Indonesia through community-based activities.

Myanmar stands determined to protect its coastline and the diverse coastal ecosystem. It can benefit immensely from the advancements in the region in aspect of linking climate preparedness with the coastal management practices and strategies. The expert from the country identified training, dialogue and other exchange with regional experts as beneficial for the National Level Management Committee in revising the coastal management practices and regional cooperation can help to minimise data and information gaps among experts, specialists, scholars, scientists, all ministries and related stakeholders. In The Philippines, information is uploaded onto a platform which is made available through direct



viewing or download. Furthermore, data on areas that are related to climate change sensitiveness can be posted and made available to coastal management planners to use for projects they are planning. The platform can also be used for wide dissemination of payments for any ecosystem services. This also guides the vacationers in choosing the place to visit considering their financial capability. In 2011, the National government established The Philippine National Aquaculture Project (PNAP) wherein Palawan was a beneficiary. This project was implemented by the two Universities, Western Philippines University and Palawan State University, the aim of which was to alleviate poverty, and achieve food security for direct beneficiaries, and rehabilitation of denuded mangrove areas. The project includes planting mangrove seedlings and putting up aqua-silviculture ponds. In planting mangroves, the beneficiary receives payment by planting propagules and planting until the propagules are in their full-grown seedlings stage. With respect to aqua-silviculture, a selected community has been divided into groups; each group was given 20,000 pesos or approximately USD 430 for growing crabs and shrimps.

Malaysia is committed to implementing the SDG goals through a number of workshops and symposiums conducted at the Ministry level to address this issue. Malaysia organised a High Level Round Table discussion around the theme of Water Security and the SDGs that aims to benefit both Malaysia and the South East Asian Region. This High Level Round Table discussion is designed to be a milestone in the new democratic Malaysia, accelerating the already ongoing Integrated Water Resources Management, Disaster Risk Reduction and WASH activities under the guidance of the Government of Malaysia and the World Bank.

In The Philippines, the government with concerned agencies, such as the navy and coastguards, is identifying sea lanes to connect port-to-port transactions (passengers, cargoes, etc.) to ensure that international marine pollution law is implemented and enforced. Some coves and bays in The Philippines are used for mariculture (fish pens and cages) and sea ranching for which fishery laws, rules and regulations were revised and strengthened under the Fisheries Code of 1998 (R.A. 8550) and implemented by the Bureau of Fisheries and Aquatic Resources (BFAR). Under R.A. 8550, the local government units have to organise a council (Fisheries and Aquatic Resource Management Council) responsible for crafting management policies for utilizing, conserving, protecting, and managing fisheries and other aquatic resources.

Thailand's effort towards SDG14, i.e., sustainable development and conservation of the marine resources is included in its 2015-2020 national development plan and their forthcoming national economic and social development plan. The Prime Minister of Thailand's, His Excellency General Prayut Chan-o-cha's speech at the United Nations Sustainable Development summit (2015) raised the issue of the need for actions against human caused climate change. He highlighted Indonesia's choice to live sustainably, focusing on quality, moderation and balance and respect for nature. These views harmonise with His Majesty the King's Sufficiency Economy Philosophy, which suggests advancing reason, moderation and building resilience at the individual level.

In Indonesia, for example, the Ministry of Marine Affairs and Fisheries (MMAF) created a community-based programme that is called by Coastal Climate Resilience Village/Area (CCRV/A) or known locally as Pengebangan Kawasan Pesisir Tangguh (PKPT) that aims to prepare communities in coastal areas and enhance their resilience to natural disasters and adapting to climate change. In 2016, this programme (PKPT) involved many community groups from over 16 regencies. This example provided a good case for scaling at the regional level through the utilization of collaboration. The Malaysia Government initiative to address the impacts of climate change action via the National Steering Committee on Climate Change (NSCCC), established in 1994 and coordinated by Environmental Management and Climate Change Division of the Ministry of Natural Resources and Environment (NRE) is a good example of vision and leadership. Malaysia's focal point to the UNFCCC, to guide and endorse operational matters

regarding climate change presents an example of institutional arrangements to connect local action with the global obligations. The National Policy on Climate Change and the National Physical Plan for Coastal Zone (NPP-CZ) are the main development plans for the management of the coastal zone in Peninsular Malaysia that intends to embed the climate governance agenda with ICZM planning.

In Vietnam the national agencies are in the process to plan implementation of SDGs. The first legal document related to sustainable development 'Decree No. 432/QD-TTg' approved by the Government dated on 12 April, 2012 on strategy for sustainable development during the period of 2011 to 2020. The strategy will make use of aggregate indicators (like Green GDP, Human development index (HDI), and Environmental sustain index (ESI) to monitor and assess sustainable development. Currently, there is unclear progression of the implementation of SDG14 from responsible organization bodies. The lack of progress provides an excellent opportunity for international partnership, in particular collaboration with the academic sector to help support the effective engagement of programs with the existing activities at local and regional levels. In Vietnam, especially in central Vietnam, the negative effect of climate change is felt by the local people, for example, flood, sea level rise, and serious marine ecosystem degradation caused by human activities. During and after the hosting of the ENGAGE programme in Vietnam, massive traction was gained from media and government agencies. Vietnam's experience is evidence that future programme can be successful when they are done with a combination of international funds and with support from organizations contributing to both human resource and a budget. Up-coming activities can be an opening for strong linkages between the participants, organisers, and the government to coordinate for joint research and development activities in the region.

As discussions on sustainable development agenda is progressing in the region, mainly so for coastal management related issues; learning from the ENGAGE programme could assist the states and stakeholders in the SEAR. This can be at the governmental level, and include the private sector, non-governmental organizations, and internal and external specialists. More so, the countries which have already taken steps toward coastal sustainable management could support other states in the region through exchange and interactions. The regional representatives of the ENGAGE programme have pledged to collaborate.

## **b) Case studies**

Case study about Public-Private partnership (PPP) from Chiva-Som, International Health Resort, Hua Hin, Thailand was also discussed. There were some key results emerging from this case. Firstly, the application of the PPP model in Natural Resource Management was quite limited. Secondly, on the long term the benefits from PPP are much appreciated. Chiva-Som provided an example of green ecotourism for mangrove preservation that inspired and motivated the youth to develop interest in studying natural sciences for a sustainable future, and creates a state of the art "showcase" for sustainable construction and low energy and low environmental impact living. Therefore, it needs to have private sector involvement in order to achieve more sustainable natural resources management. Through case studies, participants were able to better understand the current status, as well as the challenges in implementing EBA.

Participants from Vietnam represented case studies about EbA in the coastal areas of the Mekong delta (Ben Tre province) and EbA in the mangrove management in Hai Phong province, Vietnam. Participants also get the consensus that the best practice of EbA was case study in Hai Phong. In which, EbA was applied in the mangrove forest management and livelihood development in Cat Ba Biosphere Reserve. The model of shrimp and crab aquaculture in the mangrove forests was developed and bring many benefits in maintain healthy mangrove forest and making stable income for households participated in models. This is because mangrove creates shelter and food for shrimp – crab in summer heat

conditions, increase survivability and adaptation. Aquaculture uses natural food from the ecosystem resulting in high economic values.

The authors posit that regional level sharing, partnership and cooperation for sharing BMP's (Best Management Practice's) can assist in creating a long term commitment to sustainability. The positive and applied experiences from each country in SEAR can serve as an effective and valuable support to other countries to enable them to achieve their coastal management goals.

#### **4.1.2. Strengthen the capacity of participants**

The capacity of selected participants was strengthened via lectures of key speakers and presenters. They provided the knowledge and experiences on EbA, ICZM and relevant topics such as climate change adaptation as well as Sustainable Development Goals (SDGs). Particularly, the contents focused on: (1) the review of mangrove ecosystem and community-based management; (2) Ecosystem-Based Approach that was designed to apply in Applied Spatial Ecology for BES-Biodiversity and Ecosystem Services Assessment (BASE); (3) climate change adaptation and climate change vulnerability assessments and other issues related to coastal management.

Moreover, global emphasis on exchange, platforms for regular interaction is providing opportunities for communities to participate in creating better and more sustainable communities. Towards, this, different solutions (EBA, Climate Smart Practices, Disaster Risk Reduction, SDG multiple goals) for ecosystem base adaptation and stakeholders' exchange is crucial. Erosion is one of the greatest challenges in coastal management. Noting an example from one of the session that discussed remedies to tackle coastal erosion problem: (1) artificial beach nourishment and (2) coastal defence structures provided by mangrove forest as strategies that can assist in dissipating the energy of ocean waves.

#### **4.1.3. Opportunities for mainstreaming climate change preparedness to existing system**

ENGAGE programme is a platform that facilitates communication and discussion among stakeholders including young professionals, academics, government officers and resource managers too identify opportunities for integrating climate change preparedness into the existing coastal management. Integrating climate change preparedness into coastal management strategies will lead to multiple benefits for the communities depending on these resource systems.

##### **a) EbA is one of the key strategies for climate change adaptation and eco-system management**

There are synergistic advantages of ecosystem-based adaptation to protect coastal ecosystems because this approach uses the sustainable management, conservation, and restoration of ecosystems to provide services that enable people to adapt to both current climate variability and long-term change. EBA was also a financial insurance option. Ecosystem-Based Adaptation by the local community is a priority as local community plants mangrove forest for afforestation, to create mudflat. The household projects for the forest will be paid money by state revenue and the business services that use the natural resources from mangroves. It needs to ask the private sector and people who use natural resources, to invest some funds back into the community who take care of the ecosystem.

## b) ICZM provides strong tools for management system approaches

Throughout the years, management/planning tools and general approaches have been developed significantly. Among them, the Integrated Coastal Zone Management (ICZM) has been considered as an effective tool in managing and protecting natural resources aiming the target towards maximizing the compatibilities as well as minimizing the conflicts between people's actions in economic development. The Integrated Coastal Zone Management (ICZM) based on a coordinated and integrated approach involving a mixed strategy of resource management, resource restoration, economic and community development (linkages of coastal communities to regional and national economic development). Therefore, capacity building is both theoretically and practically urgent and meaningful. In the scope of ICZM, capacity building in coastal management focus on technical knowledge and procedures for coastal managers, because this has the unintended effect of accentuating sectorial approaches, but to community and stakeholders with holistic approach, which would support the ICZM framework.

### 4.1.4. Disseminate and Outreach

As agreed during the program, the participants jointly created a regional scale synthesis of experiences from the SEAR region. In addition, the ENGAGE programme created an online community of practice (CoP EBA - SEAR) to facilitate exchanged posts and ENGAGE interaction. This CoP for coastal ecosystem experts in SEAR jointly moderated by UNU-INWEH and AITCV to disseminate knowledge and subsequently develop a regional level base line data on coastal management. This is because the communication platform (<https://www.facebook.com/groups/engage.sear/>) connects strategic partners, UNU-INWEH and all experts, institutions and those who are concerned about the ecological health of resource systems, in this case coastal and mangrove ecosystems. Community and stakeholder involvement is an integral part of the natural resource planning systems. This is the 1st important step for competencies, methodology and solution is needed to enhance sustainable development.



Figure 4.1. The ENGAGE group on Facebook (<https://www.facebook.com/groups/engage.sear/>)

ENGAGE is growing as a Flagship programme of the region (ENGAGE-SEAR), filling for a long-standing need of a regional platform as most prior programs in the region focused at the national level. The ENGAGE programme created regional scale deliberation by involving members from 6 countries. The

TcW approach was tested successfully with 25 participants from different thematic backgrounds, and affiliations to various government and non-government agencies, and public and private sector.

## **4.2. Future directions**

### **4.2.1. Capacity for the policy development and improvement**

It is also becoming clear that the challenge for resource managers and national decision makers is to choose more appropriate governance and management approaches for economic sectors operating in coastal areas. Given these realities, the only feasible solution may be integrated coastal zone management (ICZM) because integration is key to ICZM that based on a coordinated and integrated approach involving a mixed strategy of resource management, resource restoration, economic and community development (linkages of coastal communities to regional and national economic development). Therefore, the capacity building is theoretically and practically urgent and meaningful. In the scope of ICZM, capacity building in coastal management should not only be limited to imparting technical knowledge and procedures to coastal managers because this has the unintended effect of accentuating sectoral approaches, but to community and stakeholders with holistic approach, which would be more in tune with the ICZM framework.

Capacity building – training for trainers is a pathway towards building resilience for a country. Strengthening institutional and individual capacities both on geophysical and socio-economic aspects of coastal vulnerability across scales of governance remain critical for facilitating exchange data, information and knowledge at the regional scale. For building resilience in coastal regions it is important that stakeholders understand the relevance of ecosystem services approach, especially in the context of climate change adaptation planning. To achieve that level of capacity, technical support and aligning objective of ongoing and planned project projects to include learning and experience from Ecosystem based Adaptation; integrated spatial planning (ISP); Integrated coastal zone management (ICZM) could serve useful.

Training of Trainers (TOT) is good approaching for EbA and ICZM. TOT is to give new trainers the background knowledge, skills and practical experience to provide training to stackholder and communities and provide technical assistance to communities.

### **4.2.2. Communication platforms and networks**

Ecological degradation and climate change is now a severe challenge not only in the SEAR but also throughout the world because of its unpredictable features. Countries need to develop a national or regional communication platform to address the ongoing and predicted effects of climate change. There is a crucial need to establish a platform and build relationships between climate change and coastal management. The management system could also be more effective if local people understood and are aware of the importance of ecosystem services. Workshops, conferences and courses on EBA, integrated spatial planning (ISP), and ICZM should be held to strengthen the communication platform. The ENGAGE platform provides for that need to a fair extent.

### 4.2.3. Public participation and engagement in ICZM

Community (or public) refers to residents and visitors that are interested in the environment and society in which they live and may wish to contribute to the future planning of that area. In contrast stakeholders have a direct interest which may be financial, property owning, legal responsibility or even belong to an organisation which speaks on behalf of an economic social or environmental interest. The latter category includes businesses, government agencies, NGOs, local societies and some may be statutory consulters to the planning process. Community and stakeholder involvement is seen as an integral part of most terrestrial planning systems around the developed world. It provides opportunities for people to shape the place in which they live, creating better and more sustainable communities because while the former may contribute opinions and information to the process they are not responsible for delivering any specific input. Stakeholders on the other hand have responsibility to their members and usually a specific expertise which it is essential to incorporate in the plan making process. Similarly, the terms, consultation, participation, involvement and engagement have different meanings, with the earlier terms implying a more passive role and the latter terms more active. Which level of involvement is most appropriate depends on the group in question and the stage at which the plan making process has reached. Again these are important considerations for plan makers to address in establishing the process.

### 4.3. Concluding Notes

Coastal ecosystems bordering the tropical coastlines play an important role in maintaining holistic environmental conditions for the coastal community, both humans and biodiversity. In that context, the ENGAGE programme provides an overview of the environmental problems facing ecosystems (coastal and marine) in the SEAR, specifically in Indonesia, Malaysia, Myanmar, The Philippines, Thailand, and Vietnam. Substantial efforts by these countries towards identifying how and why certain coastal areas in the SEAR are degraded and long term impact of the ecological degradation, and climate induced disasters, cyclones, droughts and flood, rising due to global warming and other anthropogenic drivers. This adds to the loss of coastal diversity and the adverse impacts on human health and well-being by increasing the incidences of malaria, dengue, cholera, influenza, and diarrhea.

It is widely agreed that an integrated coastal management approach is required to reduce the impact of human activities and climate change and to fulfil the Sustainable Development Goals (SDGs) and targets. Ecosystem-based Approach (EBA) initiatives and programs have either been conceptualised or adopted to address the needs of coastal management. While many countries in the SEAR have successfully implemented EBA initiatives and programs others still face obstacles (financial, institutional, human capacity etc.) with implementing or following through with their initiatives or programs. Therefore, more effort needs to be taken either internationally, regional, or nationally to see that these initiatives or programs are put in place and are effectively followed through to ensure that coastal ecosystem are protected. The Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES) as an independent intergovernmental body is steering the ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development.

The SEAR states have numerous coastal management strategies and initiatives (regional platform or community) that facilitate knowledge exchange between experts and stakeholders that could go a long way to ensure the sustainability of their coastal resources.

Recent debates in sustainability science endorses the need of ecosystem-based framework for resource management and planning as it appropriates various ecological services and benefits received

by the social capital. The ENGAGE program, with AITCV and UNU-INWEH as key partners, proposed a 3-day training course and a day of multi-stakeholder's dialogue workshop capacity development activity. The aim was to create an enabling environment for sustainable management of coastal ecosystems in SEAR. Throughout the training-cum-workshop, the trainees and stakeholders were able to learn that Ecosystem-Based Adaptation (EBA) and Integrated Coastal Zone Management (ICZM) provides nature-based solutions (mangroves) that reduce risks and vulnerability for people. Furthermore, it simultaneously generated a range of social, economic, and environmental co-benefits. South East Asian Region (SEAR) countries constitute the largest habitat for coastal diversity, including mangroves (Indonesia alone houses more than 20% of the world's mangroves) which play a key role in sequestering carbon, preventing soil erosion, controlling flood, protecting ground water from salinization, and reducing turbidity of water. Although the dialogue on EBA has increasingly gained attention from the international and local communities, the concept of EBA remains in its early development stages. This is compounded by the fact that coastal ecosystems are poorly understood; different conditions prevail in each country, and there are shortages of manpower to identify, assess, conserve and manage the coastal ecosystems. To strengthen the capacity of professionals and successfully implement EBA, further analysis of case studies is needed to understand different scenarios in the region. Regional level data base of solutions for sustainable management and different solutions for EBA, Climate Smart Practices, Disaster Risk Reduction, SDG multiple goals as well as the fostering of greater discussion are essential.

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# ANNEX 2 - AGENDA

## TRAINING & WORKSHOP SESSIONS

| TRAINING DAY  | TIME   | CONTENTS  |
|---|--|---|
| <b>DAY 1</b><br><b>SUNDAY</b><br><b>20TH</b><br><b>NOV</b>  | 8:00 – 15:00   | <ul style="list-style-type: none"> <li>• Arrival at Ho chi minh City</li> <li>• Looking for Welcome badge “APN Project, ENGAGE Programme – Welcome participants to Vietnam!” With logo of AIT in Vietnam</li> </ul> |
|   | 15:30 – 21:00  | <ul style="list-style-type: none"> <li>• Travel by mini bus to Can Tho from HCMC Dinner on the way to Can Tho</li> </ul>  |
|   | 21:00  | <ul style="list-style-type: none"> <li>• Check-in Ninh Kieu 2 Hotel in Can Tho</li> </ul>   |
| <b>DAY 2</b><br><b>MONDAY</b><br><b>21ST</b><br><b>NOV</b>  | 6:30 – 8:00  | <ul style="list-style-type: none"> <li>• Breakfast</li> </ul>   |
|   | 8:00 – 8:30  | <ul style="list-style-type: none"> <li>• Registration</li> </ul>  |
|   | 8:30 – 9:00  | <ul style="list-style-type: none"> <li>• Opening</li> </ul>   |
|   | 9:00 – 9:15  | <ul style="list-style-type: none"> <li>• ENGAGE project coordination speed (s)</li> </ul>   |
|   | 9:15 – 9:45  | <ul style="list-style-type: none"> <li>• Warm-up game &amp; Introductions by participants</li> </ul>  |
|   | 9:45 – 10:00   | <ul style="list-style-type: none"> <li>• Taking group picture</li> </ul>  |
|   | 10:00 – 10:15  | <ul style="list-style-type: none"> <li>• Tea Break</li> </ul>   |
|   | 10:20 – 12:00  | <ul style="list-style-type: none"> <li>• Coastal and Marine Ecosystems- An introduction</li> </ul>  |
|   | 12:00 – 13:00  | <ul style="list-style-type: none"> <li>• Welcome Lunch</li> </ul>   |
|   | 13:40 – 15:15  | <ul style="list-style-type: none"> <li>• Coastal Ecosystems in the Changing Climate</li> </ul>  |
|   | 15:15 – 15:30  | <ul style="list-style-type: none"> <li>• Tea Break</li> </ul>   |
|   | 15:30 – 16:30  | <ul style="list-style-type: none"> <li>• Interactive session on - Ecosystem Based Disaster Risk Reduction and Adaptation Vulnerability and risk assessments Strategy</li> </ul>                                     |
|   | 16:30 – 19:15  | <ul style="list-style-type: none"> <li>• Free time</li> </ul>   |
| 19:15 – 21:00   | <ul style="list-style-type: none"> <li>• Dinner</li> </ul> |   |
| <b>DAY 3</b><br><b>TUESDAY</b><br><b>22ND</b><br><b>NOV</b> | 6:30 – 8:45  | <ul style="list-style-type: none"> <li>• Breakfast</li> </ul>   |
|   | 8:45 – 9:00  | <ul style="list-style-type: none"> <li>• Warm- up phase &amp; welcome</li> </ul>  |
|   | 9:00 – 10:00   | <ul style="list-style-type: none"> <li>• Management of Coastal and Mangrove Ecosystem</li> <li>• Nature- Based Solutions to Disaster Risk Reduction Adaptation</li> </ul>   |
|   | 10:15 – 10:40  | <ul style="list-style-type: none"> <li>• Tea Break</li> </ul>   |
|   | 10:40 – 12:00  | <ul style="list-style-type: none"> <li>• Open Discussion and dialogue</li> <li>• Group exercise</li> </ul>  |
|   | 12:00 – 13:30  | <ul style="list-style-type: none"> <li>• Lunch</li> </ul>   |
|   | 13:30 – 14:30  | <ul style="list-style-type: none"> <li>• Wetland at Mekong delta river, Climate change resilience based on EBA</li> </ul>   |
|   | 14:30 – 17:30  | <ul style="list-style-type: none"> <li>• Field Trip</li> </ul>  |
|   | 17:30 – 19:30  | <ul style="list-style-type: none"> <li>• Dinner with team</li> </ul>  |

**DAY 4  
WEDNESDAY  
23RD NOV**

- 6:30 – 8:45 • Breakfast
- 9:00 – 10:30 • Tidal regime, flow and water quality in the Mekong delta
  - Impacts of climate change and sea level rise on hydrological dynamics in land and aquatic ecosystems
  - Exercise & Discussions
- 10:30 – 10:45 • Tea break
- 10:45 – 12:00 • Impacts on Coastal Ecosystem and Mangroves (An overview and Case Examples in the SEAR region)
  - Management of coastal mangrove ecosystems to climate change adaptation in the Red River Delta region
- 12:00 – 13:30 • Lunch
- 13:30–14:45 • Country presentation: Vietnam, Thailand, Indonesia, Myanmar, Philippines Discussion
- 14:45 – 15:00 • Tea break
- 15:30 – 16:15 • Public Private Partnership in Natural Resource Management
  - Final Discussion and conclusions
- 16:15 – 16:30 • Evaluation form filling
  - Certificate Awarding
- 16:30 – 19:30 • Free time
- 19:30 – 21:00 • Farewell party

**DAY 5  
THURSDAY  
24TH NOV  
(WORKSHOP)**

- 8:00 – 8:30 • Registration (regional guests)
- 8:30 – 8:50 • Welcome Remarks & Opening Speech
- 9:00 – 10:00 • Keynote Address
  - What does it mean for Sustainable Management and Governance of Coastal Ecosystems
- 10:00 – 10:15 • Tea break
- 10:15 – 12:00 • Community Based Approach for sustainable Coastal Zone Management Invited presentations by course participants and external experts
- 12:00 – 13:30 • Lunch
- 13:40 – 15:00 • Some more Presentation
  - Panel Discussion
    - Invited Panel Members
    - Plan of Action for improving research, training and management in the SEAR region, primarily focusing on Ecosystem Based Adaptation approach for Sustainable Management and Governance of Coastal Ecosystems (ENGAGE)
- 15:00 – 15:45 • Review, future Goals and Closing Remarks
- 16:00 – 21:00 • International participants go with bus come back to Ho chi minh city Dinner on the way to HCMC
  - Check in at the Hotel (one night – near by the airport)

**DAY 6  
FRIDAY  
25TH NOV**

- International participants fly back home
- Participants to airport by themselves

## ANNEX 3 - NARRATIVES ON SELECTED PRESENTATIONS OF THE ENGAGE Programme

### TRAINING SESSION

#### *The opening remarks*

**Asian Institute of Technology in Vietnam (AITCV) representative Ngo Tho Hung**, presented about AIT emphasizing its role as an international institution with focus on postgraduate, continuing education and consultancy, which was established under the agreement between AIT and Vietnamese Government since 1993 with a vision to become a prestigious regional institution with international quality and innovation that support sustainable growth of the region with more than 3000 Phd holders and 20000 professionals of Vietnam affiliated to this institution. AITCV provides academic programs, short training course, project development and implementation and consultancy services related to business and management, information technology and industrial management, environment, education management and language. With professional, qualified and experienced trainers and staffs, AITCV has gain reputation and satisfaction of customers from different sectors, for example, Petro Vietnam, Vinacomin, EVN, Tiger Beer, VASEP, JICA, Toyota, World Bank, UN Women, etc.

**Nidhi Nagabhatla, from UNU-INWEH- the UN's think tank on Water**, presented about the organization and its programs research and capacity-development it is leading to address the Sustainable Development Goals. She further shared about projects that encapsulates priorities of emphasizing human wellbeing and facilitating adaptation to climate change and ensuring gender equity. She also explained the ENGAGE programme and its objective to strengthen capacity, provide an overview of needs assessment and gaps analysis and the requirement to create a discussion forum for critical role, promote an open dialogue among concerned experts as well as specialists and policy makers, and to provide a platform to encourage exchanges of knowledge. She then introduced the topics that covered during the training session viz., coastal ecosystems, community based approach for sustainable coastal zone management long with joint activities through which participants will underline a plan of action in the SEAR region, primarily focusing on Ecosystem based Adaptation approach.

#### *Thematic Sections*

##### *Climate change data processing for local use*

**Chu Thai Hoanh, presented the talk covering about the** Intergovernmental Panel on Climate Change (IPCC) Data Distribution Center (DDC) that was established to facilitate timely distribution of up-to-date scenarios of changes in climate related to environmental and socio-economic factors used in climate impact assessments. He explained that DDC provides observed climate data sets, global climate model data, socio-economic data and scenarios, data and scenarios for other environmental changes using two approaches (sequential approach as the previous ones, parallel approach as the new ones). Global Climate Model (GCM) can be established from DDC with the following outputs: vintage, resolution, validity and representativeness of results. Simulation of sub-grid-scale climate based on output from GCM is provides for statistical downscaling and dynamic downscaling. In order to establish an accurate model, it is necessary to collect update information on climate change data, and other sources, processed data, downscaling information and use of bias correction and statistical techniques.

## ***Dimension index method for climate change vulnerability assessment***

**Dr. Ngo Tho Hung presented the** vulnerability risk assessment (VRA) framework as examined in a variety of case studies that seek to characterize the vulnerability of specific populations or spaces. It is an approach to presenting quantitative estimation of the risks that caused by climate change at both regional and local level. The limitations of this approach depends on the quality of information collected. VRA is inevitably uncertain as it does not account the changes in non-climatic factors. VRA framework by IPCC AR4, 2007 offered researchers to calculate the vulnerability level for each district in Ca Mau, Vietnam and scalability potential. The case study, also highlighted two main hazard dimensions (natural and human capital) to formulate the sensitivity index. The indicators for vulnerability indexes were created by a standardization method outlined by UNDP (United Nation; 2009). GIS based maps served as a useful tool to visualize the spatial distribution of vulnerability in the region.

## ***Ecosystem-based adaptation in the coastal areas of the Mekong river delta, Vietnam (a case study in Ben Tre).***

**A/Prof.Dr. Le Anh Tuan and Dr. Ngo Thuy Diem Trang presented** case study on the Mekong Delta River in Vietnam (MD) with > 600km coastal line, connecting both, the East and West Sea, including saline affected inlands, river islands, sand dunes, river mouths, shallow sea and deep sea. The 4 ecosystems in coastal areas include: estuarine delta areas, mangrove forests, sand dunes, and mudflat bar zones. The community diversity facilitates p number of livelihoods such as brackish water aquaculture, saline water aquaculture, capture fisheries, mangrove forest planting and exploiting, and vegetable and upland crops. The project "Ecosystem-based climate change adaptation in Ben Tre province" addressed strengthening the resilience of Ben Tre province to the impacts of climate change, through the EbA approach. The pros and cons caused in implementation, multiple mechanism and approaches that integrates adaptation strategies and actions is pertinent and the critical need for immediate implementation of no-regret and climate deficit reducing adaptation measures for coastal areas as a priority.

## ***Nature based solutions to disasters risk reduction and management of coastal ecosystems***

**Prof. Kathiresan Kandasamy presented** how human diseases are increasing due to global warming and if global warming continues, no human beings, no aerobic organisms may be able to survive in the future centuries, only thermophiles, chemotrophic and anaerobic organisms may survive. In order to reduce global warming, CO<sub>2</sub> concentration in the atmospheric should be kept below 450ppm, which can be achieved more easily by protecting and restoring the coastal ecosystems, especially with mangrove forests. Carbon storage in mangroves is 3-5 times higher than tropical forest. Mangrove sequester 10 times more than tropical forests. Moreover, it can reduce the height and speed of storm surges and tidal waves, dissipate wind and wave energy, and act as buffer against salt water intrusion. Soil erosion, flood, tsunami and salinization are prevented by mangroves. However, global change is threatening mangroves. It causes both horizontal and vertical migration of mangrove and affecting its growing ability. Mangrove planting and nursery are now very important to widen mangrove zones.

## ***Ecosystem based approach, data and indicators***

**Dr. Nidhi Nagabhatla presented** about the integrated approach and a multi-scalar comprehensive analysis including field data, spatial statistics and stakeholder's perceptions, which are indicators for selected SDG's-Goal 14. Ecosystem based approach is design that applies Spatial Ecology for Biodiversity and Ecosystem Services Assessment, as integrating field data + spatial models frameworks for biodiversity and ecosystem services assessment and valuation trends, patterns, driver and impacts of change such as spatial temporal analysis can add value in overall understanding ecological services

and benefits. The composite indicators concepts and research methods, mainly socio-ecological indicators, and indigenous and local knowledge system are also relevant reference sources. Other indicators on institutions, governance and other indirect drivers that impact ecosystems goods and services should also be considered.

### ***Tidal regime, flow and water quality in the Mekong River Delta, Vietnam***

**Prof. Chu Thai Hoang presented** about how the tidal regime, flow and water quality have great effects on productivity in Mekong River Delta. As of which, by the end of 1990s, although Vietnam export of 4 million tons of rice, price of the crop declined by 30%. On the other hand, shrimp culture has improved via import of shrimp seeds from Central Vietnam. Shrimp is trained to survive under low salinity (2 ppt) and the water quality is monitored and managed carefully to keep the survive rate higher to export shrimp to international market. The differences in investment and developing of agriculture and aquaculture created a great space in income of each kind. In order to resolve that, it is believed that changes in water management for both rice and shrimp is needed. Policies in natural resources management are important to all income groups, but they are not always recognized and the local livelihoods often overlooked in economic and development planning.

### ***Strategic mainstreaming of ecosystem-based adaptation (EbA) in Vietnam***

**Ms. Tran Thi Kim Lien, from GIZ presented** on available methods, strategies and policy guidelines for EbA and the case of integration of this approach in the national policy as well as implemented planning. She suggested that project, components and activities including, capacity building on national land provincial levels, pilot measures and up scaling implemented and up-scaling could assist mainstreaming EbA into policies and planning processes, and network and learning. EbA in Viet Nam served as pilot study in the terrestrial ecosystem of Ha Tinh (native timber planting -Silviculture techniques), coastal ecosystems in Quang Binh (moving/flying sands and residential area with crops). The two pilots provided an understanding of challenges, for example, lack of capacity on EbA at both national and provincial level, need of the approaches/methodologies for mainstreaming of EbA into the planning, identifying the appropriate EbA measures: selection of Eba measures/model depending on specific conditions of a province/country, among others.

### ***Case study report: Ecosystem based approach in the mangrove forest management and livelihood development in Cat Ba Biosphere Reserve, Hai Phong, Vietnam***

**Ms. Than Thi Hien from MCD presented** about the tools - vulnerability assessment, sustainable livelihood framework and the SWOT analysis used to apply the EbA in Cat Ba Biosphere. Secondary data review, fieldtrips and observations, community group meetings and depth interviews with commune staffs and local people were part of the methodology adopted for the task. In past 5 years, 30% of households in Phu Long has been impacted by climate change, the average loss and damage to fisheries and aquaculture, resulting that investments and efforts were raised to improve mangrove-shrimp aquaculture. When applying EbA, not only adaptation and environmental sustainability was addressed, but also economic, social and institutional sustainability. SWOT analysis provided for strength, weakness, opportunity and challenge for the exercise team to outline recommendations for better management of coastal areas, focusing on ecosystems health through the community based adaptation.

## ***The Private Sector on Coastal Zone Management and Mangrove protection***

### ***Chiva-Som, International health resort, Hua Hin, Thailand***

**Mr. Brian Anderson presented about** how the resort addresses integrated stakeholder wellness, environmental stewardship, social-cultural development and economic sustainability. In order to mitigating climate change through responsible business practices, the resort conducts Energy Efficiency Building Retrofit Programme in 2016 and achieved 26% total electricity reduction and 20% carbon footprint reduction. Going towards the goal of supporting environmental preservation initiatives to educate and raise awareness on natural resource conservation, climate change and humanity's impact on the environment to school children as well as the general public. Their programs and activities are not only for a group of the fixed age but for anyone in all age groups. Chiva-Som aims to improve its quality to provide a green ecotourism center for mangrove preservation and motivate youth to develop interest in studying natural sciences, and to create a state of the art "showcase" for sustainable construction and low energy and low environmental impact living.

### ***Community based management in India***

**Prof. Kathiresan Kandasamy presented about** how the community based management as a strategy applied in the South and the South East of Asia for long term and cost effective managements of coastal resources can assist in restoration and conservation. He quoted about the impact that can be seen with mangrove cover increasing in India annually 1.2% (112 km<sup>2</sup> of mangrove in total), when the world losses 0.66% areas with mangrove cover each year. Management of mangroves in India is concentrated in promontory, regulatory and participatory approach. In 2011, Indian Coastal Regulation Zone Notification (CRZ) was established to ensure livelihood security to coastal people, conserve and protect coastal stretches, and to promote development in a sustainable manner based on scientific principles, considering dangers of natural hazards and sea level rise due to global warming. The community based management have helped local community in developing sustainable livelihood such as nursing Polychaete worms, mud crab fattening, seaweed cultivation, mushroom cultivation on marine fish waste, and hygienic tunnel solar dryer, which improves local income and their quality of life.

### ***Ecosystem Based Adaptation for Sustainable Management and Governance of Coastal Ecosystems.***

**Dr. Nidhi Nagabhatla in detail** the ENGAGE programme goals emphasizing how this innovative model of uses training cum workshop model in order to strengthen capacity of professionals, discuss current status in the SEAR region, aims to create open dialogue space for concerned experts, aims to promote and encourage exchanges of knowledge. The topics it covered are mainly a plan of action for improving research, training and management in the SEAR region, primarily focusing on Ecosystem Base Adaptation approach because this approach is cost-effective, generates social, economic and cultural co-benefits and it contribute to the conservation of biodiversity. It also a great way to achieve the sustainable development goal 14 (SDG14) divided into 10 targets to follow, which are all conserving and sustainably use the oceans, seas and marine resources for sustainable development. Giving the example of the policy document that underlines the issued facing the global seaweed mariculture industry (<https://www.sams.ac.uk/t4-media/sams/pdf/globalseaweed-policy-brief.pdf>), she explained the need of bridging the science-policy interface.



### ***UNU training course in CAS-MB, India***

**Three participants, Ms. Vu Tran Ngoc Cam, Mr. Duong Ngoc Phuoc, and Mr. Phusit Horpet, presented reflections from the 15th International Course on Mangrove Ecosystem** hosted by Centre of Advanced Studies in Marine Biology, Annamalai University, India and supported by UNU INWEH. How this training course is supporting the capacity of professionals and institutions in developing countries to undertake monitoring, research and conservation of mangrove forests. Through training in the scientific methodology and knowledge of latest research work on related topics, the capacity development programme aimed to create a network of professionals working on mangroves. The mix of professional knowledge and practical field trips, the scholars can contribute more of their work in mangrove conservation activities in their own country.

## ANNEX 4 - MEDIA REPORT

| No                | Name of reporter              | Media Agency                                 | Means of Delivery | Link  |
|-------------------|-------------------------------|--|-------------------|---|
| <b>Vietnamese</b> |                               |  |                   |   |
| 1                 | Ho Quoc Minh                  | VTV1   | English subtitle  | <a href="https://drive.google.com/open?id=0B2oJDd8dii9aRmt1eTMwaVdTdGM">https://drive.google.com/open?id=0B2oJDd8dii9aRmt1eTMwaVdTdGM</a>   |
|                   |                               | 24h movement (17:05 – 19:45)                 | News programme    | <a href="http://vtv.vn/video/chuyen-dong-24h-trua-25-11-2016-187265.htm">http://vtv.vn/video/chuyen-dong-24h-trua-25-11-2016-187265.htm</a>   |
| 2                 | Quoc Minh, Quoc Tuan, Tien An | VTV9 (7:46 – 9:56)                           | News programme    | <a href="http://vtv.vn/video/tin-tuc-tap-chi-trua-25-11-2016-187268.htm">http://vtv.vn/video/tin-tuc-tap-chi-trua-25-11-2016-187268.htm</a>   |
| 3                 | Ha Giang                      | National Times                               | Article           | <a href="http://toquoc.vn/kinh-te/tiep-can-thich-ung-dua-vao-he-sinh-thai-trong-quan-ly-va-quan-tri-ben-vung-he-sinh-thai-ven-bien-220532.html">http://toquoc.vn/kinh-te/tiep-can-thich-ung-dua-vao-he-sinh-thai-trong-quan-ly-va-quan-tri-ben-vung-he-sinh-thai-ven-bien-220532.html</a>   |
| 4                 | Truong Thanh Tung             | VOV1   | News programme    | <a href="http://vov1.vov.vn/Schedule.aspx?day=13%2f12%2f2016">http://vov1.vov.vn/Schedule.aspx?day=13%2f12%2f2016</a>   |
|                   |                               | VOV1 at 12:00 on 24th Nov 2016               | News programme    |   |
|                   |                               | VOV1 at 18:00 on 24th Nov 2016               | News programme    |   |
| 5                 | Le Minh Son                   | Vietnamplus                                  | Article           | <a href="http://www.vietnamplus.vn/hoi-nghi-ve-chong-bien-doi-khi-hau-voi-rung-ngap-man-ven-bien-viet-nam/418039.vnp">http://www.vietnamplus.vn/hoi-nghi-ve-chong-bien-doi-khi-hau-voi-rung-ngap-man-ven-bien-viet-nam/418039.vnp</a>   |
| 6                 | Nhat Huong                    | Journal of Natural resources and Environment | Article           | <a href="http://www.monre.gov.vn/wps/portal/tintuc!/ut/p/c5/RclJDolwFADQE5n_QZmWgFomgwzKsCGVRIFWQCOEc-nrdmbd8UMJPT-f2QT_t0FMOOZRqZRPT2WkBlroHC-d3oGG8dEshIZCig1P6vq7GKrmNcU0-yZUQUJshxVyUd-DIOQjP6azEta49vI07hbl4Fm7XMeZWM4OmTwC3Hninex-FOaJZqJPpSnZ5tXSgk_JaQmELIiDeWLe2e2abNwqY-w8io-QVc8lqS/">http://www.monre.gov.vn/wps/portal/tintuc!/ut/p/c5/RclJDolwFADQE5n_QZmWgFomgwzKsCGVRIFWQCOEc-nrdmbd8UMJPT-f2QT_t0FMOOZRqZRPT2WkBlroHC-d3oGG8dEshIZCig1P6vq7GKrmNcU0-yZUQUJshxVyUd-DIOQjP6azEta49vI07hbl4Fm7XMeZWM4OmTwC3Hninex-FOaJZqJPpSnZ5tXSgk_JaQmELIiDeWLe2e2abNwqY-w8io-QVc8lqS/</a> |
| 7                 | Hoang Thu Huong               | Communist Review                             | Article           | <a href="http://www.tapchiconsan.org.vn/Home/PrintStory.aspx?distribution=42210&amp;print=true">http://www.tapchiconsan.org.vn/Home/PrintStory.aspx?distribution=42210&amp;print=true</a>   |
| <b>English</b>    |                               |  |                   |   |
| 8                 | Kieu Quynh Anh                | National Times                               | Article           | <a href="http://nationaltimes.vn/articledetail.aspx?sitepageid=624&amp;articleid=2829">http://nationaltimes.vn/articledetail.aspx?sitepageid=624&amp;articleid=2829</a>   |
| 9                 | Ta Anh Tuan                   | Communist Party of Vietnam Online Newspaper  | Article           | <a href="http://en.dangcongsan.vn/science-education/south-east-asian-experts-shared-lessons-on-governance-of-coastal-eco-systems-418250.html">http://en.dangcongsan.vn/science-education/south-east-asian-experts-shared-lessons-on-governance-of-coastal-eco-systems-418250.html</a>   |
| 10                | Thuc Anh                      | Vietnamnet                                   | Article           | <a href="http://english.vietnamnet.vn/fms/society/167761/social-news-30-11.html">http://english.vietnamnet.vn/fms/society/167761/social-news-30-11.html</a>   |
| 11                | Khánh An                      | Journal of Natural resources and Environment | Article           | <a href="http://www.monre.gov.vn/wps/portal/news!/ut/p/c5/dclJDolwFADQs3iC3zDGZYsylvhoJcCGNliGQQaDCJxeL2De8kEOP71c6oec66GXHaSQG4XIYFczKUJOgg2EOY8unukryEGQQW7-_UADASnSct6g4U35GOx8WUWJXsdUx-M0eKWzO3HrMr_YkpnidrGfY6xVPMOHEj1QmrA-j9yS-ISfVd-7JOr2SrhzbbaLaSjZwxbbwmjQ4HGfUjv3W2jwY!/">http://www.monre.gov.vn/wps/portal/news!/ut/p/c5/dclJDolwFADQs3iC3zDGZYsylvhoJcCGNliGQQaDCJxeL2De8kEOP71c6oec66GXHaSQG4XIYFczKUJOgg2EOY8unukryEGQQW7-_UADASnSct6g4U35GOx8WUWJXsdUx-M0eKWzO3HrMr_YkpnidrGfY6xVPMOHEj1QmrA-j9yS-ISfVd-7JOr2SrhzbbaLaSjZwxbbwmjQ4HGfUjv3W2jwY!/</a>                     |

| No              | Name of reporter   | Media Agency                                     | Means of Delivery | Link  |
|-----------------|--------------------|--|-------------------|---|
| <b>Websites</b> |                    |  |                   |   |
| 1               | Vietnamese version | Research Institute for Aquaculture No. 2 (RIA 2) | Article           | <a href="http://vienthuysan2.org.vn/index.php/vi/su-kien-noi-bat/Hoat-dong-cu-a-Vie-n/Tiep-can-thich-ung-dua-vao-he-sinh-thai-trong-quan-ly-va-quan-tri-ben-vung-he-sinh-thai-ven-bien-14/">http://vienthuysan2.org.vn/index.php/vi/su-kien-noi-bat/Hoat-dong-cu-a-Vie-n/Tiep-can-thich-ung-dua-vao-he-sinh-thai-trong-quan-ly-va-quan-tri-ben-vung-he-sinh-thai-ven-bien-14/</a> |
| 2               | English version    | University of United Nations                     | Article           | <a href="http://inweh.unu.edu/regional-training-course-and-workshop-on-ecosystem-based-adaptation-approach-for-sustainable-management-and-governance-of-coastal-ecosystems-engage-program/">http://inweh.unu.edu/regional-training-course-and-workshop-on-ecosystem-based-adaptation-approach-for-sustainable-management-and-governance-of-coastal-ecosystems-engage-program/</a> |
| 3               | Facebook           | AITCV in Vietnam                                 | Mix               | <a href="https://www.facebook.com/aitvn/videos/pcb.1820209484893724/1820210234893649/?type=3&amp;theater">https://www.facebook.com/aitvn/videos/pcb.1820209484893724/1820210234893649/?type=3&amp;theater</a>   |
| 4               | Vietnamese version | Asian Institute of Technology in Vietnam         | Article           | <a href="http://aitcv.ac.vn/vn/news-event/162/31874_tiep-can-thich-ung-dua.html">http://aitcv.ac.vn/vn/news-event/162/31874_tiep-can-thich-ung-dua.html</a>   |
| 5               | English version    | Asian Institute of Technology in Vietnam         | Article           | <a href="http://aitcv.ac.vn/en/short-term/233/">http://aitcv.ac.vn/en/short-term/233/</a>   |