EAS CONGRESS 2021

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Collab 12

Climate Change Adaptation for Coastal Communities: Learning from East Asia and Arafura and Timor Seas (ATS) Regions

25 October 2021, 9:00 AM – 11:30 AM (GMT+8)
Online via Zoom

ORGANIZERS:

PEMSEA

Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) Resource Facility

ATSEA

UNDP/GEF/PEMSEA Arafura and Timor Seas Ecosystem Action Phase II (ATSEA-2)

IGES
Institute for Global Environmental Strategies

Institute for Global Environmental Strategies (IGES)

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PROCEEDINGS

1.0 Introduction

The webinar was organized by Partnerships in Environment Management for the Seas of East Asia (PEMSEA) Resource Facility, UNDP/GEF/PEMSEA Arafura and Timor Seas Ecosystem Action Phase II (ATSEA-2), and Institute for Global Environmental Strategies (IGES) on 25 October 2021 and was the twelfth in a six-month series of knowledge-sharing collabs of the EAS Congress 2021.

Climate change impacts on marine ecosystems and associated livelihoods are growing and will have severe impacts on coastal communities if left unattended. Reduced marine ecosystem quality and productivity due to climate change will cause serious food security concerns for coastal communities. These are induced and exacerbated by ocean acidification, changes in sea temperatures and circulation patterns, the frequency and severity of extreme events, and sea level rise.

Approaching climate change involves mitigation actions that either reduce the amount of carbon dioxide and other greenhouse gases (GHGs) in the atmosphere or adaptation efforts that prepare society for the impacts associated with climate change. For coastal communities that do not emit large volumes of GHGs, adaptation strategies are often applied to help manage climate change risks and improve community resilience.

Countries in the EAS region and its neighboring Pacific countries are highly vulnerable to rising sea levels due to their low-lying communities and densely populated coastal cities. It is also the region with the highest proportion of weather-related disaster displacement in the world.

In response, several climate change adaptation (CCA) initiatives have emerged in the EAS and ATS regions through the implementation of climate-responsive integrated coastal management (ICM) and application of practical CCA decision-making. Lessons learned from the EAS and ATS regions were shared through this collab to instill best practices and enable their replication.

The event aimed to:

1. Raise awareness and foster better understanding of climate change impacts on coastal communities in the EAS and ATS regions;
2. Share climate change vulnerability assessment results and introduce the decision-making guide developed for the ATS region;
3. Showcase best practices and lessons learned from the EAS and ATS regions in developing and/or implementing local CCA strategies.
4. Contribute to enriching discussions and synergies towards CCA efforts in support of the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA) and the ATS region's Strategic Action Programme (SAP) as well as the bigger objectives of the United Nations Framework Convention on Climate Change (UNFCCC).

This collab is held under the ATSEA-2 project, which is the second phase of the GEF-financed, UNDP-supported ATSEA program and is designed to enhance regional collaboration and coordination in the Arafura and Timor Seas (ATS) region. The second phase focuses on supporting the implementation of the region's SAP, specifically by establishing a regional governance mechanism that strengthens the enabling policies and capacities of institutions and individuals to pave the way for a sustained transboundary response to overexploited fisheries and other pressures such as climate change on the globally significant biodiversity in the ATS region. It is being implemented by the PEMSEA Resource Facility.

The workshop was moderated by Ms. Nagisa Shiiba, Policy Researcher of the Adaptation and Water Area of IGES, and was attended by 108 participants from 11 countries (Australia, Cambodia, China, India, Indonesia, Japan, Malaysia, Philippines, Thailand, Singapore, and Viet Nam). Females constitute 60.2 percent (65) of the total attendance.

The program and link to the recording and presentation files can be found in Annexes 1 and 2, respectively. Annex 3 features the list of participants.

2.0 Opening remarks

Ms. Aimee Gonzales, Executive Director of the PEMSEA Resource Facility PRF, stressed the timeliness and relevance of the ATSEA-2 project as the Asia Pacific has the highest proportion of weather-related disaster displacement worldwide and is highly vulnerable to rising sea levels. She enumerated factors that contributed to its vulnerability such as the dominance of low-lying communities and densely populated coasts in the area.

She shared that the webinar is part of a series of knowledge-sharing collabs leading to the Main Conference and 7th EAS Ministerial Forum of the 7th EAS Congress, a PEMSEA-organized event happening every three years to share the progress, accomplishments, good practices, and lessons learned among stakeholders. The discussions and recommendations from this event would inform the conclusions and recommendations of the collabs to be presented at the Main Conference on 1 December 2021; the PEMSEA Roadmap to 2030; and the ongoing policy discussions of the governments of the ATS region in preparing for the 26th session of the Conference of the Parties (COP) to the UNFCCC.

She acknowledged ATSEA-2 and the IGES for supporting the EAS Congress 2021 and the speakers and participants for joining the event.

3.0 Presentations

3.1 Adapting to coastal climate change in the ATS region

Dr. Johanna Johnson, Director of C_2O Consulting, shared that the ATS lies at the congruence of two highly important large marine ecosystems (LMEs), the Northern Australian Shelf and the Indonesian Sea. It houses the habitats of different species of corals, mangroves, seagrass beds, and other species of conservation interest. The ATS also supports fisheries, aquaculture, and tourism. She summarized the importance of its marine resources into six themes, namely: (1) biodiversity hotspot; (2) regulates the climate; (3) protects the coasts from disasters; (4) supports high-value fisheries and employment; (5) supports other sectors, namely tourism, shipping, and oil and gas exploration; and (6) provides the primary source of protein for millions of people.

She then narrated how her team conducted a vulnerability assessment in the region. This was conducted to identify the species and habitats that are deemed most vulnerable to climate change and determine the driver of these vulnerabilities. The results would then help them identify adaptation options to minimize vulnerability and ensure the sustainability of its coastal and marine resources.

The vulnerability assessment was conducted in five sub-regions that have manageable fisheries area: Arafura Sea (Indonesia), Timor Sea, Papua New Guinea (Western Province), Northwest Australia, and the Gulf of Carpentaria. The study focused on species of conservation interest, fish species with high annual catch (by weight or value), those that were identified for future exploitation, and a range of biota such as finfish, crustaceans, cetaceans, sharks, and sea cucumbers, among others. Covered habitats in the study include shallow and deep coral reefs, seagrass meadows, mangroves, and the open ocean.

The assessment used the IPCC framework for vulnerability and made use of two climate change projections up until the year 2070 for the region, namely: (1) medium emission scenario (Representative Concentration Pathway [RCP] 4.5); and (2) high emission scenario (RCP 8.5). The projections had a duration of 50 years.

Based on the findings, it is anticipated that the ATS region will experience sea level rise, warmer air and sea temperature, more extreme rainfall, a more acidic ocean, and more intense but less frequent storms, with variabilities across the region. Coral reefs were found to be highly vulnerable, followed by seagrass meadows and mangroves (moderately vulnerable), and deep reefs (vulnerable). The top five most vulnerable species per sub-region is listed in order below.

- ***Arafura Sea (Indonesia):*** black teatfish, barramundi, green turtle, hawksbill turtle, and mangrove red snapper
- ***Timor Sea:*** green turtle, flowery cod, mangrove red snapper, octopus, and dugong

- ***Papua New Guinea (Western Province***): mud crab, dugong, green turtle, barramundi, and black jewfish
- ***Northwest Australia:*** golden snapper, green turtle, dugong, king threadfin, and black jewfish
- ***Gulf of Carpentaria:*** king threadfin, green turtle, dugong, barramundi, and golden snapper

Dr. Johnson noted that the results were highly technical and complex. To address its application at the local level, a non-technical summary or draft guide for decision-makers was developed. This would facilitate a targeted identification of adaptation actions at the community level.

ATSEA-2 has also conducted two case studies in the ATS region: one in Timor-Leste to support ecosystem-based approach to fisheries management and the other one in Oeseli Village, Rote Ndao, East Nusa Tenggara, Indonesia to pilot the application of the draft guide. The results of these case studies will be incorporated in the enhancement of the draft guide.

3.2 Lessons learned from implementing CCA strategies in Oeseli Village, Rote Ndao, East Nusa Tenggara, Indonesia

Mr. Ikbal Alexander, Director of the Kertabumi Recycling Center in Indonesia, presented the results of applying the draft guide in Oeseli Village, Rote Ndao, East Nusa Tenggara, Indonesia.

Located at the southernmost point of the country, Oeseli Village used to be a military base in the early 1920s and is now known for its initiatives to protect vulnerable species and habitats. The village has 480 households with around 2,800 residents. For the study, the village was divided into five—four in the uplands and one on the coast. Two methodologies were applied: community immersion and focus group discussions (FGDs).

The immersion was conducted to build rapport with, observe, and listen to the community and share emerging findings with them. The immersion also involved underwater observation of the coral reefs, fishing, and participatory mapping to identify the location of the fish and their habitats.

Findings reveal that:

- Fish are generally recognized as low-value commodities from a cultural perspective but are consumed regularly by the locals.
- Fishers value their catch based on size. Lobsters and snappers are expensive; hence, fishers prefer to sell them outside the village.
- Catching of sharks and turtles is being avoided in the village out of compliance with the law; it is not motivated by the need for conservation.
- The oil spill in 2009 resulted in low harvest and poor-quality seaweed. This caused an 80 percent reduction in the villagers' income, leading many to shift to construction and agriculture for livelihood.

- Fish stocks are decreasing in the area and nearby islands. The fishers were particularly worried about this observation made from participatory mapping due to its potential impact on their food security.
- The community acknowledged that climate change has disrupted their daily lives. In particular, the Seroja storm experienced in 2021 destructed their crops and coral reefs. This prompted the community to realize their responsibility to improve the quality of their environment; however, they are unsure of the proper activities to be implemented.

On the FGDs, Mr. Ikbal mentioned that they utilized several methods: (1) identification of habitats and species using flashcards; (2) fisheries assessment using color codes; (3) identification of local issues with their recommended adaptation using the post-it note method; and (4) form-filling. Children were also consulted; they were asked to illustrate their insights about the environment.

The FGDs yielded the following main challenges experienced in Oeseli Village:

- The quantity of fishes is decreasing, especially for teatfish, lobster, and snapper.
- Many families rely on income generated from seaweed production but the quality and quantity produced is getting worse.
- The reefs are destroyed.
- Turtles are hunted discreetly
- Mangroves and seagrass beds are not viewed as alternative sources of income.
- Use of potassium and other poisons in fishing is prevalent.
- In order to avoid retaliation, people do not report their family members who conduct illegal activities.
- Ecotourism is a growing trend.

In the same FGDs, the community identified local adaptive actions and rated them based on: (1) their perceived effectiveness and community/social acceptance; and (2) cost and feasibility. The group members then voted to select which among the identified actions would give the holistic positive impact on the community. These are: (1) developing ecotourism in the village; (2) developing a local law banning fish poisoning; and (3) developing a video to build awareness on the importance of turtle protection.

3.3 ICM as a tool/framework for addressing CCA

Ms. Cristine Ingrid Narcise, the Policy and Result-Based Management Specialist of PRF, discussed the imperatives for addressing CCA at the local level. She highlighted that climate change is a cross-cutting issue, and with the coastal areas and communities being highly vulnerable to the impacts of climate change, adaptation initiatives must take place at all levels of the government. She also emphasized that good governance is a critical element of the response and that institutions must build on what already exists and learn from experience while concurrently working towards more streamlined action.

She then shared that ICM is among the recognized management frameworks in addressing climate change. The concept of ICM originated from America in the 1960s. It was introduced in Southeast Asia in the 1980s and eventually recognized as a sustainable development framework in the 1990s. Currently, 40 percent of the coastline in the EAS region is covered with ICM.

She cited two definitions of ICM: (1) it is interdisciplinary and applies an intersectoral approach; and (2) it is a management framework that employs integrated and interactive planning processes in addressing coastal challenges. She explained that ICM is a comprehensive system for sustainable management and use of coastal and marine areas; it provides various stakeholders with a systematic, holistic approach to planning, developing, implementing, monitoring, and evaluating initiatives that address coastal and marine related issues, including climate change. ICM is based on the principles of ecosystem management, which looks at both horizontal integration and coordination across sectors and vertical across the different levels of government. It employs adaptive management to provide flexibility in development interventions. ICM can support CCA by incorporating climate change considerations during its development.

The application of ICM in the EAS Region in the past three decades resulted in the development of the Sustainable Development of Coastal Areas (SDCA) framework. The application of SDCA calls for a system of governance and management elements that are critical to achieving the overall goals of sustainable development in coastal areas. These elements are:

- Governance that promotes integration and coordination of policies and functions across sectors;
- Issue-specific management systems that are critical to achieving the overall goals of sustainable development of coastal and marine areas;
- Partnerships to strengthen and accelerate on-the-ground actions;
- A State of the Coast reporting system for assessing and reporting progress on ICM implementation;
- An ICM code to guide national and local governments and recognize their efforts in the sustainable development of coastal areas; and
- ICM development and implementation process that can guide the development of the mentioned elements in the framework.

Ms. Narcise noted however the framework is continuously evolving as a result of emerging concerns at the national and global levels and that other necessary components under governance includes public awareness and participation and capacity development.

Sample CCA-related considerations when applying the SDCA framework are listed below:

- Policies on coastal resource protection and disaster preparedness;
- Decision-making tools to help stakeholders build consensus in minimizing climate change risks; and

- Implementation of management/adaptation measures as needed and appropriate such as soft engineering approaches like mangrove reforestation to improve coastal protection, various coastal habitat restoration activities, watershed management, groundwater management, alternative livelihood programs, and waste reduction, segregation, reuse and recovery activities, and disaster preparedness activities such as simulations/drills, among others.

She then shared the ICM development and implementation cycle applied by PEMSEA in the past 30 years across different socio-political systems in the EAS. The stages include:

- ***Preparing*** – This focuses on: the establishment of a multi-agency and cross-sectoral coordinating mechanism for ICM program development and implementation; and the initiation of a baseline assessment of the coastal and marine sector using the State of the Coast (SOC) report and other related profiling tools.
- **Initiating** – This involves: identifying priorities for management options through the local SOC report; consolidating available data and information; conducting risk and vulnerability assessments; and conducting stakeholder consultations to obtain people's perspectives on issues and risks. Plans for systematic public awareness and participation and capacity development to support ICM implementation are also prepared during this stage.
- **Developing** – This entails developing a coastal strategy, implementation plan, coastal use zoning plan, and area-specific management plans. Sustainable institutional arrangements and financing mechanisms to support implementation of the plans should also be discussed during this stage. Institutional arrangements should ideally include: inter-agency, multi-sectoral committees/councils led by heads or senior representatives of various agencies and key stakeholder partners to provide strategic advice; ICM program management office to coordinate and oversee operations on-the-ground; and technical working groups that can provide scientific and technical support in the development and implementation of the ICM program. In the case of financing mechanisms, on the other hand, the concerned local government should explore possible collaborations with the private sector as a prospective source of funds to support ICM.
- **Adopting the** ICM Plans (e.g., through legislation).
- **Implementing** the ICM plans by operationalizing the agreed institutional, financing, and partnership mechanisms.
- **Refining and Consolidating** ICM – A review process must be undertaken to assess the progress, accomplishments, gaps, and next steps. The resulting findings shall be used to enhance the ICM initiatives of the locality, including incorporating climate change considerations for those that have not done so yet.

3.4 ICM as a framework for CCA in Chonburi, Thailand

Ms. Nisakorn Wiwekwin, ICM Coordinator at the Saensuk Municipal Government in Chonburi, Thailand presented the local application of ICM in Chonburi.

Located in the eastern region of Thailand, Chonburi has rapidly transformed from an agricultural economy to an industrial economy, which has led to habitat loss, pollution, resource use conflict, and other environmental issues. Through PEMSEA, it became an ICM program demonstration site in 2001 covering five local governments in the beginning. The program was eventually scaled up to cover the entire coastline of Chonburi, involving 26 local governments by the coast. By 2010, the program had collaborations with 73 in-land local governments within the province. An ICM coordination and management mechanism chaired by the Governor facilitates inter-agency and multi-sectoral coordination and provides policy guidance to the ICM program.

Considering priorities identified through the environment risk assessment and stakeholder consultations, the provincial government of Chonburi was able to establish its Coastal Strategy (CS) and developed 3-year CS implementation plans (or ICM Action Plans) in line with the government planning process. Guided by the SDCA framework, the ICM plans include actions concerned with strengthening governance mechanisms for marine and coastal resources management and management programs on habitat protection, restoration, and management; food security and alternative livelihood development; pollution reduction and waste management; and natural and man-made hazard prevention and management, which initially focused on oil spill preparedness and response. Likewise, as part of the ICM governance mechanism, they are continuously conducting resource mobilization, capacity building, stakeholder education, and integrated environmental monitoring in collaboration with various partners.

Since 2010, they have been incorporating climate change considerations in their ICM plan. They have also updated their ICM plan in accordance with new laws such as the Promotion of Marine and Coastal Resources Management Act 2015 and transformed their ICM program from a project-based effort into a local government initiative.

Coastal erosion is one of the priority issues in the province, and the recently completed SDS-SEA Project with PEMSEA demonstrated the use of the Coastal Integrity Vulnerability Assessment Tool (CIVAT) in Saensuk City in identifying key adaptation measures for consideration in the local ICM and development plans. The proposed adaptation measures contribute to Saensuk City's program on building a *"Low Carbon Society,"* which is being implemented across five management programs in collaboration with various stakeholders in accordance with the SDCA (ICM) framework.

3.5 Participatory approaches and geospatial modelling technique addressing coastal resilience

Dr. Brian Johnson, the Deputy Director of the Adaptation and Water Area of IGES, introduced their Participatory Coastal Land-use Management (PLCM) project whose objective is to help local government units (LGUs) become more resilient to climate change and its impacts. Examples of support provided include:

- Conducting land-use change and climate change impact assessments and identifying priority CCA measures based on the results thereof;

- Updating and improving the local plans and policies; and
- Helping them apply for CCA-oriented funds from Green Climate Fund, People's Survival Fund, and other similar funding windows.

PLCM is also an approach—one that they have used in the project itself and had four main steps. In the first step, **scenario development**, the local government is requested to join a participatory mapping to identify the probable location of, for example, their planned land-use conversion. This was then subjected to **impact assessment** where the location is assessed under future climate scenarios using free spatial modeling tools. The results of this assessment were then presented to the local government to allow them to identify **countermeasures** and adopt them into their **climate-resilient land-use planning** as the fourth and last step. He also emphasized that the use of free modelling software such as QGIS to train the local governments and local university students are crucial in preparing them for the end-of-life of the project to help ensure that the gains of the project will be sustained.

He then presented the location of their case study, which is Oriental Mindoro, an island province southwest of Manila, Philippines. The site is exposed to various coastal hazards such as storm surge, sea level rise, coastal erosion, and groundwater salinization. According to their survey, the perceived climate change risks vary per local government.

He then shared the different modeling tools that they used in conducting the impact assessment:

- The **Integrated Valuation of Ecosystem Services and Trade-offs (InVEST)** is a free software used to assess the benefits provided by natural ecosystems. The model calculates the exposure index using a spatial representation of seven geophysical variables: relief, natural habitats, wind exposure, wave exposure, surge potential depth contour, geomorphology, and sea level change. Its results can show that modifications of the biophysical environment can affect the vulnerability of coastal areas to different hazards. For the project, four scenarios were used: (1) vulnerability with all habitats; (2) vulnerability with no habitats; (3) vulnerability with only estuarine habitats; and (4) vulnerability with only Terrestrial Habitats. One of the results showed that if Calapan City's coastal habitats are converted to urban or agricultural areas, coastal exposure to hazards would greatly increase.

- The **Sea Level Affecting Marshes Model (SLAMM)** is used to assess sea level rise impact. In this model, the local sea level rise rates are measured through satellite measurements of sea surface height (SSH). SSH data from 1992 to 2010 showed that there was a sea level rise rate of 7.2 millimeters per year off the coast of Oriental Mindoro, which could be used in making future projections. The SLAMM model can simulate main coastal processes such as inundation, erosion, soil saturation, and overwash under different sea level rise scenarios. Using various model inputs including land-cover, elevation, slope, sea level rise rate and coastal erosion/accretion rates, the model can generate maps of future land cover considering sea level rise impacts. It could also show if the rate of soil building in mangrove habitats is faster than sea level rise, which might have an impact on the

ability of mangroves to protect inland areas from sea level rise. The model results showed that by 2050, several areas in Calapan could be flooded, and this can either be regular or permanent flooding.

- The **Water Evaluation and Planning (WEAP) System** is a GIS-based graphical interface platform used to assess groundwater quality impact. Through a workshop, the local governments in the project site were guided to collect well samples and to test for electrical conductivity, total dissolved solids, chlorine, and temperature. The data gathered were then plotted on the GIS software, which would reveal which locations have groundwater salinization issues. If overlayed with a soil map, the impact of the soil on water quality degradation can be determined with consideration of future climate change scenarios and land-use changes and population growth.

Using the results of the impact assessment, countermeasures were identified. In the case of Calapan City, Dr. Johnson shared that the local government wanted to strengthen their MPA management system to reduce the impact of possible future hazards. They deemed that the development of training and educational materials would help the locals understand the importance of mangroves and other coastal habitats in CCA. Furthermore, it would give them knowledge on how to better protect and conserve their ecosystems. Mangrove tree planting activity is also among the identified countermeasures. At the end of his presentation, he invited the participants to check IGES' PLCM guidebook as it features tutorials for each of the models mentioned.

4.0 Open Forum

Moderated by Dr. Prabhakar Sivapuram, the Research Manager and Senior Policy Researcher of the Adaptation and Water Area of IGES, the floor was opened for questions from the attendees of the session. The attendees' interest spurred a series of discussions as summarized below:

QUESTION 1: What is the importance of scientific information and tools to facilitate decision-making at the local level?

> **Ms. Narcise:** Coupled with the locals' perspectives on the risks, scientific information and tools are necessary in decision-making as they can help identify priorities in terms of management interventions. Note however that scientific information would also need to be presented in forms that are understandable to various people, including policy-makers and coastal managers. Science communication would need support not just from the natural scientists but also social scientists and communications experts.
>
> **Dr. J. Johnson:** Science can help us ensure that we are targeting the right actions that make the greatest difference. In the case of fisheries management for example, identifying which species are the most vulnerable to climate change can allow us to be more effective and efficient in terms of CCA efforts.

QUESTION 2: How much are we to rely on scientific information and tools before we take any decisions for coastal management for CCA? Do we need to wait for them, or should we go ahead with whatever information we have?

> **Dr. J. Johnson:** This is a matter of balance—the answer to which depends on the situation.

QUESTION 3 (follow-up to Q1): Just to clarify what Dr. J. Johnson said, communities will benefit more from adaptation actions targeting specific species compared to fisheries management in general?

> **Dr. J. Johnson:** General fisheries management is still important. It is unlikely the case however that local communities have the capacity to address all species; hence, targeted actions are recommended.

QUESTION 4: Do we need to prepare separate adaptation policies and plans, or can they be integrated into the general development policies and plans? In terms of the coastal zone, how much is the potential to integrate adaptation into general coastal development? Do adaptation responses have to be specific and at what level should they be integrated—is it zonal, local, or national considering that ocean-related CCA goes beyond local capacity?

> **Ms. Narcise:** We prepare CCA plans but these will remain as plans if these are not adopted and incorporated into the development plans of local governments. To ensure that plans are realistically implementable considering the capacities and resources in any area, it is important to: (1) engage local decision-makers in the formulation process; (2) get the perspectives and inputs of relevant stakeholders; and (3) see to it that there is ownership and commitment in adopting and implementing these plans.

QUESTION 5: Have you been able to use local capacities in a project? What issues did you observe? Is it practical to think that those capacities can be adjusted during project implementation, which is typically three to five years?

> **Dr. J. Johnson:** Using expert judgment and local knowledge, we were able to consider the capacity of communities or their management in the intended purposes. In the case study that Mr. Alexander presented a while ago, we were working with local communities to develop an action plan. There was plenty of discussion about the capacity of communities to implement actions—capacity in terms of costs, resources, skills, or knowledge that might be needed. That is part of the whole process of developing a community action plan.
>
> **Mr. Alexander:** During the immersion, we talked with the community. They do not wish to assess a presented action if they are not going to be the persons responsible for implementing it; hence, we want the local action to come from them and for them to do it and monitor their progress.

QUESTION 6: What kind of platforms and tools are available to support knowledge sharing and local decision-making?

Ms. Narcise: PEMSEA has an existing network of local governments that are implementing ICM programs. They get together every year to share their experiences and good practices in addressing various issues, including climate change. They are also free to interact with one another and exchange information among them in between the forums. PEMSEA also has a network of learning centers; this is composed of academic and research institutions that provide technical and capacity-building support to local and national governments in addressing various issues. Both are good platforms for knowledge sharing and capacity-building. Currently, we are preparing an event to bring the two networks together into a joint forum to determine key issues in local governments in the EAS region that may need support from our learning centers.

PEMSEA also has an online platform that we call Seas of East Asia Knowledge Bank (SEAKB), which contains information on good practices on coastal and marine sector management for replication in other sites. It also has a reporting system that can share local governments' progress in addressing the various United Nations (UN) Sustainable Development Goals (SDGs).

QUESTION 7: For Dr. J. Johnson: In your presentation, you focus more on macrospecies. What about microorganisms that respond to climate change much faster? How are they going to help us in addressing climate change?

Dr. J. Johnson: We have used this rapid desktop assessment approach in the Great Barrier Reef, parts of the Pacific, Northern Australia, and Torres Strait in the past. In some occasions, we have also assessed microorganisms and how they are vulnerable to climate change.

Based on past experience, in terms of adaptation measures that communities might be able to do or might be implemented at the strategic regional level, microorganisms are not something people will focus on generally and the activities you would take potentially to promote healthy microorganisms in communities would be taken anyway in addressing things like land-based runoff. It is something that we have included in the past but has not had a direct application to local adaptation or strategic adaptation. We already know that microorganisms are vulnerable to changing climate and they underpin the system; there is no doubt, but this is meant to be a rapid process that informs local actions.

5.0 CLOSING REMARKS

Dr. Handoko Adi Susanto, the Regional Project Manager of ATSEA-2, shared a quote from the Sixth Assessment Report of the Intergovernmental Panel on Climate Change: "*Recent changes*

in the climate are widespread, rapid and intensifying and unprecedented in thousands of years." He stressed that this statement is already evident in the ATS Region as presented by the speakers and added that the crosscutting nature of climate challenge is a tremendous challenge that must be addressed actively.

He acknowledged the two case study sites that were presented during the collab as examples of active efforts to make the EAS and ATS regions more resilient and adaptive to climate change. He also acknowledged the various tools and approaches that were discussed.

He shared five takeaways:

- Scientific findings should be translated into a language that is easily understandable for the community.
- A participatory approach is needed to build community ownership in development interventions.
- It is important to ensure that communities have the knowledge and capacity to implement any identified adaptation strategy.
- Climate change considerations should be reflected in economic development policies, plans, and actions.
- Collaboration between stakeholders is necessary to scale up best practices and lessons learned from pilot sites.

He hoped that the discussion in this collab will serve as a platform for further dialogue and collaboration on responding to climate change in the EAS and ATS regions as well as the discussions leading to COP 26 in Glasgow. He then expressed his appreciation towards the speakers and organizers.

ANNEX 1. PROVISIONAL ANNOTATED AGENDA.

Moderator: Ms. Nagisa Shiiba, Policy Researcher, Adaptation and Water Area, IGES

Time (GMT+8)	Session	Speaker/s
9:00 AM – 9:05 AM	Opening of the event	Ms. Nagisa Shiiba, IGES
9:05 AM – 9:10 AM	Opening remarks	Ms. Aimee Gonzales, Executive Director, PRF
9:10 AM – 10:00 AM	**Presentation series 1:** Adapting to coastal climate change, assessing the vulnerability of ATS region to climate change, and developing decision-making guide to enable CCA (30 min) Presentation on local application in Rote Ndao, Indonesia (20 min)	 Dr. Johanna Johnson, Director, C2O Pacific Mr. Ikbal Alexander, Director, Kertabumi Recycling Center
10:00 AM – 10:30 AM	**Presentation series 2:** Integrated Coastal Management as a tool/framework for addressing CCA at the local level (15 min) Presentation on local application in Chonburi, Thailand (15 min)	 Ms. Cristine Ingrid Narcise, Policy and Result-Based Management Specialist, ATSEA-2 Ms. Nisakorn Wiwekwin, Integrated Coastal Management Coordinator, Saensuk Municipality, Chonburi, Thailand
10:30 AM – 10:50 AM	**Presentation series 3:** Participatory approaches and geospatial modeling techniques for addressing coastal resilience	 Dr. Brian Johnson, Deputy Director, Adaptation and Water Area, IGES
10:50 AM – 11:20 AM	Panel discussion and Q&A ▪ Importance of scientific information and tools and how to facilitate their application to support local or community-level adaptation to climate change ▪ Importance of or approaches in incorporating CCA actions into economic and development plans, policies, and actions ▪ Challenges, knowledge gaps, and capacity development needs (i.e., financing and investment) in CCA planning, implementation, and monitoring and reporting at the local level ▪ Available platforms, tools, and opportunities to support knowledge and information-sharing, capacity building, and	Presenters as panelists Moderator: Dr. Prabhakar Sivapuram, Research Manager and Senior Policy Researcher, Adaptation and Water Area, IGES

Time (GMT+8)	Session	Speaker/s
	financing/investments on CCA at the local level	
11:20 AM – 11:30 AM	Closing remarks (including conclusions and recommendations)	Dr. Handoko Adi Susanto, Regional Project Manager, ATSEA-2

ANNEX 2. LINK TO THE RECORDED LIVESTREAM AND PRESENTATION FILES.

Recorded livestream - https://youtu.be/wknevDeIHmc

Presentation files - https://tinyurl.com/ATSEA-2-Collab-Presentations

ANNEX 3. LIST OF PARTICIPANTS.

Audience

Country	Organization	Name	Position and Unit/ Department
Cambodia	Ministry of Environment	Mr. Amida Prak	General Department for Policy and Strategy
	Song Saa Foundation	Ms. Claire Ogg	
China	Xiamen University	Ms. Lusita Meilana	
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	Corporate Forum for Community Development	Ms. Tri Iswari	Evaluation Department
	Gadjah Mada University	Ms. Shinta Khoiri Fadhillah	Science Information Geographic Department, Faculty of Geography
	Ministry of Environment and Forestry	Ms. Puji Prihatinningsih	Karimunjawa National Park
	Ministry of Marine Affairs and Fisheries	Ms. Erna Yuniarsih	Policy Analyst, DG Aquaculture
	Padjadjaran University	Ms. Indriyani Rahayu	
		Mr. Rio Mario Saptaniar	
Malaysia	Selangor Water Management Authority	Ms. Bidasari Binti Bahashim	Environmental Control Officer, River Basin and Coastal Management Department
	Selangor Water Management Authority	Mr. Mazhazuan bin Harun	Klang River Regional Office
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	Broadfield Engineering	Mr. Errol Secapuri	Consultant
	Calaca Senior High School	Mr. Adrian Comia	Student; and President of
		Ms. Katrine G. Caag	Youth for Environment in Schools Organization
	Calderon Research and Development Services	Mr. Neil Floresca	
	De La Salle Lipa	Ms. Vivienne Rhea Padura	Faculty/Biology Department and Science Area
	Department of Education	Ms. Rocelle Leron	Division Office of Bayawan, Negros Oriental
		Mr. Jerwin Patiga	PDO I, Division Office of Calamba City, Laguna

Country	Organization	Name	Position and Unit/ Department
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		Ms. Rose Ann P. Cruz	CENRO, Zamboanga City
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		Ms. Jorvelyn Lambojo	Forest Extension Officer, Community Environment and Natural Resources, Digos City, Davao del Sur
		Ms. April Villegas	NGP Unit, Community Environment and Natural Resources, Digos City, Davao del Sur
		Mr. Niño Diestro	Technical Support Aide, Region 11 Office
		Mr. Wilmer Lapiz	Technical Support Aide, Region 11 Office
		Ms. Danielle Justice Marie Gica	Technical Support Aide, Biodiversity Management Unit
		Mr. Harvey Jey L. Sabio	Forest Technician I, Conservation and Development Section, Community Environment and Natural Resources Office
		Ms. Antoinette De Leon	Office for Enforcement
		Mr. Arman Plazos, Jr	Forest Extension Officer
		Ms. Christine Ramos	EMS
		Ms. Joan Flores	DMO II/CCS
		Mr. Jordan Abraham	Forest Extension Officer/CDS
		Ms. Maricita Cabasa	Senior Communications Development Officer, Regional Public Affairs Office
	Don Mariano Marcos Memorial State University and Saint Louis University	Mr. John Raymund Torres	Faculty and Student Researcher
	Eastern Samar State University	Ms. Jennifer Besalda	Laboratory Technician, University Laboratory, Salcedo Campus
		Mr. Cherlowen Bolito	College of Engineering, Salcedo Campus
		Ms. Maricel Garcia	Environmental Science Department
		Ms. Noba Hilvano	Environmental Science Department

Country	Organization	Name	Position and Unit/ Department
		Ms. Rizza Josefina Doguiles	Environmental Science Department
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		Mr. Raul Firmacion	Engineer II, Shipyard Regulation Service, Region XII Office
	Mindanao State University	Ms. Sandra Manulat	College of Science and Environment
		Ms. Chrystelle Joy R. Pinonggan	Department of Science and Mathematics Education, College of Education, Iligan Institute of Technology
		Ms. Jona Mae Mendoza	Department of Science and Mathematics Education, College of Education, Iligan Institute of Technology
		Ms. Marcelle Joice Lastam	Department of Science and Mathematics Education, College of Education, Iligan Institute of Technology
		Ms. Aida Perpetua	Asst. Prof. IV, Naawan Campus
	Mommy Gina Tuna Resources Inc.	Mr. Jason Edres Sumali	Safety Inspector
	National Irrigation Administration	Mr. Elmer Joseph Coronel	Engineer, Engineering and Operations Division
	National Youth Commission	Mr. Guian Paulo Godofredo	PSOI-RYDD
	Nexperia Phils., Inc.	Ms. Arlene Jacinto	EHS Senior Manager
	Nihon Garter Philippines, Inc.	Mr. Ryan Delos Reyes	Pollution Control Officer
	Philippine Military Academy	Ms. Anni Salinas	Faculty in Environmental Science
	Philippine Women's University – Manila Campus	Ms. Milagros Serrana	Associate Professor of Environmental Science, School of Arts and Sciences
	Provincial Government of Batangas	Ms. Rochelle Amboya	Senior EMS, Provincial Government - Environment and Natural Resources Office
	Provincial Government of Cavite	Ms. Ma. Judith Motol	Provincial Government - Environment and Natural Resources Officer
		Ms. Cyjane Alcazar	Administrative Aide III, Provincial Veterinary Office
	Provincial Government of Lanao del Norte	Mr. Ronnel Lumayag	Provincial Agriculture Office
	Provincial Government of La Union	Ms. Jorrrainne Nor Rasay	Environmental Management Specialist I, Provincial Government - Environment and Natural Resources Office
	Provincial Government of Quirino	Ms. Gwyndelle Alawadin	Technical Staff, Provincial Government - Natural

Country	Organization	Name	Position and Unit/ Department
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		Ms. Mylen Dagondon	
	Society of Environmental Engineers of the Philippines	Ms. Angelica Cañete	Member
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	University of San Carlos	Ms. Brithney Shane Oquete	Supreme Student Council
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		Ms. Jennifer Puno	
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	University of the Philippines Los Baños	Mr. John Paul Manzano	Instructor, Department of Electrical Engineering
		Ms. Hildie Maria Nacorda	Faculty, SESAM
		Ms. Nicole Maxine Apolinario	
	University of the Philippines Open University	Mr. Adam Christopher Maraya	FMDS
	University of the Philippines Visayas	Ms. Jobelle Angeli Labrador	Division of Physical Sciences and Mathematics
	Water Environment Association of the Philippines – Mandaluyong City	Mr. Edwin Dona	Barangay Staff, Barangay Admin Department
	Western Philippines University - Puerto Princesa Campus	Mr. Arnel Nuevo	Student, College of Education
		Ms. Bernice Joy Eda	
		Mr. Luisito Olazo	
		Ms. Melrose Gabuco	
		Mr. Sanny Patricio, Jr.	
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Viet Nam	Hue University of Sciences	Mr. Hoang Cong Tin	Faculty of Environmental Science

Organizers and Resource Speakers

Country	Organization	Name	Position and Unit/Department
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	MoreMedia	Mr. Bryan Whildan Arsaha	Project Manager
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		Dr. Brian Johnson	Deputy Director, Adaptation and Water Area
		Ms. Nagisa Shiiba	Policy Researcher, Adaptation and Water Area
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		Ms. Elsie Merina	Programme and Admin Associate
		Mr. Rodante Corpuz	IT Specialist
		Ms. Antonia Maceda	Intern
		Ms. Isabelle Acosta	Intern
		Mr. Jan Angelo Valdez	Intern
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