



REGIONAL TECHNICAL WORKSHOP ON ASSESSMENT AND MONITORING OF **PLASTIC POLLUTION** IN THE MEKONG RIVER

Conference Room of the MRC Secretariat, Vientiane, Lao PDR
11-12 February 2020
Workshop Proceedings Report





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Introduction

1.1 Background and Rationale of Workshop

The Project on Promotion of Countermeasures Against Marine Plastic Litter in Southeast Asia and India (hereafter referred to as “CounterMEASURE”) was officially launched in May 2019 with aims to identify a region-based model for monitoring and assessment of plastic waste leakage and pollution reduction. The one-year project targets land-based plastic leakage entering waterways such as rivers and canals or drainages to the sea in the Mekong River basin in Southeast Asia, and Mumbai and the Ganges River basin in India. This project, funded by the Ministry of Foreign Affairs (MOFA), the Government of Japan, is implemented by UN Environment Programme Regional Office for Asia and the Pacific in collaboration with local partners in the regions such as line ministries, academia and NGOs. Several technical consultations and the expert group meetings for the CounterMEASURE project to discuss the methodology to identify the plastic leakage scenario were conducted in June, August and November 2019 respectively in Bangkok. Based on experts’ comments and inputs, the project developed the framework of GIS platform and elaborated the list of all necessary data and parameters to be collected at selected project site (Chiang Rai, Vientiane, Ubon Rachathani, Phnom Penh and Can Tho provinces in Mekong region) for incorporation into the GIS platform. The CounterMEASURE project advocates the promotion of transnational collaborative actions that leverage harmonised efforts and capacity assets at local, national and regional levels to monitor and assess plastic flux to the rivers and oceans. The capacity mapping component of the project aims to map out the existing capacities of Lower Mekong countries for monitoring and assessment of plastic litter in the river. Plastic monitoring and assessment in this context refers to the systematic observation and recording of current and changing conditions of plastic pollution on land in water environments, the use of monitoring data to support decision-making and planning processes related to

plastic waste management on land and in water environments. This involves monitoring of plastic use and flow along the value chain, including leakage hotspots, loading in water environments and transport pathways.

1.2 Objectives

The objectives of the workshop are to:

- ▶ To share progress of CounterMEASURE project with all stakeholders in the Mekong region;
- ▶ To identify current situation and challenges for plastic pollution in the Mekong region;
- ▶ To discuss the plan for the assessment and monitoring of plastic leakage in the Mekong region, and
- ▶ To strengthen the networking to tackle with the plastic pollution among stakeholders in the Mekong region.

1.3 Expected outcome

The expected outcome of the workshop are as follows:

- ▶ The concept and methodology of CounterMEASURE project are shared with stakeholders in the Mekong River basin including national gov. MRC focal points and academia;
- ▶ Enough information to complete the capacity mapping is collected from the stakeholders in Cambodia, Lao PDR, Thailand, and Viet Nam;

- ▶ The plan of the assessment and monitoring of plastic leakage as well as the combatting plastic pollution in the Mekong river by Cambodia, Lao PDR, Thailand, and Viet Nam is shared among participants; and
- ▶ The collaborative actions among MRCS and MRC Member Countries to address plastic pollution issues are discussed.

1.4 Agenda

Day one of the workshop focused on introducing the CounterMEASURE project and sharing the progress achieved in development of a region-based model for monitoring and assessment of plastic waste leakage and pollution reduction including ground data collection by project partners. Day 2 focused introducing the concept of the capacity mapping for monitoring and assessment of plastic pollution in the Mekong component of the project. This section engaged country participants to draw out data and information on various capacity assets; active and latent capacities are available at various levels of local, city, provincial, national and sub regional levels to carry out monitoring and assessment of plastic waste in the Lower Mekong countries as well as in the Mekong River (Please refer to Annex 1 for detail workshop agenda).

1.5 Participants

The Regional technical workshop on assessment and monitoring of plastic pollution in the Mekong River was put together to engage and discuss major stakeholders and partners from Mekong countries (Please refer to Annex 2: List of participants).



11 February 2020

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2.1 Summary of Welcome Address and Opening Remarks

1▶ Ms. Kakuko Nagatani-Yoshida, UNEP Regional Coordinator for Chemicals, Waste and Air quality, underlined that plastic issue is one of the newest emerging topics that drives the way we look at plastic materials. She referenced the famous 2015 Jambeck study, reflecting how severe plastic pollution may have potential negative impact on the environment, and how much of the plastic pollution maybe comes from SEA countries, including Mekong countries. From scientific study on plastic pollution, there's no representation of technical entities and academia community from Southeast Asia - motivation to commence the project CounterMEASURE. She highlighted auspices funding support provided by the Government of Japan. This project collects on the ground data on plastic pollution in the Mekong and the Ganges. On behalf of UNEP, she thanked the stakeholders for their contributions so far towards global and regional frameworks such as i.e. ASEAN Framework for Action on Marine Debris and the "Osaka Blue Ocean Vision" that is aimed at reducing additional pollution from marine plastic litter to zero by 2050, as well as the call of UNEA 2019 for the reduction of single-use plastics by 2030. She concluded that although plastic is an extremely useful item, we need to manage it so that it will not be become added burden to the environment. She thanked MRC for hosting the workshop and for the cooperation and briefly mentioned future cooperation for the second phase of the project.



2▶ Mr. Hak Chocheat, Director of Environmental Management Division of the MRC (MRCS ED) expressed great pleasure in chairing the Regional Technical Workshop on Assessment and Monitoring of Plastic Pollution in the Mekong River and welcomed participants to fully engage



Workshop
Day 1

and participate in every session of the workshop. Briefing on the role of the MRC in the subregion, he intimated that the MRC acts to coordinate and promote cooperation in all fields of sustainable development, utilization, management and conservation of the water and related resources of the Mekong River Basin. In that regard, the Water Quality Monitoring Network (WQMN) was established by the MRC Member Countries to provide timely data and information on the status of the water quality of the Mekong River and its tributaries. He noted that the Water Quality Monitoring Network (WQMN) serves to facilitate the identification of changes in water quality of the Mekong River; provide data that can be used by stakeholders as a baseline to assess and identify potential impacts of developments. Further, the Water Quality Monitoring Network (WQMN) supports the provision of uniform guidelines for routine water quality monitoring for data and information comparability from Member Countries to facilitate identification of trans-boundary implication of water pollution issues which includes plastic waste pollution. MRC relies on national laboratories of the Member Countries for national level monitoring of water quality under the WQMN. Mr. Hak also hinted about MRC's monitoring programmes are not limited to only WQMN but extends other four (4) other monitoring programmes focusing on hydro-meteorological monitoring, sediment monitoring, ecological health monitoring and fisheries monitoring.

3► On plastic waste monitoring and assessment in the Mekong, Mr. Hak noted that it is worrying that research outputs ranked the Mekong River as one of the top 10 rivers (among other nine rivers include the Yangtze, Yellow, Hai, Pearl, Amur, Indus and Ganges Delta in Asia, and the Niger and Nile in Africa) that carry about 95 percent of plastic debris emitted into the worlds oceans. Consequently, the MRC plans to support its Member Countries in addressing plastic pollution by developing and implementing monitoring & assessment programs and possible countermeasures in line with National Action Plan on Marine Plastic Pollution and Plastic Waste Management. The MRC's and the United Nation Environment Program (UNEP) signed the Memorandum of Understanding (MoU) in Mid-January 2020

to promote cooperation, to share knowledge and develop capacity on the exchanges of up-to-date knowledge and information on water quality monitoring regionally, including the assessment and monitoring of plastic pollution in the Mekong River, and organizing training workshops to support capacity building on marine litter. Mr. Hak intimated that the two-day regional technical workshop hosted by the MRC is as part of the MoU between the MRC and UNEP ROAP on tackling plastic pollution issues in the Mekong Region which involves in part, sharing findings of the CounterMEASURE project on plastic management MRC Member Countries while exploring further cooperation and support from UNEP. The workshop provides a relevant platform to understand prevailing challenges in plastic waste management in the region, understand the available capacities to monitor and assess plastic leakage, discuss and share ideas on solving plastic leakage challenges into the Mekong. Notably, he noted that the results of the CounterMEASURE project will be useful for MRC to prepare and design its initiative on freshwater plastic assessment and monitoring in LMB project to be implemented in 2020-2021, and the development of the UNEP pilot projects in the 4 MCs.

2.2 Introduction of the workshop agenda

4► Dr So Nam, presented the introduction of the workshop agenda. He introduced the flow of the two day workshop and the activities of the CounterMEASURE project (refer to Annex 1: Agenda of the Workshop).

2.3 Introduction of the CounterMEASURE project

5► Mr. Tsubasa Enomoto, Associate Expert, Chemicals, Waste and Air Quality, UNEP ROAP, The CounterMEASURE projects goal follows a stepwise study to identify and develop counter measures to reduce/prevent plastic leakage into freshwater river bodies and their tributaries. This will be achieved by gathering data and information to support



project countries develop and implement tailored policies and interventions towards reduction of plastic leakage and pollution rivers. Mr. Enomoto highlighted the provisions of the [UNEA Resolution 4/6 on Marine plastic litter and microplastics](#) (adopted by UNEA on 15 March 2019) which calls for immediate action to strengthen scientific and technological knowledge on marine litter (marine plastic litter: macroplastics and microplastics), assessment of source, pathways and hazards to understand marine plastic issue. Four specific target areas considered for strengthening scientific and technological knowledge highlighted by Mr. Enomoto include:

1. convening of science advisory initiatives;
2. preparation of an assessment on sources, pathways, and hazards of marine litter and microplastics and its presence in the rivers and oceans, scientific knowledge about adverse effects on ecosystems, potential adverse effects on human health and environmentally sound technology innovations;
3. recommending indicators to harmonize monitoring, report and assess methodologies, and
4. gathering of information to inform policies and action on environmentally sound technological innovations, options and measures for reducing risks of discharge.

2. harmonize the methodology applicable for the Mekong and Indian regions as a regular monitoring and assessment tool; and
3. contribute implementing evidence-based “CounterMeasures” for marine plastic pollution.
4. The CounterMEASURE project is implemented in cooperation with institutional partners from academia, relevant country ministerial agencies, among others (please refer to Annex: power point presentation).

7▶ Mr. Enomoto briefly mapped out the slated activities under the CounterMEASURE project (Figure 1). He noted that the development of the Regional Model to support the development of countermeasures towards reduction of plastic leakage by the Mekong involves data collection; plastic hotspot and leakage scenario development; and GIS platform for data visualization and mapping generated based on the leakage scenarios – which will support decision making and awareness raising via media outreach activities and cleanup campaigns and capacity mapping study in the four Mekong countries under the project will support the identification of gaps and appropriate countermeasure development. Project outputs will be disseminated via a final stakeholder workshop to stimulate networking and partnership engagement.

8▶ Since local data collections are key to the project, 5 project sites along Mekong (hotspots) have been identified-Chiang Rai, Vientiane, Ubon Ratchathani, Phnom Penh, and Can Tho- to support the development of plastic leakage scenarios. Based on the developed scenario, region-based model for plastic leakage can be developed for the Mekong. Six (6) major expected project outputs of the CounterMEASURE project include:

1. Report on desk review- Existing approaches and methodologies to identify the sources and pathways of major plastic leakage

6▶ Mr. Enomoto disclosed that the project budget of USD 1.0 million is funded by MOFA, Japan. The CounterMEASURE project is implemented in the 1) Mumbai, Ganges River (Haridwar/ Rishikesh and Prayagraji) and Yamuna River (Agra) Basins, and 2) Mekong River Basin (five sites in Laos, Thailand, Cambodia and Viet Nam). The UN Environment’s Asia and the Pacific Office is the executing agency of the CounterMEASURE project which is scheduled to implemented over 10 months period (May 2019 – March 2020). Main targets of the project are to:

1. identify plastic hotspots through trials of new methodologies;

2. Plastic leakage scenarios –Maps and dashboard that illustrate Sources and pathways of major plastic leakage

3. GIS platform to visualise and disseminate the necessary data and maps on plastic leakage into the Mekong

Figure 1 Activity map of the CounterMEASURE Project

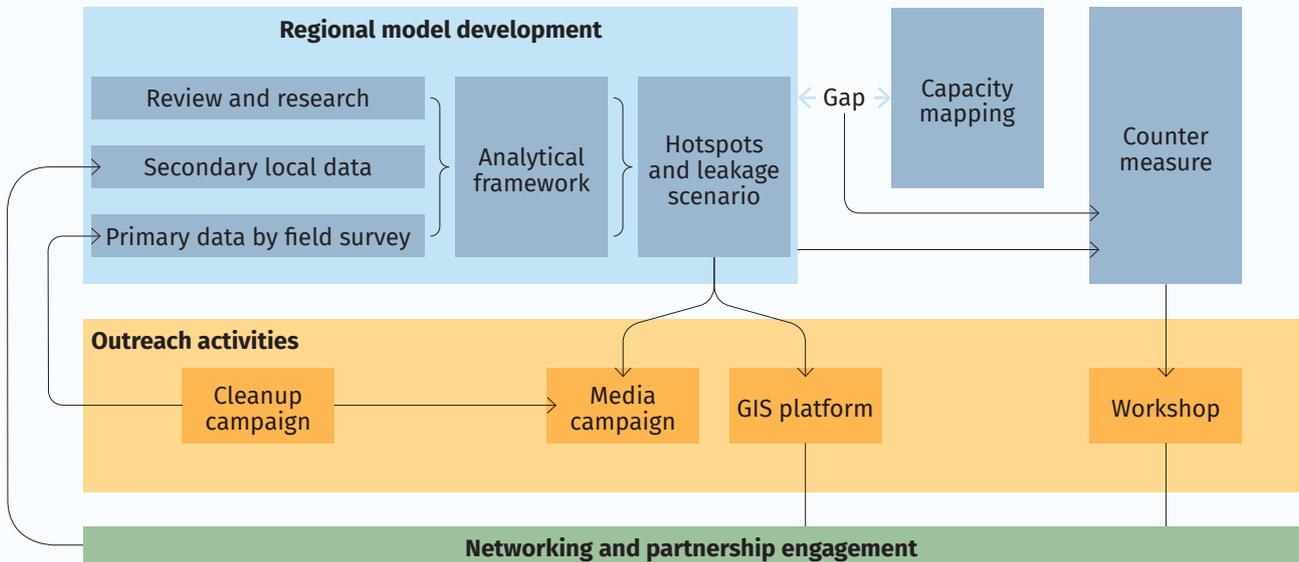
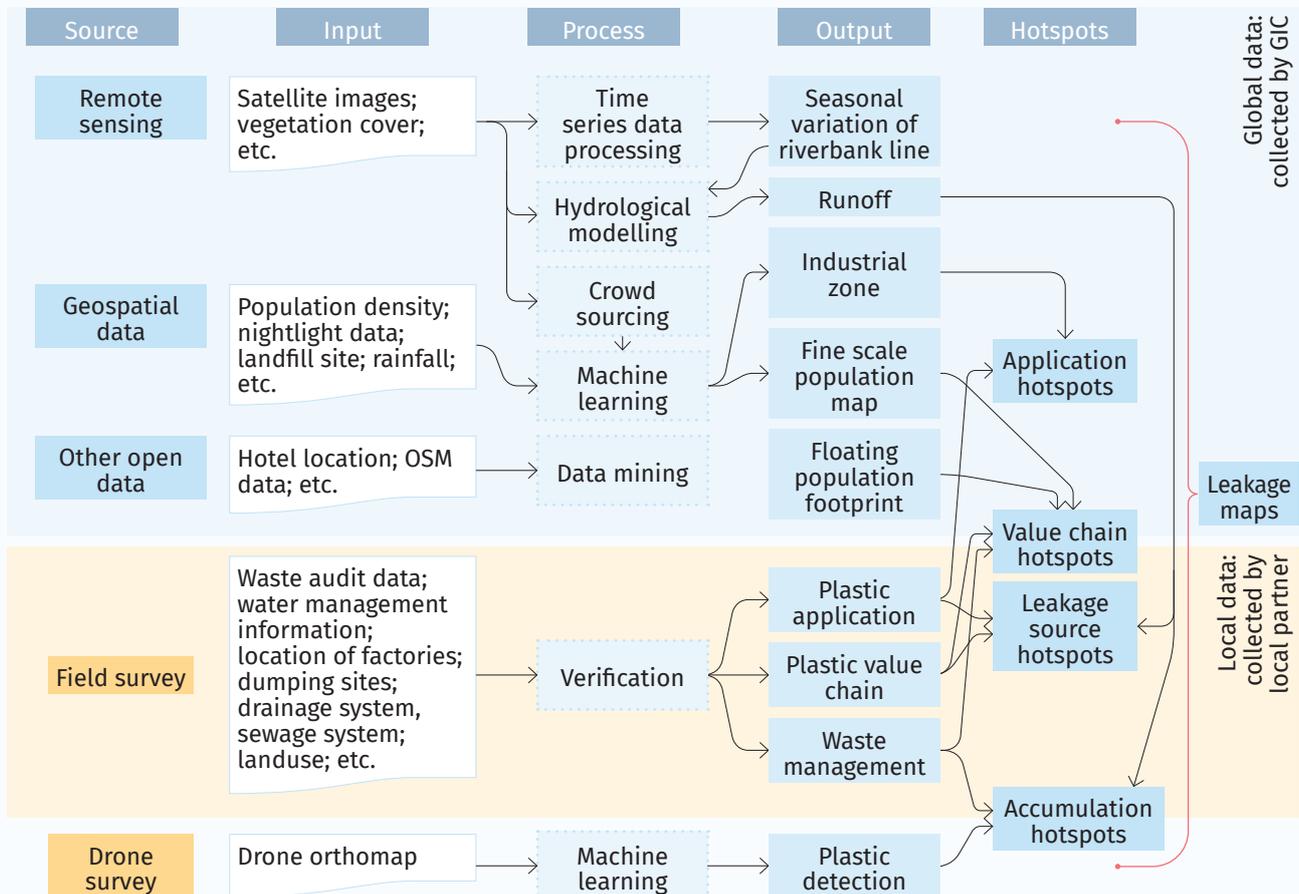


Figure 2 Data collection and survey methodology



4. Capacity Mapping Report–Assessment of the capacity of monitoring and assessment of plastic litter in the river.
5. Region-based model – The model of assessment and monitoring of plastic leakage and pollution reduction
6. Policy Recommendation and Outreach -Identification of possible countermeasures and local outreach activity.

2.4 Introduction of works of Project partners - Data Collection and Analysis

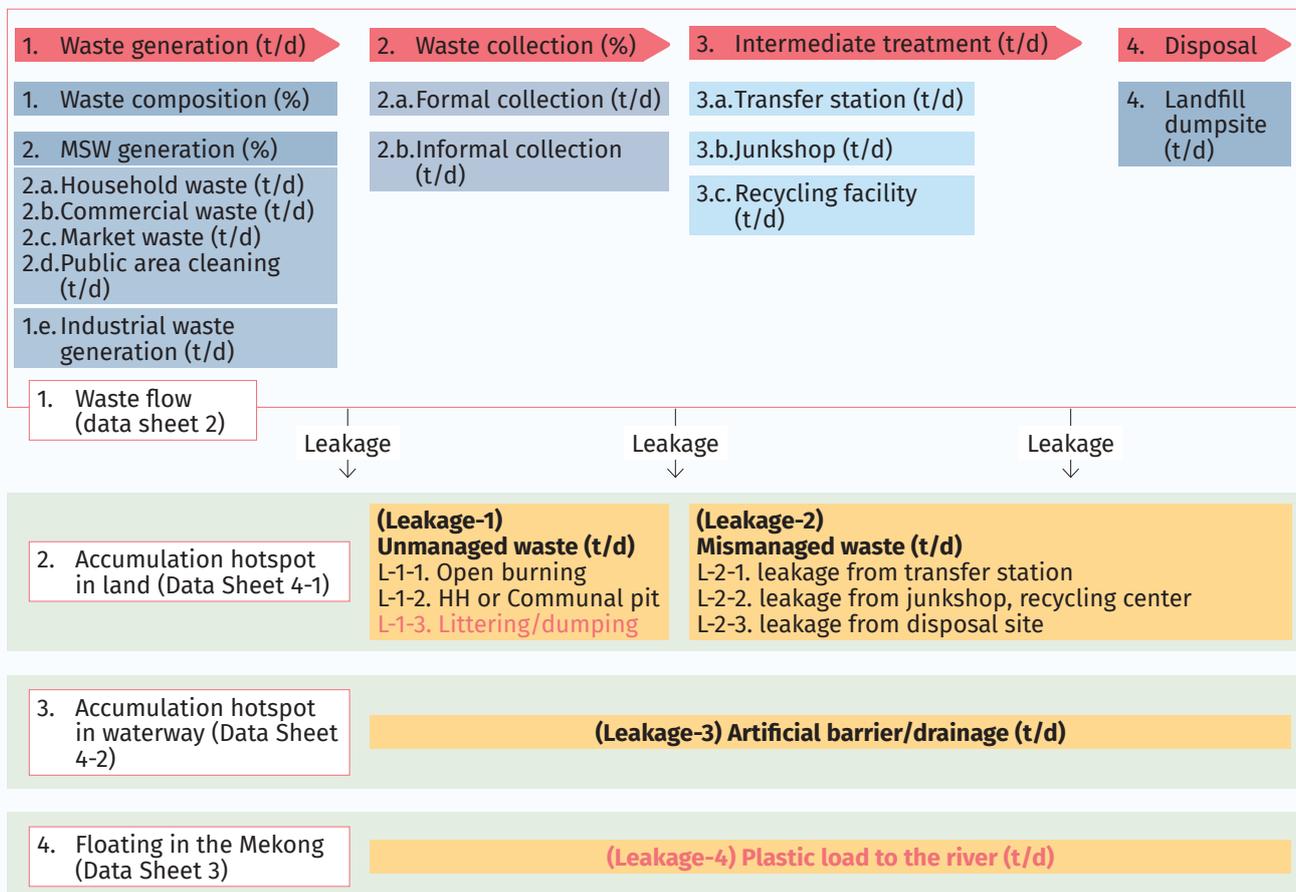
10▶ Mr. Makoto Tsukiji



presented the phases of data collection. The project will go through to identify and develop leakage scenarios. He further highlighted a sources-input, process-output hotspot mapping approach adopted under the CounterMEASURE project for identification of various types of plastic hotspots (Figure 2). This approach works towards gathering data using remote sensing methods, geospatial data collection and data mining approach for open data collection as well as local specific data collection collected by local project partners. The field data sampling are also collected by partners (illegal dumpsite, littering spot, plastic accumulation at the artificial barriers and plastic floating in the

9▶ The CounterMEASURE project therefore adopts a policy oriented, evidence-based approach to reduce plastic emission to river bodies by fostering close collaboration with local research partners in target countries to collect primary data. Collaborations with relevant government agencies under the project is aimed at promoting engagement with governments of the Lower Mekong countries for policy development and implementation.

Figure 3 Four-step methodology for survey of plastic waste leakage



river). Drone survey is conducted by GIC for machine learning approach via Pirika Inc.

- 11► Regarding the development of methodology for identification of plastic pathway, Mr. Tsukiji noted that the value chain leakages, including microbeads in products, accidental and unintentional leakage, plastic blasting, degradation of buoys, loss of nets, littering, unmanaged and mismanaged plastic waste. Three categories of plastic hotspots presented by Mr. Tsukiji include; i) Plastic leakage source hotspot, ii) Plastic accumulation hotspot, and iii) Plastic application hotspots. He further elaborated on a four-step survey methodology for plastic waste leakage used under the CounterMEASURE project (Figure 3).

He emphasized that waste management related data for development the plastic waste flow are to be collected via secondary data gathering from published reports and research papers. Data on waste management will be obtained from project partners, including country participants to the workshop. Further, Mr. Tsukiji hinted that project partners are collecting primary data from identified plastic accumulation hotspots, particularly those sites in water ways via pilot studies. The project is also trying to identify how to collect data directly from the Mekong river. The CounterMEASURE project so far uses the ocean trash data form/ template developed by the Ocean Conservancy to record and assess survey data recording. As one of accumulation points of artificial barriers, piers and ports are significant sites for data collection for input into the GIS data platform. Mr. Tsukiji also provided illustrations of primary data collection, drone surveys conducted by GIC team, and cleanup activities by project partners.

2.5 Discussions points on data collection survey and analysis

- 12► Responding to **Mr. Khamsamay Silapheth**, Pollution Control Department, MONRE Thailand on how drones and AI can be used to identify different plastic types, Mr. Tsukiji mentioned that Pirika Inc. team has successfully piloted their technology by capturing plastics with their drone system. The team is now working on developing new models for identifying

the types of plastic. The team, however, is working to improve their systems adaption to characteristics of the data in the Mekong subregion which is different from what exists in Japan.

- 13► **Dr. So Nam, MRC**, suggested the project to considers integrating other data collection methods focusing on long term running technical and financial sustainability of the project. The CounterMEASURE project may also consider narrowing its focus and many engagements with partners to improve long term sustainability of the project. The immediate sustainability arrangement and planning appears more feasible when a relevant line ministry in each country is placed in charge of the project output.

- 14► **Mr. Tsukiji Makoto** highlighted the possibility of developing multi method approach and flexible options for countries to adopt and use. Apart from helping develop statistical data, it allows the flexibility to help determine the most suitable and convenient approach based on the prevailing capacity of each country.

- 15► **Ms. Kakuko Yoshida** welcomed suggestions and further noted that many entry points are provided for countries to adopt which is appropriate for each country. She shared with participants the project use of multi-pronged plastic data acquisition approach involving waste audit, post clean up activity via sampling and categorisation, drone survey methods, use of smartphone to identify what kind of hotspots exist by taking photos and upload at riverside. On waste management and types of waste, the classification of the different types of the waste. She noted that some countries may be able to use advanced technologies including MFA for gathering data on plastics than other countries. The project will ensure that information from the project will be relevant to feed policy focusing and planning of better counter actions on plastic leakage. **Ms. Kakuko Yoshida** stressed the importance of involving officials from local and national authorities in development of the region-based model. She encouraged data collection to consider identifying plastic leakage at ports, drains and tributaries to the Mekong river.

2.6 Introduction of MRC Annual Workplan 2020-2021 to address plastic pollution issues in the Mekong River

16> **Dr. So Nam, MRC** presented the socioeconomic relevance of the vastly biodiverse Mekong River to Lower Mekong countries through contributing to trade, transport, food, fisheries and energy. The MRC established based on the 1995 Mekong Agreement and has a membership of 4 countries; Lao PDR, Thailand, Cambodia and Viet Nam. The MRC serves as a platform for water diplomacy and regional cooperation to lead the development of basin wide strategies, procedural frameworks for managing the Mekong, as well as being a knowledge hub for the Mekong. MRC's six (6) core functions include data acquisition and exchange monitoring, analysis and monitoring, basin planning, forecasting of flood and drought, and MRC procedures. Dr. So Nam noted that the MRC's has developed various monitoring systems for data collection and transfer system for Water quality: WQN, Aquatic ecology, Hydrology, HYCOS, Discharge & Sediment, DSMP for discharge and sediments, and Fisheries, FADM+ others.

2. Consultancy Services
3. Networking and outreach
4. Data and Information Sharing and Management

MRC Plan for Plastic Waste Assessment and Monitoring In cooperation with UNEP (2020-2021)

18> He highlighted the need to integrate plastic monitoring methods into the current monitoring data. How they can use the existing methods with their current methods. He stressed their methods take many years to develop the methods, protocols and standards, to develop these new protocols. MRC's plan for plastic monitoring and assessment: developing of sources, the development of methodologies, quantification of plastic data, have time series data in Mekong monitor transboundary movement of plastic includes in the state of basin report. MRC and UNEP signed MOU on water quality and freshwater plastic, knowledge and capacity development, consultancy services, networking and outreach project, data acquisition and knowledge



MRC and UNEP Cooperation

17> Dr So Nam highlighted the importance of currently signed MoU between MRC and UNEP, highlighting a joint effort towards work on water quality monitoring, including freshwater plastic pollution, and collaboration on activities of mutual interest and benefit in the four following areas:

1. Knowledge sharing and capacity development

sharing. MRC's plan of activity on plastic monitoring in the Mekong region for include:

1. reviewing the status of plastic waste management in Mekong River by and develop the concept note/proposal for the development of assessment methodology and monitoring by 2020;
2. develop the assessment methodology and monitoring programme for plastic waste management in Mekong River by 2021.

Key discussion points

19> Seasonal fluctuations of water inflow into the Tonlé Sap in Cambodia poses challenge for monitoring and sampling activities. Notwithstanding, the touristic nature of the Tonlé Sap makes it an important area for plastic litter monitoring for cleanup activities.

2.7 Methodology and preliminary result of plastic leakage analysis in the Mekong region

20> **Dr. Kavinda, Geoinformatics Center, Asian Institute of Technology** presented methodology and preliminary result of progress towards the development of leakage scenario and a Region-Based Model for Plastic Leakage under the project. He noted that his team works towards building a geodatabase which supports the development of plastic leakage scenarios and a centralized GIS Platform for data visualization. Data for building this platform is sourced techniques (see Figure 4).



He indicated that the Plastic leakage scenarios and scenario maps were developed by

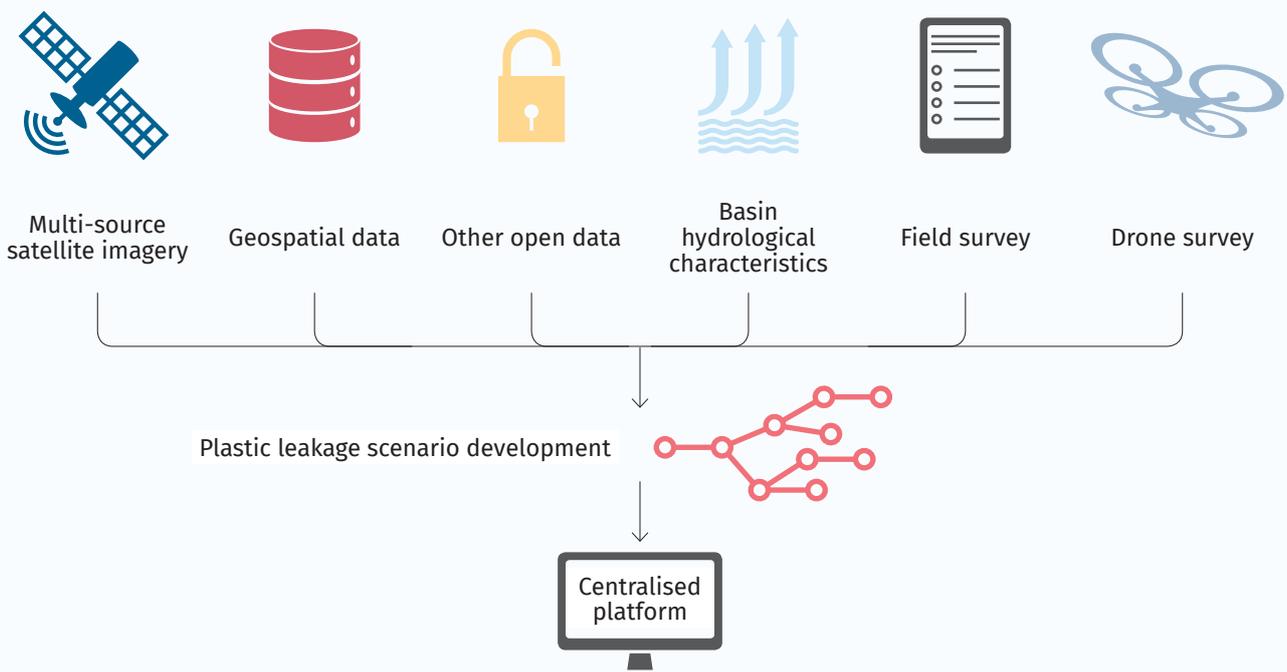
combining multiple data from; 1) multisource satellite data (including data sourced from local partners), 2) freely available GIS data products including GIS data from local partners, 3) satellite rainfall/ local rainfall gauge data and field survey data and 4) mined data from customer database, 5) time series data from drone survey.

21> Dr. Kavinda solicited inputs from all stakeholders to improve the output of the project to map out plastic leakage from various sources into the river bodies. Demonstration of field data collection by students at Ubong Ratchathani, to collect data using mobile applications using mobile apps developed by GIC at industrial locations, open dumping sites. He also hinted that the further modification of applications are ongoing for further description and customization of mobile application for data collection (live data collection).

Discussion points

22> Scenario development approach presentation by using 30x30 meter resolution and GIS data normalization using multiple source data on various indicators for prediction leakage. Land use data can be collected from some country departments. Waste

Figure 4 Diagrammatic illustration of Region-based plastic model development



management data can be used and combined to reflect the leakage scenarios-georeferenced data for GIS rendering. From India, same methodology is being applied for Allahabad data for development of leakage scenario. Development of story maps will be incorporated into the platform. Data protection and use policies under discussion.

2.8 Progress of data collection and survey from project partners

2.8.1 National University of Laos

23>

Dr. Vatthanamixay Chansomphou, National University of Laos

presented on the preliminary findings of plastic waste data collection at Thinphia village of Vientiane. A 24-hour monitoring of plastic waste flow directly from the Mekong river was carried out with an installed net trap and with the help of fishermen at predetermined monitoring times- 7-8 am, 1-2 pm.



24>

Dr. Chansomphou noted that the fishermen helped to collect surface floating plastic within a delineated perimeter in the while the trap was useful for trapping smaller plastics within some portion of the water column. He also undertook plastic waste data collection via clean-up activities along a selected section of the riverbank (length: 100 m; width: 50 m), near the waste collection station. LDPE plastic type, comprising snack package, plastic bags, transparent bags constituted major fraction

of the total waste collected via net traps and boats. The types of plastic were characterized and classified according to plastic types. He indicated that waste loading in the river is abundant in the morning while a lower loading was observed in the afternoon and evening.

2.8.2 University of Cambodia

25>

Mr. Meng Kru, Royal University of Phnom Penh, Cambodia

shared some data on plastic waste situation in Cambodia. Plastic waste comprises about 20.9 percent of over 3 million tonnes of solid waste was generated per year in Cambodia. The share of the total plastic waste in the country 18% in 2017, 17.3% in Phnom Penh, 20.7% in Siem Reap and 34% in Sihanouk Province (mainly due to touristic activities of the place). Notably, the government is committed to reduce plastics by adopting best practices, implementing policy and economic measures on single-use plastics, raising awareness, facilitating joint action through stakeholder engagement and supporting alternative recycling business development.



2.8.3 Mae Fah Luang University

26>

Ms. Pattayaporn Unroj, Mae Fah Luang University

team shared the progress of data collection in Chiang Rai. Following series of meetings with



Method 1: Net Trap



Method 2: Collection by boat

local stakeholder from Chiang Sean, Mae Sai, Chiang Khong districts, 7 days sampling of microplastic was carried out with support of Pirika team at various sampling points; Chiang Sean Port 1 and 2, Jan River, Mae Jan District, Mekong River, Chiang Khong District and Ing River, Thoeng District and Kok River, Muang District. Cleanup activity organized with support of 75 volunteers from Trash Hero Chiang Rai collected 52 bags (304.5 kg) of litter. Ocean trash data form was used to pilot sorting protocol and guide research design data requirements. Food wrappers and plastic grocery bags represented a dominant fraction of the litter collected. Subsequent survey of local hotspots included 34 illegal dumpsites (excl. sanitary landfills and incinerators) and artificial barriers (26 sites in Chiang Rai) on tributaries to the Mekong River. Ms. Pattayaporn disclosed that the team relied on records from the Ministry of Interior and Royal Irrigation Departments for sampling for illegal dumpsites and artificial barriers site selection for sampling. Ocean conservancy sampling protocol was adopted for the macroplastic survey. Future work plan of the team will focus on continuing sampling of macro plastics, local hotspots surveys, and secondary data acquisition and analysis.

2.8.4 Ubon Rachathani University

27 >

Dr. Pawena Limpiteeprakan, Ubon Rachathani University

presented the progress of plastic waste data collection directly from the Mekong river and survey from the Ubon Ratchathani project target site. Site selection along the Mekong involved identifying upstream (Phosai district) and downstream (Khong Chiam District) district were chosen for net installation. Net traps (mesh size of 1cm x1 cm with 5 cm thick ropes) were used in conjunction with boats for plastic waste collection. She revealed that tapping the expertise of local fishermen to guide the design of workable monitoring programmes for setting of nets trap for catching plastic litter in the river. Plastic bags and bottle caps constituted the highest amount of litter items collected. She noted that sampling at the ports is relevant for collecting plastic waste data since plastic waste accumulation is predominant



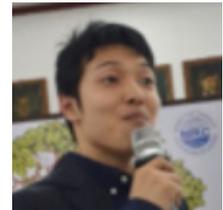
in these areas. Sharing challenges faced and lessons learnt, Dr. Pawena disclosed that appropriate site for installation of net trap is crucial for capturing plastic flow. River flow must also be considered, since high flows can pose significant risk and challenge to monitoring and survey activities. Sea weeds also pose challenge to the effectiveness of the plastic litter trapping system.

2.8.5 Experiences on microplastic surveys

28 >

Mr. Kojima Fjiuo, Pirika Inc.

Pirika shared their experience and lessons learned in microplastic and macro plastic survey in Japan (since 2011) and in the Mekong under the (CounterMEASURE project). The company's portable microplastic sampling device- Albatross mark.5 is capable of sampling microplastic in a 5 m³ volume of water in 3 minutes. The Albatross mark.5 can be used to sample microplastics along rivers or coasts, bridges and in sewer plants. Pirika has sampled over 150 sampling points globally. Mr. Kojima disclosed that a post analysis of sampled sites includes solid sample extraction and identification by a Fourier Transform Infrared (FT-IR) spectroscopy and product categorization. In Japan, artificial grass, plastic fertilizer coating from paddy fields are dominant micro plastics in urban and rural settings, respectively. Regarding macro plastic survey, Pirika is collaborating with AIT GIC to first identify plastic accumulation by aerial drone survey followed by microplastic sampling with the Albatross mark.5. to improve data capturing solutions, Pirika is currently adapting their systems to familiarize with the field conditions of the Mekong countries.



Discussion points on data collection and survey

Plastic types, categorization and abundance

29 >

Ms. Kakuko Yoshida commended project partners on adopting multiple innovative approaches for plastic sampling in the river.

Commenting on the findings from the surveys and sampling, she noted that PET and LDPE quantities appear quite high. Regarding the challenges LDPE poses, governments may consider targeting products made from these plastic types. Quite interestingly, HDPE raincoats have surfaced as contributing to quantities of leaked plastic in water environment; it may be good to promote discussions with the governments on managing the contributions of these products to plastic waste generation. Regarding biodegradable plastics, she asked governments to exercise caution about promoting them since those plastics may still end up polluting the environment. Considering the close attributes biodegradable plastics share with petroleum-based plastics, collection and separation may be difficult and thus, limits the opportunities of recovery and recycle when mixed with petroleum-based plastics. Adding to the ban of plastic grocery bags in supermarkets, a note was made also for governments to consider controlling the preponderant use of plastic bags in local markets and street food stalls.

30 ▶ **Dr. So Nam** noted that MRC developed a photo book to aid easy monitoring fishes by local partners and fishermen. He suggested that, in similar fashion as MRC, the project may consider developing a photo book that has a pictorial document of all major types of plastic and fishing gears identified during data collection and survey.

Survey and data collection approach, and monitoring of ghost fishing gears

31 ▶ **Ms. Kakuko Yoshida** mentioned a better method of tracking their sources, manufacturers, the use of the fishing gears, and constituent materials could help improve monitoring of the ghost fishing gears in the rivers. Where possible, ghost fishing gears could be recovered for recycling at the end of service life. Many countries face challenges regarding the management ghost fishing gears. For example, in Cambodia, the Fisheries Authorities survey in the lake to collect discarded fishing gears at the end of every season.

32 ▶ **Mr. So Nam** commended the use of net traps as simple methods for trapping and collecting floating plastic in the river. From the experience of MRC's collaboration with over 100 fishermen, such simple and applicable methods for monitoring and data collection are often effective, less expensive and good for long term applications. Dr. So suggested that the project may consider integrating plastic monitoring with existing MRC monitoring systems. However, ghost fishing gears remain a major challenge for monitoring systems. Developed methodologies must be able to capture ghost fishing gears in river. Sites for long term monitoring such as artificial barriers, weirs and dams and ports are very helpful in monitoring plastics because of the likely accumulation and collection of plastic from these areas. Dr. Nam so mentioned that bonger nets and plankton nets used for fish larvae sampling in the MRC fishery programme could be useful sampling tools for micro plastic monitoring. However, bonger nets may not be very suitable when for mobility of monitoring equipment's are considered. Suggestions for possible development of a basin wide Mekong guideline or Regional guideline for monitoring and assessment by the project was made by Dr. Nam So. Discussions on harmonization monitoring the method of waste categorization should be considered since different methods are being used by the partners. Existing methods such as ocean conservancy and trash hero data forms have been recommended for the pilot data surveys. Notwithstanding, considerations are underway to modify and harmonise the methodologies for use by project partners in project countries.

33 ▶ **Mr Guilberto Borongan of AIT RRC.AP** queried if emissions by canals and laterals were considered: He noted in the affirmative and said that waste communities have rules that forbid local communities from dumping plastic into the drains and rivers; and noted that based on the water current and flow dynamics using the same methodology can be challenging. This highlighted the need for harmonizing methodology.

12th February 2020

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3.1 Recap for Day 1 and introduction of Day 2 agenda

34▶ **Mr. Huno Solomon Kofi Mensah, AIT RRC. AP** presented recapped the proceedings of day one of the workshop and briefly introduced the agenda of the day two of the workshop.

3.2 Introduction and summary of the capacity mapping for monitoring and assessment of plastic in the Mekong

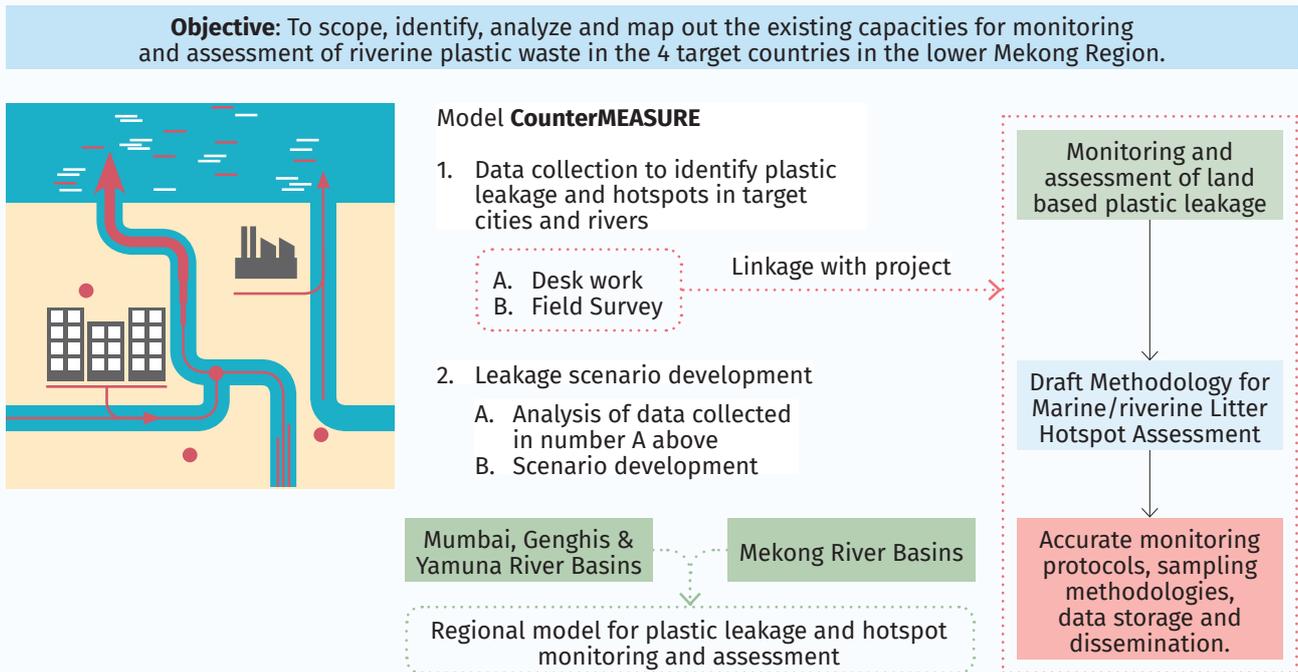
35▶ **Mr. Guilberto Borongan, AIT RRC. AP** introduced



the capacity mapping study and presented a brief summary of preliminary findings of the study. Within the context of the CounterMEASURE project, the aim of the capacity mapping study is to essentially scope, identify and map out the structures, systems and resources at community, national and sub-regional (Mekong sub-region) level necessary to support the conduct of plastic litter monitoring and assessment in the Mekong countries. Mr. Guilberto noted that the findings of the capacity mapping study will also help to draw out the existing gaps in each country to support the objectives of the CounterMEASURE project. Further, the output of the study will serve as a useful resource to guide capacity building efforts and policy interventions of Mekong countries targeted at reducing plastic leakage into the Mekong River. Mr. Borongan disclosed that his team recognizes that, the capacity to carry out reliable monitoring and assessment of plastic litter on land and in water environment exist at various levels of societal organization and administration. Hence the capacity mapping study is focused on identifying active and latent existing capacity assets available to monitor and assess waste leakage at identified hotspots along the value chain, plastic litter loading at various points along the Mekong river. The study will support the identification of gaps and development of appropriate countermeasure to

Workshop Day 2

Figure 5 Capacity mapping study linkage with other CounterMEASURE project activities



combat plastic leakage into the Mekong river. The linkage the capacity mapping study with other activities under the project is illustrated in Figure 5.

36▶ Mr. Guilberto emphasized that the capacity mapping is the first in series of processes towards for understating capacity needs of the Mekong sub region in conducting effective monitoring and assessment of plastic litter. A comprehensive capacity needs assessment study for monitoring and assessment of plastic will need to reflect the identified stages shown in Figure 6.

37▶ **Data and information** for this study will be collected by collating information through desk study and consultation with key informants, collaborating institutions and governmental

and non-governmental agencies. Identified expertise and capabilities of local, national and sub regional organizations, agencies and relevant stakeholders on plastic waste management, and riverine plastic litter management, monitoring and assessment of each target country - Cambodia, Lao PDR, Thailand and Viet Nam- will be mapped. A mixed-methodological approach using survey instruments, focus group discussions, key informants, expert opinions will be used to source relevant data for this study.

38▶ **Various dimensions** and aspects of both functional and technical capacity assets (active or latent) that exist at local, national and sub-regional levels for monitoring and assessment of plastic litter in the Mekong river will be explored by the study (Figure 7).

Figure 6 Capacity needs assessment process

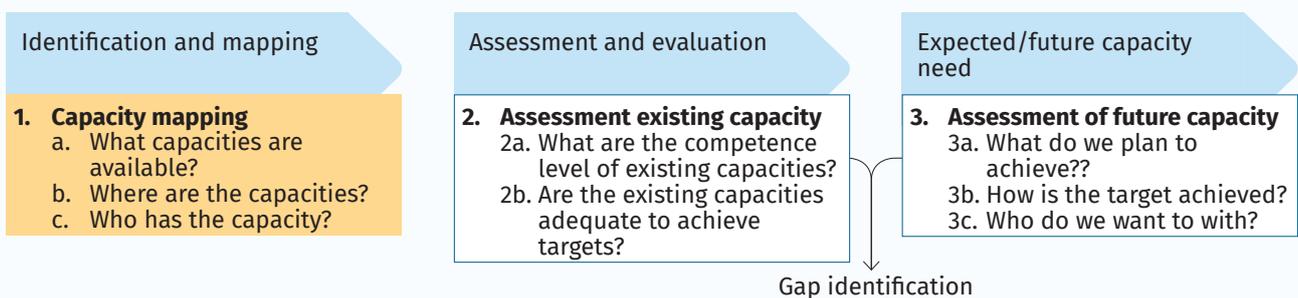
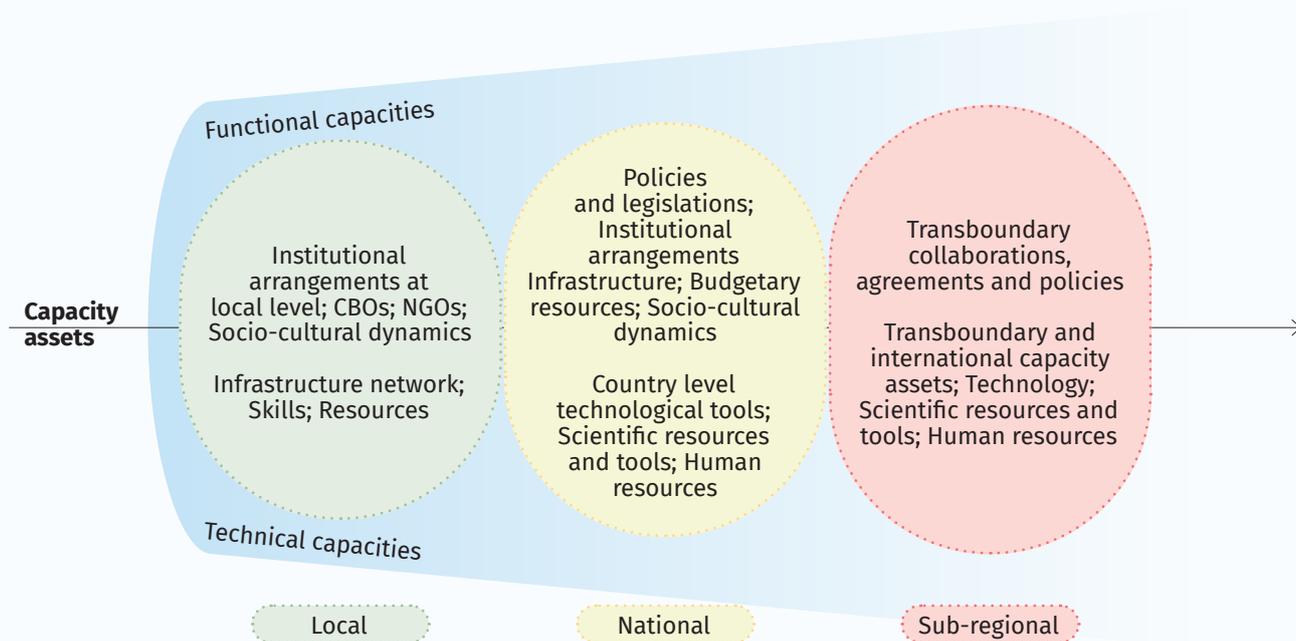


Figure 7 Dimensions of capacity assets for monitoring and assessment of plastic litter



As such, the capacity mapping study is essentially guided by the following key questions;

1. What are the existing capacity assets available in the Lower Mekong Countries to carry out monitoring and assessment of plastic leakage from land-based sources, including plastic litter in the Mekong River?
2. Who has these capacity assets necessary for carrying out monitoring and assessment reside?
3. At what levels of societal, institutional or organizational stratification do these capacities reside?

Summary of the capacity mapping (Functional Capacity)

39► **Functional capacities** are necessary for creating and managing policies, legislations, strategies and programmes that provides support and the enabling environment for various actors-individuals, NGO’s, community based organizations (CBO’s), international development agencies, governmental and other relevant stakeholders to be able to carry out monitoring and assessment of plastic litter on land and in water environment.

To understand the presence of enabling environment that support the conduct plastic litter monitoring and assessment will be examined by answering the following question:

1. Are there existing legal frameworks for environmental monitoring and assessment?
2. Do relevant environmental policies provide frameworks and clear actionable plans for solid waste/plastic waste monitoring and assessment?
3. Are there capacities available to mobilize knowledge, and expertise that are relevant to meet the strategic objectives and the needs for plastic litter monitoring and assessment programmes?
4. How efficient and functional are intra- and or inter- government agency coordination, (solid waste/plastic waste) on monitoring and assessment?
5. Are there capacities available to mobilize knowledge, and expertise that are relevant to meet the strategic objectives and the needs for plastic litter monitoring and assessment programmes?

Summary of the capacity mapping (Technical Capacity)

40 ▶ **Technical capacity** explores the technical and technological capabilities necessary to conduct accurate and reliable assessment of plastic litter on land and in water environment. These include the availability of adequate infrastructure, tools and equipment for sampling, monitoring and assessment of various, leakage hotspots, accumulation hotspots, and maintaining accurate data systems of land-based plastic flow and leakage into the Mekong. To ascertain the availability of capacities resources -knowledge, training, tools, experience and the systems-for monitoring and assessment of plastic litter, the following were questions were examined;

1. What available technologies instruments for implementing protocols for monitoring and assessment of plastic litter?
2. What scientific tools and infrastructure are available for sampling, processing and analysis storage and transmission of data?
3. What operational arrangements are available for running monitoring and assessment programmes of plastic litter?

41 ▶ **Preliminary findings** from desk study shared by Mr. Guilberto involved the current legal and regulatory framework of each country pertaining to solid waste management, plastic specific strategies, bans on single-use plastics, tax on single use plastics, deposit-refund system, membership of international conventions such as the laws for London convention and MARPOL73/78, among others. He also highlighted the identified gaps and opportunities in policies and strategies on plastic waste management, monitoring and assessment in the four project target countries. Key points highlighted include:

- ▶ **Low budgetary allocations** by central governments, cities and local governments for waste management research to building knowledge and raise awareness towards behavioral changes targeted at plastic waste reduction.

- ▶ **Technical capacity** related constraints as the main bottlenecks to effective waste management, underlining the need for further institutional reforms, new strategy development and improved collection and transport systems
- ▶ **Data on** plastic waste generation and recycling volumes, number of recyclers and existing recycling operations in the country remains limited
- ▶ **District governments and municipal authorities** remain unclear about their roles and responsibilities in terms of enforcing laws and regulations on waste
- ▶ **Addressing institutional fragmentation** and the unclear mandates and role sharing
- ▶ **Expanding waste separation at source** for plastics
- ▶ **Support informal waste** pickers with occupational health protective gear and regular health checks
- ▶ **Solid waste recycling technologies**, including plastic waste, have not been fully documented and evaluated to provide guidance on the selection of recycling technologies in accordance with local waste characteristics
- ▶ **Low quality plastics** are increasingly not attractive for market-based material recovery activities
- ▶ **Effective policies** and measures to mitigate plastic waste in Viet Nam should start by strengthening monitoring systems, with a view to better understand issues regarding quantity, components of waste, movement, distribution, major sources and impacts

Country Group Discussion to address plastic pollution issues in the country

42 ▶ **Country group discussions** to address plastic pollution issues serve to exchange experiences and to identify existing capacity assets (functional and technical capacities) in each country necessary to support plastic litter monitoring and assessment. Each

country group discussion was facilitated by a group chair with intermittent support from Mr. Guilberto Borongan and Mr. Solomon K.M Huno. Thereafter, appointed rapporteurs from each country group presented between 15-20 PowerPoint slide of each group's findings/ results and key data reflecting the respective country's capacity assets relevant to conduct monitoring and assessment of plastic waste under the following topics (please refer to Annex 3 detail guidance note on country group discussion):

1. Current priority plastic waste management challenges
2. Legal provisions, policy environment and institutional structures
3. Technical resources, monitoring tools and infrastructure systems
4. Budgetary allocations human resources
5. Mobilization and coordination
6. Way forward

3.3 Outcome Country Group Discussion (Presentation session)

3.3.1 Cambodia

43▶ **Mr. Dek Vimeanreaksmey** shared some key points on existing challenges in managing plastic waste in Cambodia. Cambodia's effort on raising plastic awareness is inadequate to stimulate behavioral change towards plastic waste reduction. The lack of waste separation at source limits the recovery of plastic waste from municipal solid waste generated. Further, poor waste collection and transportation services coupled with the lack of adequate treatment infrastructure present immediate challenges to plastic waste management in Cambodia.

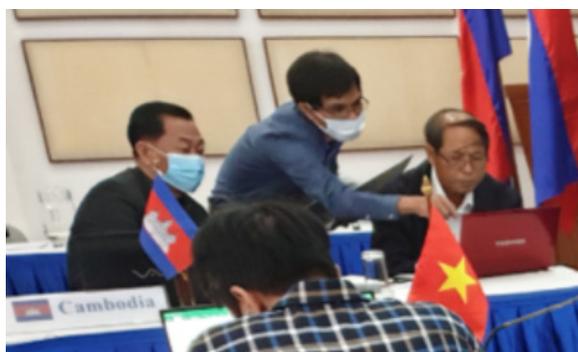
44▶ Existing legal and regulatory framework for plastic management in Cambodia include; i) Law on Environmental Protection and Natural Resources Management (1996); ii. Sub-degree on solid waste management (No 36, 1999); ii. Sub-degree on municipal garbage and solid waste management (No 113, 2015); iv. Sub-

degree on plastic bag management (No 168, 2017); v. and Principle Technical guideline on Municipal Solid Waste Management. The Ministry of Environment collaborates with other relevant line ministries such as the Ministry of Interior, Ministry of Economy and the Finance Ministry of Justice in handling plastic waste/ municipal solid wastes in the country. The country also engages in multi- and bilateral collaborations with international development partners and NGO's, including UNDP, UNIDO, USAID, JICA, World Bank, ADB COMPED and SCARO among others in waste management related project development, financing and implementation. Local Community communities are often engaged to play vital roles in plastic waste management in the country. Cambodia is preparing a national action plan on marine debris with help from the World Bank. At subnational level, the Phnom Penh Municipality and the Provincial Authority works together to achieve plastic waste management objectives through their respective Departments of Environment. However, fragmented institutional arrangements resulting from overlaps in regulatory and supervisory provisions of relevant legal regimes contributes to a certain amount of laxity in enforcement of existing laws. There are no specific laws and policy provisions that mandate the conduct of monitoring of plastic flow in the country or plastic litter input to the river.



45> In the broader context, the challenges faced in plastic waste management in Cambodia hinges on limited awareness raising programmes to stimulate waste separation at source which is lacking in the country presently. Mr. Vimeanreaksmey disclosed further that Cambodia has no technical guidelines for waste recycling and converting waste to energy. Relevant government agencies lack the necessary modern scientific tools and infrastructure for plastic waste monitoring, sampling, data storage and processing, analysis, and transmission. Waste collection coverage is inadequate and poorly handled, as waste transportation management remains a challenge in Cambodia. Limited economic analysis and costing of waste management projects which may serve as a good information resource to stimulate and spur low investment in the sector is hardly done. Waste treatment infrastructure in the country is inadequate.

46> Apart from the little to no dedicated budgetary allocation for sampling and assessment of plastic litter, there is severe limitation of human resources and dedicated research units or departments for monitoring and assessment of plastic litter on land and in water environment. Data on plastic monitoring and assessment are mostly acquired through project base research in the country's universities. Laboratory equipment's, standard protocols and modern technologies for plastic leakage monitoring at dumpsites and landfills are lacking in the responsible government agencies and departments.



3.3.2 Lao PDR

47> Mr. Khamsamay Silapheth presented the key outcome of the country group discussion of

Laos PDR. In his presentation, he disclosed that poor waste collection service in Lao PDR is partly due to the lack of equipment, underfunding and adequate workers within the sector. Though there are no laws for waste separation at source, dumpsites and existing landfills are improperly built and poorly operated. Private sector investment in waste disposal facilities such as standard landfills, incinerators, recycling facilities, collection service, transport and waste management remain low.

48> Current plastic waste management practice in Laos PDR is implemented within frame of the following laws; i) Environmental Protection Law; ii) Decree on the Implementation of the Environment iii) Protection Law and iv) the Regulation on Environment Impact Assessment. Although, there are no specific legal provisions for the conduct of monitoring and assessment of plastic waste in the county The National Strategy on Environment 2018-2025, MONRE Vision 2030; the Action Plan on Environmental Education and Awareness and Climate Change 2018-2020 provide the policy framework for plastic waste and general municipal solid waste management in Laos PDR. Mr. Khamsamay intimated that the enforcement of waste management law and regulation and monitoring of relevant sectors are relaxed, allowing for the refusal of many waste generators to patronise the services of formal waste collectors. Consequently, plastic waste littering and waste burning is pervasive in the country. The Ministry of Natural Resources and Environment (MONRE) has an overarching is responsible for the creation and enforcement of policies and regulations dealing with the environment, including the management of resources and natural environment.



49▶ The Pollution Control Department (PCD); the Provincial Department of Natural Resources and Environment (PDONRE) and the District Office of Natural Resources and Environment (DONRE) work together to tackle pollution control matters at national, provincial and district levels, respectively. Other development partners including JICA, UNDP, UNEP, GIZ, ADB, and the World Bank support Lao PDR in development and implementation of waste management.

50▶ Revenue sources for funding waste management initiatives are obtained from i) environment tax; ii) environmental rehabilitation fees from investment projects or activities, iii) payment for ecological services, iv) contribution by investment projects, vi) enterprises and ordinary persons; vii) grant aids from both local and international organizations; viii) fines and indemnities of environmental damages; and iv) interest and profits generated from capital investments of the Environmental Protection Fund. However, there is no specific budgetary allocations for plastic monitoring and assessment

51▶ In closing, Mr. Khamsamay hinted that the country is committed to finding better methods of waste management by adopting new technologies for monitoring and management of plastic waste. Improving the data system of solid waste for the monitoring and management to support environmental reports (for example, the GIS). The country is also focused on exploring innovative sources of financing waste management by promoting waste markets and recycling, strengthening institutional mechanism, mainstreaming 3R activities as well as raising public awareness and environmental education. Sustained public awareness is needed to court public participation and cooperation.

3.3.3 Thailand

52▶ **Dr. Panut Manoonvoravong** presented the outcome of the country group for Thailand. He noted that Thailand has legal, regulatory and policy frameworks that support plastic waste management but has no specific legal, regulatory frameworks for mandatory monitoring and assessment for plastic litter. The Department of Marine

and Coastal Resources of the Ministry of Natural Resources and Environment (MONRE) conducts monitoring of macroplastics amount in Thailand. Other institutions such as the Plastics Institute of Thailand, the Plastic Intelligent Unit of Thailand and the Thai Plastic Industries Association provide useful resource information for monitoring plastic consumption and trade in the country. There are ongoing research in institutions such as Kasetsart University, Chulalongkorn University, Sirindhorn International Institute of Technology, Mae Fah Luang University, and Ubon Ratchathani University regarding microplastics both in river and sea. The Department of National Park Wildlife and Plant Conservation has launched campaign about banning foam packaging and single use plastic in all national park in Thailand.

53▶ On intra-agency, cross sectoral, multi- and bilateral collaborations, Thailand has launched a pilot project about the material flow of plastic in Thailand by Chulalongkorn University, Pollution Control Department (PCD) and Plastic Institute of Thailand. Also, Thailand has signed MOA with GIZ under Rethinking plastic, circular economy solution to marine litter (May 2019 to April 2022) with 7 partners country. The country is working to implement projects on deposit refund schemes to promote sustainable consumption and production of plastic. Other areas of focus include the reduction of litter from sea-bases sources, strengthen green procurement policy and awareness for sustainable consumption and production of plastic and the impact to environment. Cross sectoral collaborative efforts involved the setting up of sub-committees on plastic waste management under the National Environment Board (NEB) as to support the efforts in plastic waste management. The Ministry of Interior (MOI) has developed its policy on plastic waste reduction having each province develop their own action plan. According to MONRE, the 152 government organizations and 76 provinces of the country including the provincial governors having their key performance indicator (KPI) waste reduction.

54▶ Sharing on the technical capacities of the country to monitor and assess plastic litter, Dr. Panut disclosed that the major challenges



of plastic waste management relates to the operational arrangements for monitoring and assessment of plastic litter. He noted that apart from the lack of recycling law/disposal fee there is the lack of political will enforcement at national and community levels. Economic incentives and awareness on waste separation are lacking. Other alternatives to monitor and reduce plastic waste considered by the country are inconvenient and costly. Necessary infrastructure scientific tools for monitoring and assessment of plastic are only available in few universities that are working on this plastic related research. Data and information from research on plastic monitoring and basement are often obtained from pilot/experimental projects. Budgetary allocations for sampling and assessment are provided by the National Research Committee of Thailand (NRCT) based on project by project without continuity of funding.



- 55▶ Government agencies lack the adequate human resource to work on plastic waste management. The sub-committee on plastic waste management involves memberships diverse institutions including research/academia and industry. Through there are no formal protocols for monitoring and assessment of plastic litter set up yet, a number of on-going research project by the country's academic institutions, projects with UNEP and JICA for plastic leakage monitoring (MFU, UBU) "CounterMeasure for plastic free river" are setting the pace to promote plastic waste monitoring and assessment in Thailand.

3.3.4 Viet Nam

- 56▶ Presenting the key points current priority plastic waste management challenges of Viet Nam, Mr. Nguyen Van Trong shared the situation of plastic production in Viet Nam. He noted that Viet Nam has an average plastic consumption of about 25 - 35kg plastic/person/year and rated among the top 5 countries in the world with the estimated amount of plastic waste discharged into the sea. Currently, in Viet Nam has about 2,000 plastic enterprises growing at 15 - 20% / year. The MONRE estimates that plastic waste and plastic bags accounts for about 8 - 12% of domestic solid waste. Viet Nam lacks much



practical experience in managing, controlling, monitoring and assessing plastic waste. As such, statistics on plastic wastes is still limited, leading to incomplete information and data to support decision making. Inter-agency coordination among relevant agencies on implementing environmental pollution control projects are not continuous and are often ineffective. Infrastructure for classification, recycling, reuse and waste treatment in general, plastic bags waste has not been invested synchronously. He intimated that the current Law on Environmental Protection Tax hardly is the solution to behavioral change of the communities on plastic use and disposal. Awareness of manufacturing enterprises as well as communities about environmentally friendly plastic bags is confusion. Investment policy and application of recycling technology of plastic bag waste is still limited.

57▶ The Decision 1746/QĐ-TTg dated 04/12/2019 on “the National Action Plan of Management of Marine Plastic Debris by 2030” was issued by the Prime Minister is aimed at achieving the following by 2030;

1. reduce 75% of plastic debris in ocean;
2. achieve 100% discarded fishing gears collected and no littering anymore;
3. ban all coastal tourist sites, accommodations and tourism service providers from using disposable plastic

products or non-biodegradable plastic bags;

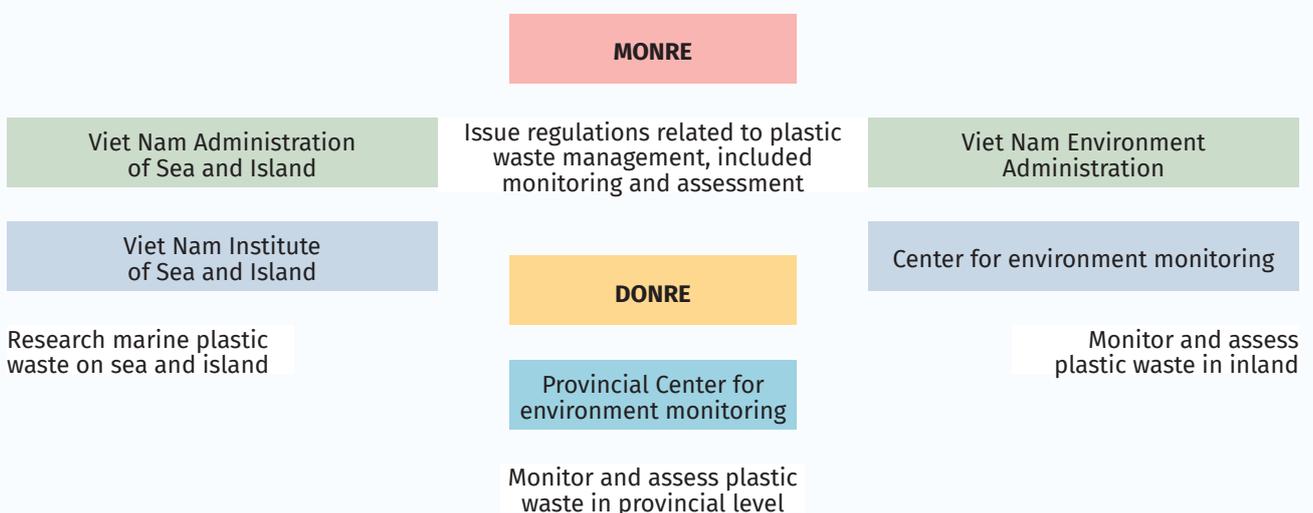
4. to rid all Marine Protected Areas of plastic debris and to;
5. enhancement annual monitoring system and implementation 5-year assessment of the status of ocean plastic wastes in estuaries of 11 main rivers and in 12 island districts.

It was clarified that the said NAP focuses on coastal and marine ecosystems in Viet Nam and currently on inland waterways.



58▶ Viet Nam is committed to promoting global cooperation in data sharing, training and development of human resources, focusing on technology transfer and sustainable use and utilization of marine and ocean resources. This is to be achieved by establishing an international center for ocean plastic waste. Promote the formation of a global cooperation

Figure 8 Institutional structure for plastic waste management in Viet Nam



mechanism for reducing plastic waste. Other initiatives include the development of a regional project under the Coordinating Body on the Seas of East Asia (COBSEA). Mechanisms are being put in place to support the ministries, sectors, mass organizations, media, NGOs and localities in conducting necessary activities to prevent and prevent dumping of plastic waste into the ocean. The institutional structure of the Ministry of Natural Resources and Environment (MONRE) of Viet Nam relating to plastic waste/solid waste management is shown in Figure 8.

59▶ In 2018, Viet Nam issued the strategy of sustainable development of Viet Nam's marine economy to 2030. Viet Nam has identified a key task in the coming period to prevent, control and reduce marine environmental pollution significantly, included monitoring and assessment of plastic waste as follows. The country hopes to achieve this by: i) training staff of relevant institutions on methods of monitoring, sampling and analysis of micro-plastics; ii) implementation of national scientific and technological tasks on the development of technologies for treating difficult to decompose plastic bags and; ii) strengthening the application and technology transfer program to produce environmentally friendly products to replace the persistent plastic bags.

60▶ Regarding the availability of scientific resources, equipment, knowledge, training tools and systems for monitoring and assessment of plastic waste, Mr. Nguyen Van Trong disclosed that the system of TCvNs for evaluating environmentally friendly plastic bags, include:

1. Guidance on exposure and testing of plastics for decomposition in environments combining oxidation and biodegradable process;
2. Determination of complete aerobic biodegradability of plastic materials in water environment - method of measuring oxygen demand in a respiratory meter (respirometer) (ISO 14851:1999);
3. Determination of complete aerobic biodegradability of plastic materials in

water environment - method of analyzing the amount of carbon dioxide produced;

4. Plastics - cadmium - wet decomposition method;
 - a. Method of exposure plastic capable of optical decomposition under the influence of fluorescent;
 - b. Labeling requirements for plastics are capable of aerobic composting at municipal or industrial waste treatment facilities;
 - c. Packaging - Requirements for recoverable packaging through composting and biodegradation - Test scheme and evaluation criteria for accepting packaging

61▶ Viet Nam plans to embark on the following actions to combat plastic waste leakage into water environment:

1. Promote education to improve public awareness towards changing behavior to reduce plastic waste and marine plastic debris.
2. Collecting, categorizing, transporting and relevant treatment of plastic wastes in the coastal areas and in the seas.
3. Promote international cooperation, scientific research, development, application and transfer of advanced technologies in marine waste treatment.
4. Investigate, survey, review and develop managerial mechanism for marine waste pollution in comprehensive, efficient and effective ways.

3.4 Summary of discussion points on capacity mapping

62▶ Despite strong commitment of Mekong countries to reduce plastic waste leakage into the Mekong, the four MRC Member Countries are facing significant challenges in plastic waste management planning, including the following:

- ▶ National level legal and institutional frameworks lack specific provisions for monitoring of plastic
 - ▶ Policy landscape on plastic waste management omits (in many cases) provisions for robust plastic monitoring programmes.
 - ▶ Sub-regional and regional level frameworks prescribe data gathering of plastic through monitoring and assessment.
 - ▶ Limited scientific tools and basic infrastructure available for data gathering on plastic waste collection, transport, recycling, disposal systems.
 - ▶ National monitoring and assessment programmes lacking;
 - ▶ Limited technical capacity at local and national levels for monitoring and assessment of plastic
 - ▶ Monitoring and assessment experience from other monitoring programmes can be harnessed from local level and sub-regional waste institutions
 - ▶ Severely limited financial and technological resources for building and maintaining know-how for systematic development of data and information, knowledge and experiences sharing on plastic waste
3. Incorporate the counter measure methodology on monitoring and assessment for plastic pollution in the plan for freshwater plastic litter monitoring to be developed by MRC's in consideration of the following:
 - ▶ Link plastic pollution monitoring to the existing monitoring programmes such as WQN and FADM with protocol and national self-funded mechanisms;
 - ▶ Expand monitoring activities to cover pollution from ghost gears, and
 - ▶ Consider using Bongo nets as plastic pollution capturing device.
 4. Focus assessment and monitoring at major ports and piers with the involvement of port authorities.
 5. Integrate outcomes of CounterMEASURE project in the State of the Mekong River report that comes out every 5 years (the next one will be published in 2023).
 6. Explore developing a Mekong strategic framework for plastic pollution management based on identified policy recommendations and the issues identified during the capacity mapping exercise.

3.5 Summary and next steps

63▶ The workshop concluded with the following next steps:

1. Continue cooperation between MRC and UNEP under the signed MoU framework
 1. Follow up data collection (possibly ground truthing), data gap filling, and confirmation from countries
 2. Data analysis and capacity mapping report development
2. Strengthen Mekong networking for the management and monitoring of plastic pollution



7. Support MRC Member Countries to develop and implement a simple and cost-effective long-term monitoring and assessment programme, and practical countermeasures in line with National Action Plan on Marine Plastic Pollution and/or National Plastic Waste Management Plan:

1. Categorization of different plastic types, emergent plastic types, with definitions;
2. Development of Mekong photo book on different plastic types, with coding; and
3. Standardization of collection and sampling methods
4. Support the pilot of monitoring & Assessment pilot programmes in MRC Member Countries (Phase 2 of the CounterMEASURE Project)

3.6 Media interview

64▶

As part of the project-wide strategy to raise awareness on plastic waste challenges in the Lower Mekong sub-region, media coverage including interviews were granted to invited media houses to explain the objectives of the CounterMEASURE project. Some of the media publication of the CounterMEASURE project reported and published in electronic, television and print media reported across the sub-region include:

1. Experts tackle plastic waste [Phnom Penh Post]

<https://www.phnompenhpost.com/national/experts-tackle-plastic-waste>

2. Actions to address Mekong plastic pollution take shape [Law News Agency]

<http://kpl.gov.la/En/Detail.aspx?id=50634>

3. Mekong countries agree to conduct plastic waste study [Khmer Times]

<https://www.khmertimeskh.com/50690822/mekong-countries-agree-to-conduct-plastic-waste-study>

4. Mekong nations to address choking plastic pollution [VN Express International]

<https://e.vnexpress.net/news/news/mekong-nations-to-address-choking-plastic-pollution-4054675.html>

5. Experts tackle plastic waste [Eleven Myanmar]

<https://elevenmyanmar.com/news/experts-tackle-plastic-waste>

6. Thailand joins three nations to tackle plastic waste in Mekong [The Nation Thailand]

https://www.nationthailand.com/ann/30382196?utm_source=bottom_relate&utm_medium=internal_referral

7. Thailand joins three nations to tackle plastic waste in Mekong [Asia News Network]

<https://sootinclaimon.wordpress.com/2020/02/16/thailand-joins-three-nations-to-tackle-plastic-waste-in-mekong-%E0%B8%A8%E0%B8%B2%E0%B8%AA%E0%B8%95%E0%B8%A3%E0%B9%8C%E0%B9%80%E0%B8%81%E0%B8%A9%E0%B8%95%E0%B8%A3%E0%B8%94%E0%B8%B4%E0%B8%99%E0%B8%9B/>

8. Actions to address Mekong plastic pollution take shape [MRC News]

<http://www.mrcmekong.org/news-and-events/news/actions-to-address-mekong-plastic-pollution-take-shape/>

9. Viet Nam, Other Mekong Nations Launch Joint Program to Tackle River Plastic Waste [Saigoneer]

<https://saigoneer.com/saigon-environment/18324-vietnam,-other-mekong-nations-launch-joint-program-to-tackle-river-plastic-waste>

10. Countries along the Mekong River Look into Combatting Plastic Pollution [Cambodianess]

<https://cambodianess.com/article/countries-along-the-mekong-river-look-into-combatting-plastic-pollution>

11. Mekong countries agree to conduct plastic waste study [Open Development Mekong]

<https://opendevlopmekong.net/news/mekong-countries-agree-to-conduct-plastic-waste-study/>

12. Lower Mekong Nations to Address Choking Plastic Pollution [Chiang Rai Times]

The regional workshop was hosted by Mekong River Commission (MRC) and UNEP Regional Office for Asia and the Pacific in Vientiane, Laos.

<https://www.chiangraitimes.com/featured/lower-mekong-nations-to-address-choking-plastic-pollution/>

13. Mekong countries agree to conduct plastic waste study. Government officials and researchers from Mekong river countries on Wednesday agreed to assess plastic waste pollution in the region and take action to reduce it. [Khmer Times] ...Kakuko Nagatani Yoshida, regional coordinator for UNEP, yesterday said addressing plastic pollution will help to promote the environment sector and reduce its impact on people living along the waterway.

<https://www.khmertimeskh.com/50690822/mekong-countries-agree-to-conduct-plastic-waste-study>

14. The Nikkei, 8 April 2020 (Japanese)

<https://www.nikkei.com/article/DGKKZO57807030Y0A400C2EAC000/>

Annex 1 Workshop Agenda

Regional Technical Workshop on Assessment and Monitoring of Plastic Pollution in the Mekong River

11-12 February 2020, Conference Room of the MRC Secretariat, Vientiane, Lao PDR

Chair: MRC Secretariat and UNEP representative

Time	Items	Responsibilities
DAY 1: 11th FEBRUARY 2020		
10.00	1. Registration	
10.30	2. Welcome Address & Opening Remarks	UNEP ROAP Director of the MRCS Environmental Management Division (MRCS ED)
	3. Objectives, expected outputs and agenda of the Workshop	MRCS ED
10.50	4. Introduction of CounterMEASURE Project	UNEP
11.20	5. Introduction of MRC Annual Workplan 2020-2021 to address plastic pollution issues in the Mekong River	MRCS ED
12.00	Lunch	
13.00	6. Methodology and preliminary result of plastic leakage analysis in the Mekong region	Geoinformatics Center (GIC)- Asian Institute of Technology (AIT)
13.30	7. Progress of the Data Collection and Survey from academia <ul style="list-style-type: none"> • National University of Laos • University of Cambodia (20 minutes each of academia)	National University of Lao, University of Cambodia,
14.30	Coffee Break	
15.00	8. Progress of the Data Collection and Survey from academia (cont'd) <ul style="list-style-type: none"> • Mae Fah Luang University • Ubon Rachathani University (20 minutes each of academia)	Mae Fah Luang University, Ubon Rachathani University
15.40	9. Presentation from Pirika Inc. (Experiences on microplastic surveys)	Pirika Inc.
16.00	Closure of Day-1	

Chair: MRC secretariat and UNEP representative

Time	Items	Responsibilities
DAY 2: 12th FEBRUARY 2020		
08.30	1. Recap for Day-1 and introduction of Day-2 agenda	Asian Institute of Technology, Regional Resource Centre for Asia and Pacific (AIT RRC.AP)
09.00	9. The introduction and summary of the capacity mapping (Functional Capacity) Q & A	AIT RRC.AP All participants
10.20	Coffee Break (Media Interviews)	
10.50	10. The summary of the capacity mapping (Technical Capacity) Q & A	RRC.AP All participants
11.50	Lunch (Media Interviews)	
13.00	11. Country Group Discussion to address plastic pollution issues in the country (Split the group by countries)	National Representatives
14.30	Coffee Break (Media Interviews)	
15.00	12. Outcome of the Group Discussion (Presentation session) <ul style="list-style-type: none"> • Cambodia • Lao PDR • Thailand • Viet Nam (15 minutes each including Q&A x 4 countries; 60mins)	National Representatives
16:00	13. Summary and next steps	MRCS ED, UNEP
16.30	14. Closure of Day-2	Chair
16:30	(Media Interviews)	

Annex 2

List of Participants

Regional Technical Workshop on Assessment and Monitoring of Plastic Pollution in the Mekong River,
11-12 February 2020

No	Name and Surname	Position	Organization
CAMBODIA			
1	H.E Mr. Khov Meas	Director of Projects and Programme	Department and National Coordinator for ED, CNMC
2	Mr. Sok Khom	Deputy Director	Solid Waste Management Department, MOE
3	Mr. Dek Vimeanreaksmey	Assistant to National Coordinator	for ED, CNMC
4	Mr. Thay Piset	Lecturer of Department of Environment	Royal University of Phnom Penh, Cambodia
5	Mr. Meng Kru	Lecturer of Department of Environment	Royal University of Phnom Penh, Cambodia
LAO PDR			
6	Mr. Khamzone Philavong	National ED Focal Point	LNMC
7	Mr. Thilaphone Phoumma	Technical Officer	LNMC
8	Ms. Outhonlamany Toulamasing	Technical Officer,	Department of Environmental Quality Promotion (DEQP), MONRE
9	Mr. Khamsamay Silapheth		Pollution Control Department, MONRE
10	Mr. Somboun Chanliya	Technical Officer	Living Aquatic Resource Research Center National Agriculture and Forestry Research Institute (LARRec)
11	Dr. Vatthanamixay Chansomphou	Lecturer and Researcher	Faculty of Environmental Sciences, National University of Laos, Lao PDR
12	Ms. Palichat Sivilay	Student	Internship at LNMC
13	Ms.Souvanna Phengsisomboun	Lecturer, Faculty of Environmental Sciences	National University of Laos, Lao PDR
THAILAND			
14	Dr. Panut Manoonvoravong	TD National focal point	Thai National Mekong Commission
15	Miss Montharop Puruen	Fisheries Biologist, Professional Level	Inland Fisheries Research and Development Division
16	Miss Chittima Charudacha	Environmentalist, Professional Level	Department of Environmental Quality Promotion, MONRE
17	Dr. Apisom Intralawan	Lecturer	Mae Fah Luang University, Thailand
18	Dr. Pawena Limpiteeprakan	Academic Lecturer	College of Medicine and Public Health, Ubonratchathani University, Thailand
19	Ms. Pattayaporn Unroj		Mae Fah Luang University, Thailand
20	Ms. Viphawan Monyanont	Researcher's Assistant	Mae Fah Luang University

No	Name and Surname	Position	Organization
21	Ms. Benchawan Chokchaitrakolpo		Pollution Control Department, Thailand
Viet Nam			
22	Nguyen Dinh Dat	National focal point	Viet Nam National Mekong Commission
23	Pham Tuong	National focal point	Viet Nam National Mekong Commission
24	Nguyen Van Trong	Technical Expert	MONRE, Viet Nam
MRC SECRETARIAT			
25	Mr. Hak Chocheat	Director	Environmental Management Division
26	Dr. So Nam	Chief Environmental Management Officer,	Environmental Management Division
27	Dr. Prayooth Yaowakhan	Ecosystem and Wetland Specialist	Environmental Management Division
28	Mr. Noun Vanna	Fisheries and Aquatic Ecology Officer	Environmental Management Division
29	Mr. Sopheak Mea		Midea, OCEO
31	Dr. Phattareeya Suanrattanahai	Fisheries Management Specialist	Environmental Management Division
32	Ms. Vannida Chanpadith	Administrative Assistant	Environmental Management Division
33	Ms. Phoukham	Secretary	Environmental Management Division
34	Ms. Chanvilay Somvongsa		
35	Kritsana Kityuttachai	Remote Sensing & GIS Specialist,	Technical Division
36	Anoulak Kittikhoun	Chief Strategy and Partnership Officer	OCEO
37	Pubill Panen Erinda		GIZ LA
38	Vanna Nuon	Fisheries and Aquatic Ecology Officer,	Environmental Management Division
39	Thi Thanh Yen Ton Nu	Navigation Operations Specialist	Environmental Management Division
31	Dr. Phattareeya Suanrattanahai	Fisheries Management Specialist	Environmental Management Division
32	Ms. Vannida Chanpadith	Administrative Assistant to	Administrative Assistant to ED
33	Ms. Phoukham	Secretary	Environmental Management Division

No	Name and Surname	Position	Organization
UNEP & OTHERS			
34	Ms. Kakuko Yoshida	Regional Coordinator for Chemicals, Waste and Air Quality	United Nation Environment Programme, Regional Office Asia and Pacific (UNEP ROAP)
35	Mr. Tsubasa Enomoto	Associate Expert	United Nation Environment Programme, Regional Office Asia and Pacific (UNEP ROAP)
36	Mr. Makoto Tsukiji	Individual Consultant	United Nation Environment Programme, Regional Office Asia and Pacific (UNEP ROAP)
37	Mr. Keiichi Iwamoto	Charged' Affairs ad Interim	Embassy of Japan to the Lao PDR
38	Mr. Takahiro Suenaga	Second Secretary	Embassy of Japan to the Lao PDR
39	Ms. Reiko Matsui	Project Formulation Advisor, Laos Office	Japan International Cooperation Agency (JICA)
30	Mr. Guilberto Borongan	Head, Waste and Resource Management Cluster,	Regional Resource Center for Asia and the Pacific, Asian Institute of Technology (AIT RRC. AP)
41	Mr. Solomon Kofi Mensah Huno	Programme Officer Waste and Resource Management Cluster,	Regional Resource Center for Asia and the Pacific, Asian Institute of Technology (AIT RRC. AP)
42	Dr. Kavinda Gunasekara	Senior Program Specialist	Geoinformatics Center, Asian Institute of Technology, Thailand
43	Dr. Dan Tran	Research Specialist	Geoinformatics Center, Asian Institute of Technology Thailand
44	Mr. Kojima Fujio	Chief Executive Officer	Pirika, Inc.
45	Mr. Shinya Inoue	Project Manager	Pirika, Inc.
MEDIA			
54	Adam Hodge		UNEP
46	Vichien Rachawong	Camera man	ThaiPBS
47	Sahattaya (Aye) Kraikhunthot	Reporter	NHK
48	Chottchai Keawprachea	Camera man	NHK
49	Takashi Koga	Producer	NHK
50	Patpicha Tanakasempipat		Reuters
51	Marimi Kishimoto		Nikkei
52	Chihiro Inoue		Kyodo News
53	Amy Bainbridge		ABC (Australia)

Annex 3

Guidance note for country group discussion and workshop presentations

- ▶ Guidance Note:

https://www.dropbox.com/sh/zitd306hegci7hu/AADTzsEpl70tOh4rwnmPT9Vka/1.%20Guidance%20note%20country%20group%20discussion_30012020_revised%20final%20draft.pdf?dl=0

- ▶ Presentations:

<https://www.dropbox.com/sh/2fcjpn9geh0fwzz/AAD7ogGxe43hAyR9NUd2yNRXa?dl=0>

- ▶ Meeting Documents:

<https://www.dropbox.com/sh/zitd306hegci7hu/AADBwISs06bHrvdTiqcJbYEda?dl=0>

- ▶ Meeting Agenda:

<https://www.dropbox.com/sh/1bz16mnjpbfxdql/AACbXRSLr1JQ64BFC-l1ELcxa?dl=0>

