



TOWARDS LITTER FREE INDIAN OCEAN

Summary of the
Regional Marine Litter Action Plan
for South Asian Seas Region





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Foreword



Marine litter has become a serious Global, Regional and National challenge and has significantly impacted not only the marine and coastal environment but also human health. The problem is further aggravated due to lack of proper information on the marine litter production and consumptions as a major obstacle in developing any useful mitigation measures at national and regional levels in the South Asian Seas (SAS) Region. To address the Marine Litter issue, SACEP initiated the development of the Marine Litter Action Plan for the SAS region on the request of the SAS member countries and with the assistance of the UNEP-GPA. The Marine Litter Action Plan will greatly help in addressing this emerging issue in the SAS region.

The SAS region's constantly expanding coastal population and increased developmental activities has exacerbated pressure on coastal and marine resources, with growing evidence seen in further degradation of the coastal and marine environment and continued exploitation of living as well as non-living resources. South Asian Seas Programme (SASP) is the appropriate regional platform working on need-based actions for protection and sustainable management of marine environment including preparation of regional action plans, regional policy, coral reef taskforce, capacity development, awareness raising and experience sharing among the member countries.

This report concludes the marine litter management strategies, challenges and opportunities and the way forward and is primarily based on the information shared by the SAS member countries and the participants of the consultative workshop at Mumbai, India on 5-6th April 2018. As this report is prepared when all contracting parties are finalizing their National Marine Litter Action Plans to combat marine litter pollution, containing programs and measures for marine litter prevention and reduction, and timeframe for their implementation. Therefore, this report will prove as a reference tool for future policy, planning, research and development of marine litter mitigation tools in areas related to marine environment as well as pollution from the land and sea-based sources.

A handwritten signature in black ink, appearing to be 'Dr. Muhammad Khurshid', written over a white rectangular background.

Dr. Muhammad Khurshid
Director General, SACEP

Acknowledgement

On behalf of the South Asia Cooperative Environment Programme (SACEP), I would like to appreciate the support extended by the member countries of the South Asian Seas Programme (SASP) and information sharing for drafting the regional marine litter Action Plan for the SAS region. Technical and financial support provided by the UNEP-GPA is highly appreciated. Contribution by member states and focal points during the consultative workshop on the Marine Litter at Mumbai is highly appreciated as this has greatly helped in making the report highly comprehensive and updated. Contribution by the National and Regional consultants in drafting and completing the Action Plans all the way till its completion is commendable.

SACEP is also indebted to all those stakeholders who participated in the SACEP parallel event on Marine Litter challenges and opportunities in the 8th 3R Forum at Indore, India in April 2018. I am also thankful to the professional and support staff of SACEP for their hard work in putting the threads together and providing facilitation during the process of the report writing. I hope and wish this report will go a long way in protecting the marine environment of the SAS region from ever increasing marine litter pollutions.



Dr. Muhammad Khurshid
Director General, SACEP

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1. Introduction

Marine Litter and micro plastic concentration is increasing with every passing day due to the increased use of disposable substances especially plastic. Plastic use has greatly increased during the past couple of decades as it is easily and cheaply available in the market everywhere. Plastic being light is easily carried by water from the inland through canals, streams and rivers to the seas in South Asian Seas region. The increased quantity of marine litter and micro plastic has not only affected the marine environment but also both animal and human life besides economic activities such as shipping, tourism industry, fishery, aquaculture and other blue economy activities in the SAS region. With a view to mitigate the increased impacts of marine litter and micro-plastic, SACEP and SAS member countries jointly initiated the regional marine litter action plan with the support of UNEP-GPA.

The origin and routes of marine litter are diverse and exact quantities and pathways are not fully known in the SAS region. However, research that aims to estimate the exact quantities and types of plastic litter and pathways in the environment are undertaken to quantify these parameters. The past studies show that approximately 83% of the 4.8–12.7 million tons of land-based plastic waste ends up in the ocean from the 192 coastal countries. Of those, majority of the countries are Asian and four of them Bangladesh, India, Pakistan, and Sri Lanka are located in the SAS region. Studies also indicated that 80 percent of the marine litters are originated from land based sources.

The amount of plastic waste eventually ending up in the ocean was mainly determined as a percentage of mismanaged waste. Studies estimated that between 1.15 and 2.41 million tons of plastic waste flows from rivers into the

ocean annually, and the main drivers were population density. The top 20 polluting rivers were mostly located in Asia, and they accounted for 67% of the total global plastic waste. Available knowledge on main sources of marine litter and possible solutions offers a solid basis for effective management of the marine litter. Yet it is clear that so far the impacts of management strategies and policies and other initiatives are either missing or still not properly studied. Moreover, due to its multiple use, global plastic production increases each year and it has already exceeded 300 million tons in 2014.

At present, there are several international efforts aiming at reducing and preventing marine litter besides mitigating its impacts. These include worldwide initiatives such as the Global Partnership on Marine Litter (GPML), the Honolulu Strategy and the G7 countries. GPML is a voluntary multi-stakeholder co-ordination mechanism which brings together policymakers, civil society actors, the scientific community and the private sector to discuss solutions and catalyze actions.

In the last few decades the adoption of various marine litter resolutions as well as multi-lateral Environmental Agreement (MEAS) such as the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 and London Protocol prohibiting all dumping except for possibly acceptable wastes on the so-called "reverse list", 2006. The 2nd United Nations Environment Assembly (UNEA-2) held in May 2016 adopted resolution on Marine plastic litter and Micro Plastics which indicate that the issue of marine plastic litter and micro plastics has continued to receive much international attention. The UNEA-2 resolution acknowledged marine plastic and micro plastic as a rapidly increasing, serious problem of global concern

that needs urgent global response. The resolution signals countries continued willingness to put marine plastic pollution high on the environmental policy agenda. In order to keep it also high on national agendas, pollution has been the focused of the 3rd UN Environment Assembly held in December 2017.

United Nations Conference held in June 2017 to Support the Implementation of Sustainable Development Goals as part of the 2030 Agenda also affirmed a strong commitment, through various SDGs such as SDG-12, SDG-6 clean water and sanitation, SDG-14 life under water etc.

The SAS member countries have almost a fifth of the world's total population. High population density, low per capita income, low development indicators, and high dependency on natural resources for livelihood and they are highly vulnerable to the impacts of marine litter and micro-plastics. The SAS region host some of the largest biologically rich marine biodiversity like the Gulf of Mannar, coral atolls of the Maldives, Coastal lagoons like Chilika in India and Puttalam in Sri Lanka, vast mudflats of the Gulf of Kutch, large sea grass beds in the Gulf of Manner, the mangroves of the Sundarbans and Pakistan coastal belts, marine mammal like dolphin, Dugong, and whales in the Indian Ocean.

The current marine litter and micro-plastic management strategies of the countries in the SAS region are either non-available or very weak and disjointed. There is no uniform and standard methods adapted to study and compare the micro-plastic for better management including marine litter removal and disposal in the SAS region. From the available data it could be concluded that the major sources of marine litter and micro-plastics are domestic and industrial wastes, solid waste, urban and sewage runoff, shipping and fishing activities, tourism and recreational activities, etc. Very little data is

available in the open ocean on floating or submerged marine litter as no systematic monitoring of such debris has so far been undertaken in the SAS region.

An overview of the marine litter in the SAS member countries show that most of the marine litter is coming from land-based sources. Most of the Bangladesh big cities and industries are located near major rivers. These rivers are the repositories of most of the waste discharge from industries and municipal waste of the city. Industries are mainly responsible for originating litter that is directly disposed to the main rivers without proper recycling and management. There is no marine litter monitoring programme in Bangladesh. The last data about marine litter monitoring in Bangladesh was reported in the SACEP/UNEP report in 2007.

Quantification of marine litter in India including plastics in the water columns, sediment and biota has been documented in certain areas of the Indian beaches, estuaries, coastal waters and open sea. However, comparisons between studies or even systematic status and trend analyses are not available due to differences in the collection and measurement methodologies used by the respective researchers. India, has undertaken research on the marine litter circulation patterns. Marine litter is one of the biggest environmental challenges in Maldives as there has been a significant increase in the magnitude of the problem in Maldives due to the rapid growth of population, changing consumption patterns, expansion in the tourism industry, and logistical difficulties of waste disposal and lack of proper waste management facilities.

According to a study the total solid waste generation in Pakistan was about 20.024 million tons a year in the past couple of decades, which is approximately 59,000 tons per day. The study also indicated that the growth rate of solid waste generation is about 2.4% per annum. At the current rate of population increase in Pakistan, the amount of waste production will double in

the next ten years (Environment Ministry, Government of Pakistan). The marine litter data in Sri Lanka were analyzed based on the total number of pieces collected during the 2012-2015. The composition of debris is dominated by food and beverage packaging items. As per the World Bank Waste Atlas, per person waste generation rate of Sri Lanka is 215.4 kg per year.

All SAS member countries are facing problems of marine litter quantification in their respective countries. As a result, they fail to identify the magnitude of the marine litter which is directly or indirectly impacting the ecological, social and economic systems in the SAS region. Therefore, this situation has severely affected preparation of the management policies and strategies to address the marine litter issues in the SAS region. Social, Economic and Ecological impacts of marine litter have to be understood to enable thoughtful prioritization and development of effective management strategies. Entanglement of animals by marine debris presents issues of limited mobility and restricted movement that can lead to starvation, suffocation, laceration, subsequent infection, and possible mortality in marine animals.

No area specific or site specific ecological, social and economic parameters in relation to the marine litter have so far been studied or documented in the SAS region. Instead of the site specific or country specific information, these countries have indicated general ecological issues experienced due to marine litter. This is a very serious problem for preparation of management strategies and plans to mitigate the marine litter issues at national and regional level and therefore require urgent attention by national and regional organizations and authorities in the SAS region. However, according to the present status, no quantifiable and scientific data and information is available in the SAS region to prepare a target-oriented management plan for the region as well as SAS member countries to manage marine litter on sustainable basis. Therefore, degradation of the

coastal resource, habitats and biodiversity in the region may attain critical condition in near future thereby making coastal biodiversity in the region unproductive besides, creating social unrest, and the huge economic losses. Therefore, immediate proactive measures need to be implemented in the region for avoiding any disaster to happen.

There are several management strategies implemented by various agencies at the global level to mitigate the marine litter impacts. All of the strategies can be grouped under following categories.

- a) Formation and declaration of International Conventions, laws, regulations and treaties
- b) Implementation of Direct development activities
- c) Conducting Research and surveys
- d) Implementations of enforcement program
- e) Monitoring and evaluation
- f) Conducting Education and awareness programs

Even though there are numerous International and Regional conventions, agreements, laws, and treaties which provide good legal platform for the management and control of marine litter issues, several cases indicate that cooperative action on marine litter has lagged behind and participation of states in these initiatives was insufficient. For example, there are no dedicated legal instruments in place for to the management of marine litter in the SAS region. Some countries in the region do not even initiate action in the UNEP Global Initiative. Therefore, it is an urgent requirement to prepare regional plans for implementation of international conventions, agreements, laws, regulations and treaties

Effectiveness of the management strategies can be monitored if accurate baseline data is available. Therefore, availability of accurate data for marine litter is critical to prepare proper policies, strategies and management plans to

minimize the quantity of marine litter and also to minimize their social, economic and ecological impacts.

Despite the existing marine litter management strategies, current knowledge of the quantities and the degradation of litter in the marine environment and its potential physical and chemical impacts on marine life is very limited.

Knowledge gaps in the SAS region in terms of the biological consequences of marine litter and micro-plastics exposure, economic and social impacts of marine litter have been indicated. These gaps hinder the ability to prioritize mitigation efforts and to assess the effectiveness of implementation measures. Little data exist on quantities, trends, sources and sinks of marine litter in the SAS region and very little is known about the extent and nature of the problem in the SAS region.

Further, accurate and quantitative data is needed in relation to large-scale and long-term monitoring across SAS countries and environments, smaller-scale dynamics that affect plastic movement and accumulation, and trophic transfer dynamics of persistent organic pollutants via plastics through the marine food web in the region as large number of coastal population in these countries directly depend on coastal and marine resources.

The main objective of the direct development strategy is to prevent the litter and solid waste entering into the beaches and open seas areas. Therefore, activities are carried out under the direct development strategies includes source reduction, waste reuse and recycling, structures for waste conversion to energy, reception facilities, development of gear marking facilities, debris contained at points of entry into receiving waters, beach and reef cleaning activities and waste management initiatives on land. Product modification and improvement (e.g. through eco design) is an important method for source reduction. A variety of source

reduction schemes have been developed and are available, such as designing packaging in such a way that the product can be refilled, maintaining and repairing durable products, developing more concentrated products and electronic messaging. Other methods include the development of packaging material that is made from sustainable natural resources, the design of push-tap opening of metal beverage cans and the design of lids on beverage bottles or containers attached to bottles with a leash are some of the direct development activities.

The strategic research and studies is cross cutting with all the other strategies for marine litter management. If research data and information is not available, it may create difficulties to prepare an implementable marine litter management plan.

In the SAS region, most of the research has been confined to the ecological and beach studies. Research and studies are needed to be done for all the segments of the marine environment including land based solid waste, beaches/shoreline, sea surface, water column, sea floor, sea floor shallow, sea floor deep, ingestion by other marine organisms, entanglement rates of marine organisms, micro-plastic on shorelines, micro plastic at sea surface, ecological, and socio-economics aspects.

India has done research on circulation patterns in the Indian Ocean but other countries have not so far done any such type of research to collect circulation pattern data to identify the litter circulation.

There is no standard and uniform methodology being followed in the SAS Region for collecting, analyzing and interpreting the marine litter data. Therefore, SAS region is required to develop standard research methodologies for joint research studies on marine litter. It is also strongly recommended to share data among the countries in the region to minimize cost of the marine litter research.

Regulations and enforcement strategies are

basically aiming to streamline the deployment activities in relation to marine litter and mitigate the impacts of marine litter. The concerned agencies are required to prepare guidelines, regulations and enforcement plans to control the ways that marine litter is disposed. These measures are largely command and control method for controlling marine litter. This strategy is overlapping with direct development strategy and also involves preventing certain types of litter from entering into the sea.

One of the important factor for regulation is the need of a separate legal institute/agency to prepare the regulation and its implementation. Most of the SAS member countries do not have separate legal agency except Sri Lanka to prepare and implement proper regulation plan. Possess qualified enforcement team having understanding of different type of litter. It is also required to deploy vessels and other vehicles to facilitate the enforcement programs. Financial and human resources are also required for enforcement.

The education and awareness strategy is crosscutting strategy for all management activities for marine litter. These strategies aim to encourage people to embrace the notion of waste as a resource and choose the products that generate lower quantities of litter, dispose of waste in a more environmentally sound way and participate in beach cleanup campaign.

A well-designed, education and awareness programme can create the conditions necessary for implementing and adjusting policies for the sustainable management of coastal and marine litter.

According to the available reports and information many SAS countries have so far not prepared and implemented properly developed marine litter education and awareness programs. Very few activities have been implemented targeting general public. It is also observed that all SAS countries have implemented beach

cleaning programs annually but have not focused on the real stakeholder's/target groups who are directly responsible for marine litter.

Properly designed education and awareness programs can change human behavior from the current throw-away culture into more accountable and responsible culture about marine litter. The marine litter education and awareness programs need to focus on change of behavior of all the stakeholders through changing the attitude toward the marine litter. Therefore, educational and awareness programs need to be designed very carefully identifying the correct target groups, correct messages to be delivered to the target groups and identifying appropriate educational tools such as print and electronic media, social media, seminars workshop and discussions etc.

Most of the developing countries are heavily using marketing and economic instruments to reduce plastics thereby reducing the marine litter. However, in the SAS region very few marketing and economic instruments are used to manage the plastics and marine litter. Reason may be the market failure in these countries or distorted market system that does not properly reflects the marginal cost of beach pollution.

Under the market system direct tax can be introduced for the polluter to pay since international environment law allows imposing laws for the polluter pay the price systems. Except few marketing instruments, most of SAS countries have not introduced marketing tools such as high tax for untreated landfilling which could incentivize recycling and recovery, reducing the risk of waste reaching the marine environment. Introduction of product tax for plastics bags, packaging, deposit refund schemes, direct investment in infrastructure such as rubbish bins and secure waste collections from beaches and high fees and fines for littering are some of the marketing and economic instruments need to be introduced in the SAS countries.

The Process:

In follow-up to the adoption of the UNEA-2 resolution on the “Marine plastic litter and micro-plastics” 23-27 May 2016, UN Environment Nairobi, Kenya, SACEP engaged the South Asian Seas Programme (SASP) member countries (Bangladesh, India, Maldives, Pakistan and Sri Lanka) for a litter free Indian Ocean. The idea of developing a Regional Marine Litter Action Plan was conceived during the SACEP side event on “Marine Environment Challenges and Opportunities in the South Asia Seas (SAS) region” at the World Ocean Conference on 6th June 2017, New York, where focal points from the SASP member countries raised concerns about non-availability of data on Marine Litter at National Level. UNEP-GPA responded to this call and offered technical and financial support to SACEP for developing the Regional Action Plan for the SAS region. SACEP initiated the process involving SAS member countries to develop five National and one Regional Marine Litter Action Plan.

The process involved hiring of National and Regional consultants followed by holding National Level consultation in each country. The national consultation involved relevant stakeholders from public sector, civil society, private sector, researcher and academia. The draft national marine litter actions plans were ready by early January 2018, which were used by the regional consultant for developing the Regional Marine Litter Action Plan. The regional progression involved holding of a regional consultative workshop 5-6 April 2018 at Mumbai, India followed by another round of consultation at the SACEP parallel session on Regional Marine Litter Challenges and Opportunities at the UNCRD 8th 3R Conference, on 10 April at Indore, India. The consultative workshops greatly helped in improving the draft regional marine litter action plan and the updated plan as agreed by the SASP focal points was shared with the member countries for their inputs which were incorporated. A summary of the agreed Marine Litter Action Plan is being launched during the special session of the WED-2018 on 4th June 2018 during 1400-1530, at Vigyan Bhavan, New Delhi, India.



Left-Right: Mrs. Jacintha S. Tissera, Dr. Sivaji Patra, Dr. Muhammad Khurshid, Dr. Pravakar Mishra, Dr. Anil Premarathne, Mr. Rifath Naeem, Mr. A.J.M. Gunasekara, Ms. Enas Mohamed

2. Major Gaps and Challenges

Based on the national marine litter action plans of the SAS region coupled with the interactive dialogues during the consultative meetings at Mumbai and Indore, India, the following major gaps and challenges were identified:

2.1 Lack of Marine litter data in the SAS Region

SAS member countries do not possess any consolidated marine litter database nor does any indicators available for such database. Therefore, very little data exist on the quantities, trends, sources and sinks of marine litter in the SAS region and very little is known about the extent and nature of the problem in the region. As effectiveness of the management strategies can be ensured if accurate baseline data is available. Therefore, availability of accurate data for marine litter is critical to prepare proper policies, strategies and management plans to minimize the quantity of marine litter. Despite the existing management strategies for marine litter, the current knowledge of the quantities and the degradation of litter in the marine environment and its potential physical and chemical impacts on marine life is still scarce.

SAS member countries possess a great deal of knowledge gaps in terms of the biological consequences of marine litter and micro-plastics. These gaps hinder the ability to prioritize mitigation efforts and to assess the effectiveness of implementation measures. Therefore, accurate and quantitative data is highly essential for large-scale and long-term monitoring across SAS region and countries. The small-scale dynamics that affect plastic movement and accumulation, and transfer of persistent organic pollutants via plastics through the marine food web in the region as large number of coastal population in these countries directly depend on coastal and marine resources.

2.2 Poor Institutional system for management of Marine litter

One of the major gaps in the Marine litter management in the SAS region is lack of proper institutional mechanism to implement marine litter mitigation activities. Except Sri Lanka all other SAS member countries do not have any dedicated agency for management of the marine litter. Due to non-availability of separate institutions and marine litter management system there is no separate Act or legal instruments to regulate and manage marine litter. The absences of proper regulations became hard to establish the enforcement system. Consequently, marine litter has emerged as a serious threat to the marine resources in SAS region. Therefore, establishment of institutional mechanism especially for management of marine litter in the SAS region and countries is urgently required.

2.3 Non-availability of legal framework for marine litter management

Legal framework which helps in regulating the production, use and recycling of the marine litter. SAS member countries do not possess any dedicated legal framework for regulating the marine litter. Despite the availability of many international and regional level legal instruments, SAS region is very poor in term of proper enforcement of regulatory and management regime of the marine litter. Therefore, marine litter continues to increase on the shorelines, in oceanic gyres, and on seafloors thereby, signaling that marine litter remains a

significant problem, particularly with respect to micro plastics in the SAS region. There are complex reasons for this situation and, it is possible to identify a number of gaps in the current legal framework in the region since the existing legal framework does not specifically focus on the marine litter.

A few global examples indicate that such legal management measures have generated desirable results, such as fishing gear buyback programme in South Korea, Taiwan's plastic restriction and compulsory garbage sorting policy, US Fish for Energy, OSPAR Fishing for Litter, EU PRF Directive and HELCOM Baltic Strategy. Therefore, legal systems are highly helpful in ensuring effective control of marine litter. Under this situation enactment of new legal framework for marine litter management in the SAS region countries is critically important.

2.4 Poor and insufficient enforcement of international Conventions, Agreements, laws, regulations and treaties

Even though there are numerous international and regional conventions, agreements, laws, and treaties that provide a good legal platform for effective management of marine litter, several cases indicate that cooperative action on marine litter has lagged behind, or the participation of states in these initiatives was insufficient. There is neither any legal framework nor any rules and regulations that support enforcement of the relevant MEAs in the SAS member countries. Therefore, it is urgently required to either develop new laws and regulations or modify the existing regulations in line with the provisions of the MEAs. This will greatly help in effective enforcement of the marine litter MEAs in the SAS member countries.

2.5 Limited Implementation of Direct development activities for marine management

SAS region possess very few direct development activities and those available are confined only to two main activities such as beach cleaning, and recycling of waste at limited level. The main objective of the direct development strategy is to prevent the litter and solid waste that enters into the beaches and seas. Therefore, there is an urgent need to undertake activities such as source reduction, waste reuse and recycling, structures for waste conversion to energy, reception facilities, development of bio-degradable fishing gear marking facilities. Marine litter contained at points of entry into receiving waters, beach and reef cleaning activities and various waste management initiatives on land are areas of special and immediate attention. Product modification and improvement (e.g. through eco design) is an important method for source reduction. A variety of source reduction schemes have been developed and are available, such as designing packaging so that the product can be refilled, maintaining and repairing durable products, developing more concentrated products and electric messaging (Vaughn 2009). Other methods include the development of packaging material that is made from sustainable resources, the design of push-top opening of metal beverage cans and the design of lids of beverage bottles or containers attached to bottles with a leash (Gold et al. 2013).

2.6 Lack of Research and surveys on Marine Litter

The marine litter research and studies are very limited in the SAS member countries. Lack of research is a significant impediment in the way of innovation and developing futuristic mitigation strategies and action plans. Most of

the research in the SAS region has been confined to the ecological and beach studies. There is therefore an urgent need to undertake marine litter and micro plastic research and survey of the marine environment components including land based solid waste, beaches/shoreline, sea surface, water column, sea floor, sea floor shallow, sea floor deep, ingestion by other marine organisms, entanglement rates of marine organisms, micro-plastic on shorelines, micro plastic at sea surface, ecological, and socio-economics.

India has done some research on marine litter circulation pattern in the Indian Ocean but other SAS member countries have so far not done such type of research on marine litter circulation to identify the marine litter circulation patterns.

No standard and uniform methodologies are followed in the SAS region for collecting, analyzing and interpreting the marine litter data. The available methods mismatch among countries and therefore this common problem of the SAS region could not effectively be tackled. Therefore, the SAS region failed to develop the required standard and uniform research methodologies for marine litter joint research studies. It is also strongly recommended to share data among the region and countries to avoid duplication and minimize cost for marine litter research.

2.7 Weak formulation and enforcement of regulatory framework.

Regulations formulation and enforcement strategies are basically aiming to streamline the development activities in relation to marine litter to mitigate the impacts of marine litter. The concerned agencies are required to prepare guidelines, regulations and enforcement plan to control the ways that marine litter is disposed. Methods of marine litter disposal that helps to minimize its adverse impact on the marine environment has to be adapted. These measures are largely command and control method to control marine litter.

One of the most important factors for regulation is a separate legal framework and institutions to prepare regulations and ensure its implementation. It is essential to employ qualified and trained enforcement team to understand different dimensions of marine litter. It is also essential to deploy adequate vessels and other equipment to facilitate the enforcement programs along with provision of adequate financial resources.

2.8 Lack of marine litter Production and Consumption Policy and Strategies

SAS region lacks proper marine litter production and consumption policies and strategies for regulating the marine litter in the member countries. Nor is there any formal forum to engage the producers and consumers of major marine litter products. This has created great deal of gaps between the regulators on the one hand of producers and consumers on the other hand.

2.9 Lack of Education and Awareness Program for Marine litter management

There is no dedicated education and awareness programme for marine litter in the SAS region. The education and awareness strategy is always crosscutting and same is true strategies for marine litter management. These strategies aim to encourage people to embrace the notion of waste as a resource and choose the products that generate low quantities of litter, dispose waste in a more environmentally sound and sustainable manner and regularly participate in beach cleanups. Well-designed, education and awareness activities can create the conditions necessary to implementing and adjusting policies for the sustainable management of coastal and marine litter.

A sound and balanced education and awareness program need to assign a main goal, priority topics/messages, target groups, educational

objectives and messages to be delivered. Therefore, it is essential to prepare well designed short, medium and long term education and awareness programme for SAS countries and region. Use of print and electronic media coupled with the use of smart communication technologies such as internet, social media and dedicated apps has to be developed as effective education and awareness tools.

According to the available reports and information many SAS countries have not prepared and developed any education and awareness program. Very few and scattered activities have been implemented that are targeting general public. It is also observed that all SAS countries are observing beach cleaning program annually but mostly such activities do not focus the real stakeholders/target group in public sector, civil society and private sector who are directly responsible for marine litter. There is no regular follow-up after the stand alone beach cleaning at institutional level.

Properly designed education and awareness program may lead to change of human behavior from the current throw-away culture into more accountable and responsible culture for marine litter disposal. The environmental education and awareness program need to focus on change of behavior of the stakeholders through changing their attitude toward the marine litter. Therefore, education and awareness program need to be designed very carefully identifying the correct target groups, correct messages to be delivered to the target groups, identifying effective communication tools such as print and electronic media, social media, internet seminars and workshop, discussion etc. It is therefore; strongly recommend to develop effective education and awareness need assessment in SAS member countries for preparing a comprehensive education and awareness program.

2.10 Lack of Marketing and Economic Instruments for marine litter management

SAS member countries lack marketing and economic tools and techniques for effective management of marine litter at production and consumption level. Private sector production, trade and consumption and businesses have never been involved for the marine litter management under market mechanism. Most of the developed countries are heavily using marketing and economic instruments to reduce plastics thereby reducing the marine litter. However, in the SAS region very few marketing and economic instruments are used to manage the plastics and marine litter. Reason may be the market failure in these countries or distorted market system that fails to properly reflect the marginal cost of the beach and marine pollution.

Under the market mechanism, direct tax can be introduced to the polluter as international environment law allows imposing laws for the polluter pay the price systems. Except few marketing instruments, most of SAS countries have not introduced any marketing instruments such as high tax for untreated landfilling which may incentivize recycling, recovery and reducing the risk of waste reaching the marine environment. Introduction of product tax for plastics bags, packaging, deposit refund schemes, direct investment in infrastructure such as rubbish bins and secure waste collections from beaches and high fees and fines for littering are the marketing and economic instruments that need to be introduced into the SAS member countries.

3. Way forward

In view of the information provided in the country action plans coupled with consultative workshops, the literature review and analysis of the gaps and challenges, the way forward of the marine litter action plan for the SAS region is given below:

3.1 Establishment and Revamping of the Institutional structure/system

Objective 3.1.1 Ensure that all SAS member countries have dedicated institutions for sustainable management of marine litter

Action-i: SAS member countries shall;

- 01) Review strengths and weaknesses of the existing institutional structure and improve their capacity for marine litter management.
- 02) Establish dedicated marine litter institution in countries lacking such institutions.

Action-ii: SAS member countries shall;

- 01) Review the existing marine litter policies, plans and strategies.
- 02) Develop marine litter policies, plans and strategies.
- 03) Enhance interagency cooperation among the relevant institutions for effective management of the marine litter.

Action-iii: SAS member countries shall

- 01) Review the annual or periodic marine litter management programme and plans
- 02) Develop periodic marine litter management programme and plans

Action-iv: SAS member countries shall

- 01) Review existing guidelines for governing the marine litter management
- 02) Formulate and implement guidelines for governing the marine litter management
- 03) Streamline coordination and information exchange among various agencies to identify interagency roles and responsibilities in relations to the marine litter management activities.

3.2 Establishment of new Legal frame work

Objective 3.2.1 Ensure that all SAS member countries have legal framework in place for sustainable management of marine litter

Action-i: SAS member countries shall;

- 01) Review the existing legal framework including their strengths and weakness for effective governance of the marine litter
- 02) Develop dedicated laws or Act to minimize the legal dispute for sustainable management of marine litter

Action-ii: SAS member countries shall;

- 01) Review the existing rules and regulation relating to marine litter
- 02) Develop rules and regulations for effective governance of marine litter
- 03) Develop guidelines for governance of marine litter
- 04) Prepare enforcement program for the governance of marine litter.
- 05) Undertake regular monitoring and evaluation of the marine litter management systems.

3.3 Review and Establish Regional Institutional Mechanism for enforcement of the marine litter related MEAS

Objective 3.3.1 Review the existing institutional mechanism for enforcement of the marine litter related MEAs

Actions-i: SAS member countries shall:

- 01) Review the existing MEAs enforcement mechanism and identify gaps for improvement.
- 02) Align national and sub-national laws and regulations to the existing marine litter related MEAs.
- 03) Identify and establish institutional mechanism for the enforcement of marine related MEAs

Objective 3.3.2 Improve coordination within and among agencies for effective enforcement of marine litter related MEAs

Actions-i: SAS member countries shall:

- 01) Review existing coordination mechanism for enforcement of marine litter related MEAs.
- 02) Improve the coordination mechanism to facilitate enforcement of marine litter related MEAs.
- 03) Develop a mechanism to Monitor and report the progress on marine litter MEAs to the secretariats of the respective MEAs.

3.4 Review and encourage direct development activities to control and minimize marine litter

Objective 3.4.1 Develop programs and plan for management of waste to reduce the marine litter at source.

Action i: SAS member countries shall;

- 01) Review the existing source reduction activities such as recycling, reuse, reduce, structures availability waste to energy, reception facilities, sanitary waste disposal facilities etc.
- 02) Encourage direct development structure and tools at the river mouths at points of entry into the sea.
- 03) Prepare plans to implement identified source reduction activities for short term, medium and long term interventions.

Objective 3.4.2 Develop a programs and plan for Product modification and improvement to reduce marine litter

Action ii: SAS member countries shall;

- 01) Review all existing plastics and polythene Production modification and improvement possibilities (e.g. through eco design)
- 02) Prepare plans to implement plastics and polythene production modification and improvement program.
- 03) Encourage public private partnership for product modification activities
- 04) Encourage waste segregation at primary, secondary and tertiary levels.
- 05) Promote and develop recycling enterprise for increased marine litter recycling on decentralized scale.

3.5 Lack of Research, surveys and innovation of Marine Litter technologies

Objective 3.5.1 Research and innovation shall be undertaken to determine the total quantity of marine litter coming into the coastal areas through all sources and to prepare guidelines for best management of marine litter.

Actions-i: SAS member countries shall:

- 01) Start research studies to review the amount of solid waste generation of all segments of the country and estimate by kind total quantity of marine litter that they have managed.
- 02) Develop and regularly update marine litter data base
- 03) Involve local bodies for preparation of solid waste management plan and programme by all local authorities and relevant other private and public agencies to effectively manage the marine litter on sustainable basis.
- 04) Identify various recycling and removal tools and techniques, and activities for sustainable management of marine litter
- 05) Assess the quantity of marine litter recycled and removed as percentage of the total production.

Actions-ii: SAS member countries shall:

- 01) Introduce training and techniques for marine litter data collection on scientific basis.
- 02) Identify marine litter hotspots and focus its management on priority basis.

3.6 Encourage and involve Private sector, Public sector and Civil Society through partnership arrangement for marine litter management and recycling.

Objective 3.6.1 Involve and encourage Private sector, Public sector and Civil Society involvement for marine litter management through partnership

Actions-i: SAS member countries shall:

- 01) Review the existing public-private sectors and civil society partnership arrangements for marine litter management.
- 02) Identify private sector, public sector and civil society stakeholders involved in the marine litter management.
- 03) Encourage and identify private sector, public sector and civil society partnership arrangement.
- 04) Review and assess the existing marine litter recycling activities, and propose and develop measure to increase the recycling and management capacity under market mechanism.
- 05) Assist local authorities in identifying landfill/recycling sites in environmentally less vulnerable locations outside the coastal areas.
- 06) Assist local authorities to relocate dumping sites out of the coastal areas.

3.7 Development of Education and Awareness Program to manage the Marine litter

Objective 3.7.1 Prepare country specific education and awareness programme on marine litter management

Action-i: SAS member countries shall

- 01) Review the existing education and awareness programme on Marine litter management
- 02) Prepare need assessment reports for education and awareness Program
- 03) Prepare the education and awareness programme on Marine litter management
- 04) Provide foundation and context for effective public participation in Marine litter management
- 05) Motivate people and organizations to find appropriate solutions to marine litter problems and propose actions
- 06) Encourage people to comply with marine litter management regulations
- 07) Implement programs to encourage local participation in marine litter management

Objective 3.7.2 Prepare regional education and awareness programme for SAS region

Actions-ii: SAS region shall

- 01) Review the existing marine litter education and awareness programs in the SAS region and assess its strengths and weakness
- 02) Prepare need assessment reports for SAS region education and awareness program
- 03) Develop regional marine litter education and awareness programme
- 04) Assign each country responsibilities to implement regional education and awareness program activities

3.8 Introduction of market and economic instruments for marine litter management

Objective 3.8.1 Introduce new economic and market instruments for influencing consumers to reduce amount of marine litter

Action i: SAS member countries shall:

- 01) Review effectiveness of existing economic and marketing base instruments for managing solid waste and marine litter in the SAS countries
- 02) Introduce some economic instruments such as financial disincentives (penalties, taxes and charges for plastics and polythene) to discourage market behavior that may contribute to reduce the marine litter.
- 03) Introduce financial incentive schemes for polythene and plastics (deposit-refund schemes, subsidies, and direct payments, price differentiation,) to stimulate behavior of customers on polythene and plastics.



Handing over of the Plastic bottle crusher machine with courtesy of SACEP to MEPA, Colombo, Sri Lanka.



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