Co-Chairs' Summary

Sixth Regional 3R Forum in Asia and the Pacific

(*3R as an Economic Industry – Next Generation 3R Solutions for a Resource Efficient Society and Sustainable Tourism Development in Asia and the Pacific*)

16 to 19 August 2015
Venue: Dharubaaruge, Malé, Maldives

I. Introduction

1. The Ministry of Environment and Energy (MEE) of the Government of Maldives, the Ministry of Tourism (MoT) of the Government of Maldives, the Ministry of the Environment (MoE) of the Government of Japan and the United Nations Centre for Regional Development (UNCRD) co-organized the Sixth Regional 3R Forum in Asia and the Pacific held from 16 to 19 August 2015 in Malé, the Republic of Maldives with the theme of "*3R as an Economic Industry – Next Generation 3R Solutions for a Resource Efficient Society and Sustainable Tourism Development in Asia and the Pacific"*. The Forum was supported by various international organizations and donor agencies, including the United Nations Environment Programme – International Resource Panel (IRP) and the International Environment Technology Center (IETC), the Environmental Protection Agency of the Ministry of Environment and Energy Maldives (EPA/MEE), the Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries (J-PRISM) / Japan International Cooperation Agency (JICA), the Institute for Global Environmental Strategies (IGES), Zero Waste South Australia, the South Asia Co-operative Environment Programme (SACEP) and the Secretariat of the Pacific Regional Environment Programme (SPREP).

2. The Forum was attended by more than 300 participants, comprising high-level government representatives and other stakeholders from thirty-one Asia-Pacific countries including Australia, Afghanistan, Bangladesh, Bhutan, Cambodia, the People's Republic of China (hereinafter, China), India, Indonesia, Japan, Kiribati, Republic of Korea (hereinafter, Korea), Lao PDR, Malaysia, Maldives, Mongolia, Myanmar, Niue, Nepal, Palau, the Philippines, the Russian Federation, Samoa, Singapore, the Solomon Islands, Sri Lanka, Thailand, Timor-Leste, Tonga, Tuvalu, Vanuatu, and Viet Nam, and from six countries in other regions (Africa, Europe, North America); Subsidiary Expert Group Members of the Regional 3R Forum in Asia; international resource persons; representatives from various United Nations and international organizations; scientific and research organizations; non-governmental organizations (NGOs); representatives from the private and business sector; and local observers and professionals on waste management from Maldives. As pre-event to the Forum "*Maldives National 3R Day ~ Our Environment-Our Economy, Our Future*"and "*Signing of Saafu Raajje Declaration by the City and Atoll Councils of the Maldives*" were organized by the Goverment of Maldives on 16 August 2015 in Malé with the participation of more than one hundred private tourist resorts of the Maldives. As an expression of

their commitment to progressively implement 3R and resource efficiency measures in their business operations, ninety-nine private resorts signed the "*Declaration on the Promotion of 3Rs and Resource Efficiency towards Protection of Local Environment and Marine Ecosystems*" with an objective to achieve sustainable tourism development and green economy in the Maldives (See Annex 1). During the opening session of the pre-event on 16 August, the Vice President of the Republic of Maldives His Excellency Ahmed Adeeb Abdul Ghafoor announced a prestigious award dedicated to the resorts of the Maldives in the name of National 3R Award starting from the year 2016. Further, the Minister of Environment and Energy, His Excellency Thoriq Ibrahim announced that the 16th of August would be celebrated as the National 3R Day starting in 2016 and made a commitment to ban non-biodegradable plastic bags through a phase-out plan.

3. Within the framework of the Maldives 3R Forum, few other side events were organized such as: 2015 Malé Workshop on Multilayer 3R Partnerships and Cooperation among Asia-Pacific Cities ~ Building on the Outcomes of 2014 Chiba Workshop towards Realizing Smart, Resilient, Inclusive, Low Carbon and Sustainable Cities and Communities, co-organized by the Japan Environmental Sanitation Centre and the Ministry of the Environment of Japan; and an NGO event ~ The Sixth Asia 3R Citizens Forum～Creating a Closed-Loop Community based on 3Rs practice in Asia and Pacific Islands, co-organized by Live & Learn Maldives and the Asia 3R Citizens Network and supported by the Japanese Ministry of the Environment. With the purpose of providing the Forum participants with the latest scientific findings on challenges, opportunities and policy options on resource management, recycling and remanufacturing, including knowledge on the potential of remanufacturing, the environmental benefits of recycling, and current recycling technologies and opportunities, UNEP International Resource Panel (IRP), MEE-Maldives, MoT-Maldives and UNCRD organized two special luncheon events on 17 and 18 August 2015. An International 3R Exhibition was also co-organized by MEE-Maldives, MoT-Maldives, MoE-Japan, and UNCRD with the participation of a number of private and business sector representatives to showcase and demonstrate state-of-the-art technical know-how and advancements in 3R and resource efficiency areas.

4. The Asia-Pacific region is experiencing the fastest rate of urbanization among all the regions of the world. The countries face tremendous challenges in managing their natural and ecological assets sustainably, and at the same time, dealing with a growing volume and diversification of various waste streams, mainly as a result of unsustainable production and consumption. As the Asian countries grow industrially and economically, new emerging waste streams such as industrial waste, electronic waste, plastics in coastal and marine environments, construction and demolition waste, hazardous waste and chemicals have become matters of serious concern for sustainability. These issues have reached a stage which is beyond the capacity of developing cities and municipalities to manage within the often limited means available to city governments. Many countries in the Asia-Pacific region have successfully integrated 3R and resource efficiency into their national development plans, including macroeconomic policies, however, much more effort is still required at city, provincial, regional and national levels to truly achieve a resource-efficient society in the region. The region needs to address an alternative model of growth that favours policies, programmes, institutions and technological interventions towards sustainable use of resources, thereby preventing unsustainable generation of waste that has to be ultimately managed. It is welcoming that resource efficiency is becoming an important driver for economic success in a world where resources are scarce and finite, and the Asia-Pacific countries

are expected to benefit from international experience.

5. Environment, tourism and economy are symbiotically linked to each other's success and sustainability. Tourism has contributed much to the economic development of many countries in the region and will continue to be an important driver of future growth in the region. In the case of many small island developing States (SIDS) and coastal cities of the region, the state of their environment, ocean ecosystems, tourism potential and business opportunities are closely tied to each other in mutually beneficial ways. Limited availability of land, resources and technology combined have become major drivers for waste management problems and related health and environmental degradation in SIDS. The hosting of the Sixth Regional 3R Forum in Asia and the Pacific by the Government of Maldives, a SIDS, has given an important signal about viewing the environment in the context of achieving social well-being and economic prosperity. It is clear from the message that any form of degradation in its environment and marine ecosystem would negatively affect its tourism sector, a major contributor to the economy of the Maldives. This is also applicable to many other countries, including other SIDS. Addressing 3R as an economic industry would help pave the way for integration of 3R and resource efficiency into key sectoral development policies in the post-2015 development era. In return, 3R and resource efficiency can stimulate innovation, partnerships, investment in research and development (R&D) and ultimately sustainable business and economic opportunities.

6. For this reason, the Sixth Regional 3R Forum in Asia and the Pacific not only aimed to discuss innovative, effective and smart solutions (policy, institutions, technology, infrastructure, financing and multi-stakeholder partnerships) towards effective implementation of the Ha Noi 3R Declaration (2013–2023), but also provided a unique opportunity to discuss various economic and employment opportunities in 3R areas, keeping in mind the diverse socioeconomic conditions across the region as well as the limitations of SIDS and the emerging development scenario under the post-2015 development agenda: *Transforming the World: The 2030 Agenda for Sustainable Development.*

II. Opening Ceremony

7. On behalf of the Government of Maldives, Mr. Ali Amir, Deputy Minister for Environment and Energy of Maldives welcomed the participants of the Sixth Regional 3R Forum in Asia and the Pacific. He also briefly introduced the history and objectives of the 3R Forum.

8. Recognizing the collaborative effort of the Government of Maldives, the Ministry of the Environment of Japan and the UNCRD, H. E. Mr. Thoriq Ibrahim, Minister for Environment and Energy of the Republic of Maldives explained that waste management was a critical issue that cannot be overlooked. It is an important aspect of the major crises facing humanity today. From climate change and ecosystem degradation to natural resource consumption, waste management is the common challenge. As a consequence, progress towards sustainable waste management can have significant benefits for the overall environment, development and the quality of life. This requires changes not only in how we manage waste, but also in patterns of consumption and production and overall lifestyle. This has been recognized by the Millennium Development Goals (MDGs), in the Rio+20 outcome document and in the post-2015 development agenda. Waste management and sustainable consumption and production form a key component of the new

sustainable development goals (SDGs). The theme of this year's 3R Forum follows this line of thought and builds on the outcomes of the previous years. It seeks to bring to the forefront the significant role that the 3R can play in the economy, particularly for tourism industries within the region. Over the years, the Regional 3R Forum in Asia-Pacific has been a critical platform to catalyse high-level political action, stakeholder engagement and regional cooperation, and has provided much-needed policy direction. There is a need to enhance this cooperation. There is a need to facilitate and build partnerships, not only bilateral and multilateral between countries, but also at the subnational level. The Maldives are currently in the process of revising their national solid waste management policy. It will integrate fundamental principles, such as waste hierarchy, proximity and extended producer responsibility (EPR), into the overall waste management approach. The Government has also initiated a campaign under the umbrella "Saafu Raaje" (Clean Maldives Initiative). This campaign is geared towards proper waste management and encouraging a significant reduction in waste generation. The Minister recognized the "Declaration on the Promotion of 3Rs and Resource Efficiency towards Protection of Local Environment and Marine Ecosystems" adopted by the ninety-nine resorts in Maldives at the National 3R Day as a pre-event of the Forum. He expressed hope that such a declaration would form the basis for a number of major activities to be undertaken at the island level across the country. He finally highlighted that although contributions from small island developing states to overall global greenhouse gas emissions were negligible, the small islands stood at the forefront of any changes to global climate change. Geographical limitation and environmental fragility, coupled with a limited resource base, has made the response to such changes highly challenging. The Maldives Climate Change Policy Framework launched earlier this month recognizes these challenges. Through this Policy, the Maldives are determined to achieve low-emission development. Sustainable waste management forms a key feature of this strategy and will enhance the overall mitigation efforts by the Maldives.

9. H.E. Mr. Yasuhiro Ozato, State Minister of the Environment of Japan, expressed his sincere appreciation to the Government of Maldives and UNCRD for co-organizing the Sixth Regional 3R Forum in Asia and the Pacific. He recognized successful collaboration with UNCRD in organizing six Regional 3R Forums in Asia and the Pacific, which had been expanding steadily. In relation to the theme of the Maldives 3R Forum – "*3R as an Economic Industry*" – Japan's waste disposal systems were noted, while Japan has been promoting bilateral cooperation including business feasibility studies and capacity-building in order to enhance its outstanding technologies and expertise for 3R promotion in the region. Mr. Ozato also highlighted the importance of publishing the State of the 3Rs in Asia and the Pacific on a regular basis, expressed Japan's support for it, and sought cooperation of UNCRD and member countries under the framework of the Regional 3R Forum in Asia-Pacific. The regular assessment will help member countries of the Forum to share and exchange the status of implementation of 3R policies and programmes in the context of Ha Noi 3R Declaration (2013–2023). He wished for the further advancement of the Regional 3R Forum in Asia and the Pacific towards achieving a resource-efficient society and a green economy in the region. Finally, he urged Asia-Pacific countries to implement 3R policies and programmes in order to attain the goals set in the Ha Noi 3R Declaration through multilayer partnerships as emphasized in the Surabaya 3R Declaration (2014), and to further champion the unique role of the Regional 3R Forum as an important venue for member countries and other stakeholders to share best practices and technical know-how, and to create tangible opportunities to strengthen international cooperation in 3R areas.

10. In her opening address, Ms. Chikako Takase, Director of the United Nations Centre for Regional Development, noted that it was fitting to hold this Forum in Maldives as the first Forum after the successful Third International Conference on Small Island Developing States (SIDS Conference) held in Samoa in September 2014, which adopted the S.A.M.O.A. Pathway. She explained that this Forum focuses on 3Rs as an economic industry, which would offer solutions for efficient management of resources and sustainable tourism development. She noted that making an economic case is a very effective way of promoting the 3Rs, and thus promoting the implementation of the Ha Noi 3R Declaration (2013–2023). She explained that tourism would be highlighted among the various industries as it is the key industry for many countries, in particular for SIDS. She noted the significance of the signing of "Declaration on the Promotion of 3Rs and Resource Efficiency towards Protection of Local Environment and Marine Ecosystems" by the 99 Resorts in Maldives during the National 3R Day that was held on the previous day, demonstrating the commitment of the industry toward sustainable tourism and protection of the environment. She also pointed out that the Forum would also focus on the water security and waste management nexus and the importance of marine and coastal ecosystems management, noting the threats caused by human activities, including plastic litter. She noted that an introductory discussion on the planned assessment of the implementation of Ha Noi 3R Declaration (2013–2023) would be produced as the State of the 3Rs in Asia and the Pacific. Praising the strong commitments demonstrated by the host country, including the "Saafu Raajje" (Clean Maldives) Initiative, she expressed her hope that the Forum would induce other countries and cities to introduce similar initiatives.

11. Ms. Shoko Noda, United Nations Resident Coordinator in Maldives, mentioned that the United Nations' comparative advantage of working both at national policy level and at community levels was vital to address waste management in the Maldives. UNDP's strong history of empowering civil society has been very evident in the area of waste management. Recent celebrations of both World Environment Day and International Youth Day had strong youth-led NGO participation. Both Project Damage Control and Save the Beach are grass roots-level movements that have, through regular "social action", raised awareness on environmental issues in the country. These are a good demonstration of how a small group of young people equipped with sheer willpower and resourcefulness can bring transformational changes beneficial to the whole community. Community-led initiatives such as the success story of Ukulhas becoming the first "systematically waste-managed" island showcases how partnerships with local councils can create innovative and sustainable results. At the same time, national-level policy interventions are required for sustainable solutions to a multi-sectoral issue such as waste management. UNDP supported the development of the waste management policy and a waste transportation guideline in the past for the Maldives. The Tourism Adaptation Project addresses waste management as a challenge as the tourism sector works towards becoming more resilient to climate change. In this regard, the signing of the "Malé 3R Declaration of Private Tourist Resorts towards Sustainable Tourism and Protection of Marine and Coastal Ecosystems" is a testament to the maturity of the Maldivian tourism sector and its dedication towards eco-friendly sustainable tourism. She urged for a combination of both community and national-level movement to bring about immediate results in the area of waste management.

12. Delivering the keynote address, H.E. Mr. Ahmed Adeeb Abdul Ghafoor, Vice President of the Republic of Maldives and recognizing the high-level representation from Members of the

Alliance of Small Island States (AOSIS) and the SAARC region, mentioned that resource efficiency was a matter of utmost importance to the Government of Maldives. Maldives aims to embark on an ambitious agenda to transform its economy to ensure a more resilient and prosperous future for its people. Sustainable use of resources is vital to achieve this goal, as Maldives relies heavily on its natural environment for economic growth. Tourism and fisheries form the major basis of the economy of Maldives. The natural beauty of coral reefs, their unmatched marine biodiversity combined with the turquoise crystal clear lagoons encircling coral islands, form a premium product sold to tourists. It is essential for Maldives to maintain this beauty. As such, this year's focus on sustainable tourism development as part of the theme of the Maldives 3R Forum is close to the hearts of Maldivians. Maldives has more sea than land, and marine ecosystems form the very essence of Maldivian culture and livelihoods. In this regard, he underscored the dynamic leadership and commitment shown by ninety-nine private resorts by adopting and signing the "Declaration on the Promotion of 3Rs and Resource Efficiency towards Protection of Local Environment and Marine Ecosystems". With a population of less than 400,000 scattered across 200 islands, attracting investment in the waste management sector has been very hard. To overcome this challenge, Maldives has recently developed a national policy on waste management based on internationally agreed principles. The Government has made special arrangements within the policy framework to create regional facilities rather than creating atoll-level systems. This is particularly important to make it economically feasible, environmentally sustainable and locally appropriate. In order to demonstrate leadership and an example to other small island developing states, Maldives assumed the Chairmanship of the Alliance of Small Island States (AOSIS) in 2015, a critical year for global sustainable development. In September 2015, United Nations member countries plan to meet in New York to agree on the post-2015 development agenda. In December 2015, Maldives will adopt a new agreement to tackle climate change. Maldives is proud to have taken on the leadership on behalf of small island states to ensure that concerns of small islands are addressed in these critical issues that will shape the future of SIDS. Finally, underscoring the importance of political commitment by the countries to integrate 3Rs and resource efficiency into their national development plans, he officially opened the Sixth Regional 3R Forum in Asia and the Pacific.

III. Evolving 3R Trends and Development in Asia and the Pacific and their role in the post-2015 development context

13. The Forum addressed the progress of 3R policy initiatives and implementation in Asia and the Pacific and assessed the extent to which economic opportunities that exist in the domain of resource efficiency and waste minimization have been realized in Asia and the Pacific member countries. Many countries in Asia and the Pacific are strengthening the integration of 3R policies and principles into their policy frameworks, including national economic development plans, sectoral policies for agriculture, energy, manufacturing, climate mitigation and procurement policies. The Forum discussed lessons learned from country experience in terms of levers and barriers to 3R implementation in institutions, policies, regulation, financial incentives, research and development and financing mechanisms.

14. The background paper presented by Dr Prasad Modak reflected on the evolution of the Regional 3R Forum in Asia-Pacific since the reception meeting in Tokyo in 2009 leading to the Ha Noi Declaration and Surabaya Declaration. Resource scarcity, land paucity, population rise,

loss of biodiversity, natural disasters, climate change and high dependence on fossil fuels are some of the global challenges we face today. Worldwide resource consumption and waste generation are rising and more steeply so in the Asia-Pacific region. Wastes are often dumped leading to significant impacts on human health and the ecosystems. Tourism is today a major contributor to the economy of SIDS. Waste, if not managed properly, can have a rebound effect on SIDS' economies as indiscriminate disposal of waste threatens the very ecosystems that attract the tourists in the first place. These impacts can be avoided if waste is perceived as a resource and 3Rs are integrated into sectoral development plans or policies. However, many countries in the Asia-Pacific region still rely only on end-of-pipe solutions to manage waste and do not address waste management issues in the context of resource management.

15. The Forum recognized the important role of 3Rs in many areas. 3Rs can help towards achieving green economy by conserving natural resources and reducing greenhouse gas emissions (GHGs). 3Rs can lower public expenditure on waste management infrastructure and operations. Importantly, 3Rs widen the nature of investment in the waste sector with investments flowing from disposal activities to upstream activities such as energy and material recovery. This leads to sustainable investments. 3Rs can also contribute to alleviation of poverty of those vulnerable, provide employment and promote entrepreneurship.

16. The Forum recognized that policy forums like the Regional 3R Forum in Asia-Pacific have an important role to play in sharing knowledge and experience. Over the past five Forums, a lot has been achieved in this direction by providing policy guidance to the countries in the region, encouraging action plans, fostering knowledge networking and promoting partnerships in 3R areas. There are, however, several challenges to be addressed and priority actions could include the following: (a) establish consistent or harmonious definition and classification of waste; (b) address immediate concerns of dumpsites in the region and take action to protect human health and ecosystems. Techniques like landfill mining and reclamation (LFMR) could be given more attention with innovative financial engineering, inviting private sector participation; (c) among the new waste streams, industrial and hazardous waste, e-waste, plastics and construction and demolition (C&D) waste form priority waste streams for the Asia-Pacific region, and there is a need to reduce generation of these waste streams at their sources through sustainable consumption and production (SCP); and (d) region-wide comparative analysis of waste management policies for a shared vision.

17. The Forum recognized the emergence of a number of waste processing technologies which could help with better implementation of 3Rs. In many countries, there is no independent technology assessment and guidance centre that can help urban local bodies in technology assessment. The Regional 3R Forum can play a catalytic role in promoting such technology assessment centres in the region. Decentralization of the Regional 3R Forum in the form of National 3R Forums in partnership with the national governments could be a future strategy.

18. The background paper presented by Dr. Schandl of CSIRO of Australia argued that the single largest problem of Asia and the Pacific was the question of how to accommodate more people, more production and more consumption while stabilizing resource use, waste and emissions. He stressed that, because of a changing economic context of reduced supply security for many natural resources (fossil fuels, metals, food, water, land), and fast increasing emissions

and waste, most economic opportunities will arise in the resource efficiency and waste minimization sectors, including 3R technologies, practices and infrastructure. It was acknowledged that the fundamental change required would not happen spontaneously but needed well-designed policies that encourage and guide businesses and households towards increased resource efficiency and low-waste, low-emission strategies. The background paper introduced the large potential for resource efficiency and waste minimization that exists in many economic sectors and the need for transformational policies including ecological budget and tax reform, carbon abatement strategies (cap and trade systems), and removal of subsidies that encourage increased usage of natural resources (such as those for gasoline) while compensating low income households.

19. Policy initiatives would include mainstreaming of 3R practices into national development plans and sectoral policies. This would be accompanied by transformational policy initiatives which may include, depending on the specific situation of each country, a price on primary resources and emissions, ends to subsidies on primary resources, and redirection of investment to resource-efficient low-carbon and waste strategies.

20. The Japanese Councillor for the Ministry of the Environment, Mr. Masahito Fukami, reported on the experience and success of the implementation of the Japanese high-level policy strategy for moving the Japanese economy and society towards a sound material-cycle society. The Japanese policy initiative was triggered by a lack of suitable landfill capacity and the need to reduce waste, and recognized that waste minimization profited from reduced overall material throughput. The policy initiative was implemented through a process of stakeholder participation, sound government policy and establishment of incentives, and underpinned by mature technology such as waste to energy. The Government of Japan has been providing financial incentives to local governments for waste treatment and incineration facilities. The Japanese example demonstrates the usefulness of indicators to monitor the effectiveness and efficiency of the policy initiative, which was based on the Japanese material flow accounts and indicators for material productivity, recycling rates and waste volumes. The Forum recognized that Japan had excelled on all three indicators.

21. The Permanent Secretary of the Ministry of Environment and Energy, Mr. Ajwad Musthafa, shared the experience from the Maldives with regard to the limitation of landfill sites in his country. To deal with the rising amount of waste the Maldives have embarked on a comprehensive waste management strategy which includes the establishment of regional waste management centres and community-based composting capacities for organic waste. Regional waste management centres and community-based initiatives for organic waste enable economies of scale in the waste sector. Bundling different utilities (including waste management, water provision and sewerage and electricity supply) under one central service provider helps optimize operation costs and service provision. This example from the Maldives could be implemented in other SIDS, which could benefit from the rich experience that was reported.

22. The representative of the International Labour Organization (ILO) reminded the Forum of the importance of employment opportunities and the need for fair pay and decent working conditions based on good health and safety standards in the workspace. The Forum noted the importance of the workforce having the necessary skills to implement 3R principles in workplaces. This will require training of new workers and retraining of existing workers in material- and waste-

intensive sectors of the economy including construction and housing, transport and mobility, agriculture and food, as well as energy and water provision. Large investments into training and education programmes and institutions will be required to enable a skills revolution to underpin the implementation of the objectives of the Ha Noi 3R Declaration (2013–2023).

23. The Forum recognized that the Regional 3R Forum in Asia and the Pacific was a unique initiative which did not exist in other regions. The traditional focus of the Regional 3R Forum on solid waste management has continuously been extended to accommodate emerging policy issues around sustainable resource management and resource efficiency. In this regard, the cooperation and partnership between the Regional 3R Forum and the International Resource Panel of the United Nations Environment Programme could be strengthened.

24. The Forum recognized various economic opportunities which could result from the implementation of 3R policies and programmes. The government sector and private households rely on well-designed policies that help facilitate innovation and enable investment in such economic activities that further the 3Rs, and in doing so help facilitate decoupling of economic activity from accelerating use of natural resources, emissions and waste. While certain policy frameworks exist now in most Asian and Pacific countries, it is important that a coordinating authority is established in countries to lead the implementation of 3R and resource efficiency measures and practices through mainstreaming into national and sectoral development policy initiatives. This would require effective coordination among relevant ministries and government agencies. At the same time, the Forum also recognized that implementation constraints still exist at regional and city levels.

25. The Forum noted a changing economic context, in which the risk of supply constraints of natural resources will be expressed in higher and more volatile prices for natural resources. At the same time the amount of waste disposal and emissions may also become more restricted because of overreaching the absorptive capacity of landfill sites and the global atmosphere. The changing economic context, on the other hand, presents a window of opportunity for the region. Economic opportunities exist in all sectors of the economy across many systems of provision and in many regional contexts. Creating wealth from waste will become a new business opportunity. The Forum acknowledged that primary resource use and waste and emissions are two sides of the same coin. Both aspects are addressed by the 3Rs, which aim to reduce primary resource inputs, reuse infrastructure and assets and recycle material from the waste stream.

IV. Enabling framework for 3R Science-Policy-Business Interface towards Smart, Resilient, Inclusive, Low Carbon and Sustainable Cities

26. The Forum acknowledged the critical role of cities, which are concentration points for economic activity – 75% of Asia-Pacific GDP is generated in cities – and offer large potential for investment into sustainable urban infrastructure for housing and transport. Cities are also centres of waste accumulation.

27. A background paper presenting enabling Frameworks for Promotion of 3R Science and Technologies and Technology Transfer was prepared by UNEP-IETC and presented by CRC

Mohanty of UNCRD. The background paper identified technology facilitation and adaptation as one of the key areas for the post-2015 development agenda and noted the importance of access by all countries to environmentally-sound technologies, new knowledge, know-how and expertise. In order for developing countries to make the best use of environmentally-sound technologies (ESTs), however, they must increase their ability to assess, analyse and choose technologies based on their own needs and development priorities, and then adapt these technologies to specific local conditions. The background paper flagged the need to establish a technology assessment (TA) framework to assess and evaluate environmental technologies to facilitate identification and selection of "best possible technology options" in 3R areas.

28. At the policy or government level, technology assessment can be applied for strategic decision-making, while at the operational level it can assess alternative technology systems. Better choice and better adaptation of technology will require South-South as well as North-South cooperation. Science-driven 3R policy framework is key to conservation and sound management of resources and ecological assets. At the same time, with scientific backup, 3R needs to be linked to other policy domains such as climate mitigation and adaptation, resilience, energy and water security, urban air pollution and supply security of critical natural resources, among others.

29. The Forum recognized that science and research could drive better policy options in 3R areas and visionary policies in return could drive better science and R&D in 3R areas, and when both science and policy are translated into concrete or practical actions and projects on the ground level with active participation of business community and civil society, it provides a complete package of solutions to many of the waste management issues the world is currently facing. The Regional 3R Forum in Asia-Pacific could provide a unique platform to drive science-based policymaking for sustainable waste management as well as material and natural resource management.

30. As a concrete case of science-policy-business dynamics, two success stories of urban level implementation of the 3Rs in Kitakyushu and Kawasaki were presented. Both cities have introduced the concept of eco-town, and adapted the principle of sound material-cycle society at the city level. It was reported that during the early days of industrialization and urban development Kitakyushu faced very high pollution levels, which were eventually overcome through cooperation among residents, local government and the private sector. Today, Kitakyushu has achieved environmentally sustainable growth and a smart community, for example, through the Kitakyushu Asian Centre for Low Carbon Society and Hibiki Biotope projects. These various projects employ an approach to natural resource use best characterized as industrial symbiosis, and enabled through cooperation among various stakeholders. Kawasaki city, the other example provided, has introduced unique and successful efforts on pollution prevention and 3R. Introduction of the new laws and agreements with industries helped in solving diverse pollution problems. In addition, unique efforts on 3R through diverse awareness-raising activities and eco-town projects aiming at resource circulation in industrial areas have significantly contributed to environmentally sustainable growth and the reputation of Kawasaki City as an ecologically-sound and resource-efficient city. There has been a significant reduction in wastes and increased use of recyclables. The total amount discharged of wastes has decreased despite increasing population. Both examples demonstrate the profound positive effects 3R activities can have in a sustainable urban development context and show their applicability for cities in transition.

31. The Director-General of Environmental Protection, National Environment Agency of Singapore, Mr. Koh Kim Hock, shared the experience of Singapore, a country with limited natural resources. The challenges that Singapore faces have driven the country to develop effective resource-efficient policies and measures. At the macro level, the Singapore Sustainable Blueprint 2015 provides a road map to realize the vision of a liveable and endearing home, a vibrant and sustainable city, and an active and gracious community. Important improvements have been introduced in waste management, enabled through ambitious policies and adoption of advanced technologies. These include projects for waste to energy, waste collection, the introduction of mandatory waste reporting for large hotels and malls, and the establishment of a Multi-Storey Recycling Facility. An Integrated Waste Management Facility will help to realize the waste-water-energy nexus for maximum efficiency.

32. It was reported that UNCRD assisted Bangladesh in developing its National 3R Strategy, which has become an essential instrument for the implementation of integrated waste management practices in the country. Many economies in South Asia lack waste segregation capacity, a problem exacerbated by population increase, which results in increasing amounts of waste that are badly managed. Mixed waste makes it harder to capture the potential value of raw materials through recycling. In partnership with UNESCAP, a waste-to-resource model has been introduced in Bangladesh which includes composting, bio-digestion, refuse-derived fuel, co-composting and bio-diesel production. The globally recognized clean development mechanism (CDM) composting project has been operational in Bangladesh since 2008, earning certified carbon credits under the UNFCCC mechanism. The activities ultimately enabled improved informal sector working conditions in Bangladesh and have been replicated in different regions. An equity fund was established to fund waste management and waste reduction projects in Bangladesh and these were linked with carbon trading, often in public–private–community partnerships and were mainstreamed into a national action plan and the economic development plan. It was stressed that the successful implementation of the 3Rs relies on political will, simple and replicable processes, access to resources (land and materials), well-set incentives, appropriate accounting, research and development and capacity-building.

33. The Forum took note of the achievements shared by Mr. Jagdeep Singh Deo, State Executive Councillor for Town and Country Planning and Housing for the city state of Penang, Malaysia, an island state, "Cleaner Greener Safer and Healthier Penang". The programme involved green architecture with a focus on resource efficiency and energy conservation which responded to the local climate situation in Penang. Achievements made relied on the cooperation between the development industry and the city planning department. The island state of Penang also successfully implemented a no free plastic bag campaign, which saw a drastic reduction in the use of plastic bags (from 22 million in 2009 to 1.9 million in 2013), although it rejected a use of non-biodegradable plastics initiative due to its uncertain effectiveness.

V. Harnessing Economic Opportunities through 3Rs – A Win-Win Strategy for Asia-Pacific Countries

34. The five round-table dialogues of the Forum recognized a number of 3R related economic opportunities in sustainable urban practices. It was recognized that in Asia and the Pacific, a region

that has become a net importer of raw materials and natural resources, there is a need to explore business opportunities based on 3R principles to further sustainable urban development. Cities and industries need to move from a linear or "one way" economy to a resource-efficient and even closed-loop or "circular" economy. Economic opportunities may exist, among others, in green chemistry and nanotechnology, sustainable transportation, energy and water efficiency, sustainable farming, bio-economy, green buildings and wastewater reuse for urban green spaces and urban agriculture. Public private partnerships were identified as critical for realizing business opportunities, as the success of cities and businesses are closely linked. They also critically depend on macroeconomic and development policy settings such as, for instance, a circular economy policy. It was discussed that economic benefits can take various forms and may include savings in waste disposal costs, revenue from the use of previously wasted materials, saving foreign currency by reducing imports of materials, job and livelihood creation, and even carbon credits in the case of utilizing the clean development mechanism (CDM).

35. The round-table dialogues acknowledged that cities offer perfect conditions for reuse and recycling as waste flows appear in high magnitudes and are concentrated in a small area, facilitating easy collection. For example, plastics that are entering into recycling can be used for new plastic material products, but it was recognized that after the first few iterations of recycling, it will become more difficult to recycle waste plastic into new plastic due to the accumulation of additives such as flame retardants, stabilizers and so forth. In these cases, the waste plastic can be used for the production of chemicals and as a fuel, for instance in steel production. The energy content of plastics is relatively high in comparison to coal or wood, but has a lower carbon footprint, and plastics recycling plants are evenly dispersed, hence close to fuel demand. Waste plastics can also be used to produce chemicals such as caustic soda.

36. Metals are known for their recyclability, but there are limits to the recycling of metals due to the way they are used in products and a lack of collection systems. Policies must therefore be based on engineering knowledge to be realistic. Recycling rates of bulk metals used in simple applications such as steel beams are high, but rates for metals in complex products like e-waste are extremely low and it is much harder to increase them substantially. Therefore, opportunities to improve recycling depend upon designing recycling systems that are product-centric. Sustainability assessment of technologies and systems can provide information for designers and consumers on the recyclability of particular products through a recycling "index". For example, incandescent lamps are more energy intensive but more recyclable than LEDs, which are energy-efficient in the use phase but components are not easily recyclable. Looking at metal recycling as a whole system rather than focusing on materials will open up opportunities to improve design, collection and technology systems to optimize recycling. Best practice metal recycling can take advantage of globalization so each step can be done where local conditions are ideal – dismantling in well governed countries with low labour prices but high labour protection; smelting in countries that can afford to invest in specialized smelting technology and have available low-carbon energy sources.

37. A number of countries in the region have implemented good 3R policies and programmes targeting urban waste. For instance, Korea has been actively managing municipal solid waste (MSW) since the Rio Summit in 1992 and has progressively reduced the fraction of waste for landfilling from 96% to 16% in less than three decades. The key policies that led to this success

include a volume-based charging system, where households purchase bags for waste disposal according to volume. Secondly, a comprehensive waste-to-energy policy was launched in 2008, to reach a target of 70% of renewable energy from waste and biomass. Businesses involved in 3R implementation reported large increases in employment, sales, investment and exports. The upcoming resource circulation policy of Korea aims at zero waste to landfill by 2030 through systematic action along the supply chain. Many countries and sectors are already pursuing smart, resource-efficient, resilient and inclusive urban development paths. Involving the private sector in this process though multi-stakeholder partnerships has shown to result in shared benefits for both public and private actors.

38. The Forum recognized various economic opportunities in construction and demolition waste. The construction industry contributes very significantly to economies, especially developing ones, and application of 3R concepts could go a long way towards reducing the environmental impact of construction activity. Construction and demolition (C&D) waste constitutes a large percentage of total waste generated, and has a diverse composition including materials such as metals, glass, concrete, bricks, asphalt, carpets, furniture, etc. In principle, the problem may be looked in terms of value and volume components in the C&D waste. In the absence of clear policies and procedures, etc. for handling such waste, valued materials, such as steel, are sometimes removed from the waste. The challenge is in handling the volume component, which is often dumped by unscrupulous operators in an unauthorized manner.

39. In new construction, steps such as the use of prefabrication and on-site waste management could contribute to reducing amounts of waste generated at site. Through proper planning and appropriate technologies, considerable portions of the materials, which otherwise would be drawn from natural sources, can be replaced by products from C&D waste.

40. The round-table dialogue recognized a number of needs for the region such as: (a) collection of accurate, relevant data in different countries; (b) best practices in different countries, regions, etc. be shared; (c) development of appropriate protocols for inspection and planning of demolition, handling and disposal of the C&D waste generated; (d) regional collaboration in terms of sharing of resources such as construction materials, and handling of C&D waste; and (e) developing model documents addressing technical, commercial and regulatory issues relating to different aspects of C&D waste handling.

41. The round-table dialogue also brought out a number of issues for the attention of the Forum, such as: (a) natural disasters leading to unplanned creation of large amounts of C&D waste, whose handling needs to be done perhaps as a part of a disaster management plan; (b) presence of hazardous materials in C&D waste and examples of asbestos, etc., especially in the dismantling of old buildings; (c) handling and disposal of extraction waste – soil, marine clay, etc.

42. The round-table dialogue highlighted that the economic potential of the biomass economy was 17 trillion US dollars globally. The monetary value of biomass, as well as GHG reduction potential, could drive investment opportunities in many countries in the region. To overcome challenges for effective biomass utilization, such as competition with other resources or uses, lack of technology for certain countries, limited policy incentives and logistics for effective utilization, government incentives are key. The case of Malaysia, for instance, emphasized the availability of

various biomass utilization technologies, including efficient gasification technologies. Biomass utilization technology should be encouraged as a part of socioeconomic development policies and programmes which could create better environments for private investment. The Japanese case introduced several available technologies for biomass utilization for energy recovery including biomass boilers, sludge digestion, food waste digestion and mixed organic waste treatment for generating electricity from biogas and cement from digested sludge. The Thailand case showed existing policy support mechanisms for biomass energy recovery including a national plan, investment facilitation for renewables such as BOI and FIT, data support and ESCO funds. Stable biomass supply is key and should be supported through policy incentives as well as through proper zoning and logistics.

43. The agriculture sector contributes between 0.7% and 30% of total GDP for Asia-Pacific countries. There is a huge potential from agricultural and biomass waste resources available in the Asia-Pacific region. Rice, wheat, coconut, sugar cane, bananas, cattle, maize and livestock are the major agricultural commodities in the Asia-Pacific region. These provide potential biomass for economic utilization with suitable technology. Based on a 2013 estimate, Asia-Pacific countries generated 673,694,540 tonnes of agriculture biomass waste only from the one major agriculture commodity. Some studies say that there was an estimated potential of 153 million tonnes of briquettes (worth USD 23,000 million) from the Asia-Pacific region in 2013.

44. The Forum recognized that imported technologies are often not suitable for local biomass feedstock. It was pointed out that no single technology could provide a single solution for effective and efficient utilization of biomass. Experience shows that projects for technology introduction without adaptation to local conditions, reflection of local and national interests, or proper development of human capital to handle them often fail. The countries needs to recognize social, economic and environmental benefits from circular economic biomass utilization.

45. The round-table dialogue recognized a number of 3R-related economic opportunities in waste electrical and electronic equipment (WEEE). It was reported that globally 41.8 million tonnes (Mt) of e-waste were generated in 2014. E-waste is estimated to reach 50 Mt by 2018, with a growth rate of up to 5 per cent per year. The Asian region produced the highest amount of e-waste (16 Mt or 38% of the total), followed by the Americas (11.7 Mt) and Europe (11.6 Mt) in 2014. The top three Asia-Pacific countries with the highest e-waste generation in absolute quantities are PR China (6 Mt), Japan (2.2 Mt) and India (1.7 Mt).

46. E-waste is not only a problem but also a business and economic opportunity. E-waste can provide an alternative source of raw materials for the manufacturing industry, thus reducing the need for extraction of natural resources and at the same time reducing associated environmental impacts.

47. Most Asia-Pacific countries face major barriers/challenges (policy, institution, technology) to resource recovery and recycling from e-waste. Lack of funds and investment to finance formal environmentally-sound recycling infrastructure, absence of appropriate legislation to deal with the issue, tackling the informal e-waste recycling sector and achieving appropriate technology transfer are some of the challenges faced by these countries.

48. There is an urgent need for Asia-Pacific countries to develop innovative business models to incorporate the widespread informal e-waste recycling sector into the formal e-waste recycling sector to combine each other's strengths to achieve environmentally-sound e-waste management. Informal e-waste recycling sectors in developing countries, if combined with original equipment manufacturers (OEMs) of EEE through their formal e-waste recycling facilities, can result in increased collection and resource recovery of e-waste generated.

49. In most Asia-Pacific countries, there is a lack of reliable data on generation, collection, import and export and management schemes in general. Proper inventory will attract investors in the e-waste recycling industry as they can clearly evaluate the resource recovery potential of valuable materials contained in e-waste.

50. Effective collaboration between the private and public sectors is seen as a key contributor to achieving the overall objectives of e-waste management. The ESM of e-waste cannot be achieved by the public sector alone. However, these partnerships will only materialize if enabling conditions are met for both parties.

51. Success of technology transfer to countries with dominant and successful informal e-waste recycling sectors will depend on innovative models whereby the informal sectors are still allowed to participate in safe recycling practices while hazardous operations are transferred to state-of-the-art formal recyclers. Such models would require giving high priority to further improvement of collection and pre-processing by the informal sector through technology transfer to benefit state-of-the-art formal recycling operations towards the end of the recycling chain.

52. EPR is considered globally as one of the most powerful policy mechanisms in dealing with the e-waste problem. However, Asia-Pacific countries should design their EPR schemes based upon their own conditions and capacity to implement such schemes. Asia-Pacific countries also need to develop national e-waste management strategies based on 3R concepts. Such strategies should address not only the environmental and health impacts of e-waste (end-of-pipe) but also look at the reduction of e-waste through green design (up-the-pipe). They should also create enabling conditions for relevant stakeholders to develop business and economic opportunities to recover materials from e-waste. Such strategies should take into account the financial, institutional, political and social aspects of e-waste management, including due consideration to the activities of the vast informal sector in the region.

53. Businesses and cities are closely tied to each other for their own success and sustainability. Uncertain impacts of climate change, increasing vulnerabilities in urban environments, and increasing frequency and magnitude of natural disasters might hamper businesses opportunities in cities. A city which is not resilient might reduce investment willingness from the private sector, and pose further hindrances on urban financing and development, such as maintaining tax bases and building urban infrastructure. Sustainable urban practices can lead to highly profitable business opportunities if local governments or urban local bodies create enabling policies, institutions, partnerships and investment regimes to expand markets for environmental goods (equipment, technologies, eco-products, green energy, etc.) and services.

54. The Forum acknowledged a number of areas for proliferation of sustainable business opportunities in 3R areas. For example (a) 3R as an economic industry offers competitive solutions to many urban environmental issues, provided 3Rs and resource efficiency are integrated into macroeconomic development policies (e.g. the circular economic policy of China); (b) eco-towns, eco-industrial parks and industrial symbiosis could significantly contribute to regional development as has been demonstrated by Japanese cities such as Kawasaki, Kitakyushu, and others; (c) city governments and urban local bodies should recognize and publicize the excellent performance of private companies that carry out environmentally-sound operations; (d) R&D-oriented industrial structure and environmental efforts by companies are critical to fostering sustainable urban businesses; and (e) consumers' awareness (green consumerism) is a critical driver of sustainable urban practices and related green business opportunities.

VI. Contribution of 3R and Resource Efficiency towards Sustainable Tourism Developments in SIDS

55. The Forum recognized the important nexus between the environment, marine ecosystem protection and the tourism industry. Sustainable tourism development and marine ecosystems complement each other, while 3R initiatives provide possible business opportunities. SIDS need to consider four important factors in capturing opportunities such as the preventative principle, efficiency strategies, knowledge management and indigenous innovation capability. SIDS also need to explore 3R opportunities evolving from the conventional integrated waste management approach to a more dynamic and holistic life cycle thinking of resource (material and human) management approach. These approaches will generate ideas for scale-appropriate technology and technique, life cycle thinking-oriented and resilience-oriented action plans (collective bargaining of EPR), value chain product and services, avoiding unnecessary resource consumption (reduce), and others.

56. The Forum took note of the serious threat posed by micro-plastics (size < 5 mm) in coastal and marine environments. Plastic waste also has a high impact on sustainable tourism development. More than 200 species of marine life are known to have ingested plastic debris, including birds, fishes and turtles. Reduction of inputs of single-use plastic from the land should be an important step followed by a paradigm shift from disposability to reusability. Sustainable tourism development contributes significant inputs to economies, especially in SIDS, and application of 3R concepts in reducing plastic pollution and promoting sustainable tourism development is crucial.

57. The presentation delivered by the Ministry of Tourism of Maldives reported that the tourism industry has developed as a supply-driven industry led by the private sector. Maldives has well-developed resort infrastructure, with the concept of "one island one resort", and maintains a high occupancy rate. Recent years have also witnessed expansion of the tourism industry from tourist resort islands to developed guesthouses. Tourist growth has remained at 11.8% over the past five years. Major markets in 2014 are China, followed by the European economies, i.e. UK, Germany, Russia, Italy and France. Environment, tourism and the economy are intricately linked in Maldives. Tourism generates tax revenue, jobs and trade. Tourism is dependent on good environmental condition. Hence, tourism law in the Maldives includes regulations on the protection and conservation of the environment by the tourism industry. Hotels have to comply with strict facilities and capacity requirements to safeguard environmental health.

58. The video message by Mr. Taleb D. Rifai, Secretary-General, United Nations World Tourism Organization (UNWTO) introduced a number of model management cases of ecologically sustainable tourism development in the world. He highlighted that Asia had magnificent nature destinations for tourism, and sustainable tourism can significantly contribute to three pillars of sustainable development. UNWTO is also committed and dedicated to promoting sustainable consumption and production (SCP) practices in the tourism sector. Decoupling of economic gain and environmental degradation could result in enormous economic opportunities in sustainable tourism development.

59. The Secretariat of the Pacific Regional Environment Programme (SPREP) is a 26 member country intergovernmental organization, promoting cooperation and providing assistance in environmental protection and improvement in the Pacific islands region. Many of its member nations are constrained in their economic activities due to geographical isolation – remoteness makes them highly dependent on imported goods – and use a lot of goods with non-biodegradable packaging. Fishing, agriculture and tourism remain the drivers of economic growth in the Pacific. Wastes and pollution are grave threats, as small islands and atolls are inappropriate for landfills. Marine debris poses severe threats to ecosystems and aquatic resources.

60. The Forum took note of 3R initiatives by various Pacific Island Countries (PIC) and the benefits of 3R, such as provisioning services, regulating services and cultural services. However, there is a need to conduct further cost-benefit assessment and to quantify net benefits of 3R contributions towards the tourism industry. There is also a need for innovative and indigenous solutions to meet tourism industry demand.

61. The case of Mauritius on management of plastic wastes serves as a good example for SIDS in the Asia-Pacific region. Mauritius has been paying high priority to MSW management, which is guided by national policies, strategies and programmes. There is also strong management, control and supervision of transfer stations and sanitary landfill sites in Mauritius. About 416,000 tons of MSW was landfilled in 2014 and this figure is expected to reduce as composting and other 3R initiatives take shape. Recognizing the impact of plastic waste to society and the environment, Mauritius initiated a PET bottle recycling programme in 2001, which is still running successfully. Regulatory policies, such as clean-up campaigns prior to cyclonic and summer seasons, have added strength to the implementation of various 3R programmes. Mauritius will introduce new legislation banning certain plastics in 2016 and is expected also to convert existing transfer stations into Material Recovery Facilities.

62. For the benefit of SIDS, the panel member from Thailand shared an important lesson learned in the promotion of 3R and green industry. While the Thai Government is proactively promoting, educating and providing technical assistance to industry, the industries seem to be more reactive and responsive to various award schemes. Motivated by recognition schemes, the industries voluntarily practised greening the industry operations. To this regard, market behaviour could be an important element to assess in order to carry out government initiatives.

63. The panel member from Asia 3R Citizens Network, a NGO, shared the Japanese experiences of a recycling system of scrap compost and a fish farming fee programme at local

level, which have created significant business opportunities, ensuring self-sufficiency and minimal environmental impact at local level. Non-products were composted and used locally by the farmers. Iseshima Food Recycle Research Group was responsible for advising on appropriate technologies and techniques to deal with indigenous resources (and wastes) so that full value could be extracted or cascaded by another user group, e.g. fish farming. Another example given involved biofuel production, which was used as a replacement for virgin diesel oil as well as for waste-to-heat conversion for consumer use. The Japanese regional self-sufficiency initiatives serve as good examples for SIDS for effective management of resources at local level.

64. The round-table dialogue recognized the need to attune 3R initiatives to the underlying goals and aspirations in the *S.A.M.O.A Pathway* with a view to helping countries attain sustainable development. Through the Japanese Technical Cooperation Project for Promotion of Regional Initiatives in Solid Waste Management (J-PRISM) in selected Pacific Island countries, local experts are developed through training and involvement as project counterparts. The aim is to promote the South-South/triangular cooperation within these countries and sustain the knowledge base on solid waste management within the region. A Solid Waste Management Guidebook written by local experts is currently being developed. The Secretariat of the Pacific Regional Environment Programme (SPREP) undertakes similar capacity-building initiatives with the intent of developing accredited courses in solid waste management involving universities within the region. In order to sustain these initiatives and progress waste management and pollution control in the region, a 10-Year Strategy was developed that will direct 21 countries in their common pursuit of a Cleaner Pacific by 2025. A Cleaner Pacific Roundtable is being proposed to enhance sharing of information, address common waste and pollution issues and monitor progress of the strategy. The neighbouring small island regions outside of the Pacific have expressed interest in the information exchanges and willingness to participate in the round table.

65. The Forum underscored the importance of addressing the objectives underlined in the "*S.A.M.O.A. Pathway*," the outcome document of the Third International Conference on Small Island Developing States, held on 1 to 4 September 2014, in Apia, Samoa, and recognized that sustainable tourism represented an important driver of sustainable economic growth and decent job creation. Ms. Frances Reupena, Environment Sector Coordinator, Ministry of National Resources and Environment, Samoa, presented on the agreed priority areas articulated in the *S.A.M.O.A Pathway* and highlighted key priorities that would contribute to the achievement of the 3Rs in particular. Mapping out the *S.A.M.O.A Pathway* against the SDGs and the Regional Frameworks was noted as an important initiative that is well under way with the assistance of the UNEP. Ms. Reupena also noted the following requirements: (a) The *S.A.M.O.A Pathway* to be mapped against the Post-2015 Development Agenda to be adopted in September 2015; (b) SIDS priorities should be recognized and considered in the elaboration of the Post-2015 Development Agenda; (c) stronger inter-linkages of sustainable development dimensions in national planning, legislative and institutional frameworks; (d) more coordinated, strategic and inclusive platforms to facilitate implementation, monitoring and evaluation of the *S.A.M.O.A Pathway* (SDGs) at the national, subregional and regional levels; (e) targeted capacity-building programme to facilitate the implementation of the *S.A.M.O.A Pathway*; (f) ownership of the *S.A.M.O.A Pathway* as the blueprint for the SIDS Sustainable Development Agenda; (g) scaled-up climate finance – need to ensure SIDS are adequately prepared to apply for, and make effective use of such resources; and (h) call on development partners to consider assistance with adapting the green economy approach,

sustainable consumption and production and other new modalities into models that are suitable for SIDS, in particular in the Pacific context, to address gaps in sustainable consumption and production patterns in the *S.A.M.O.A Pathway*.

66. The representative of the Ministry of Environment and Energy of the Government of Maldives made an introduction on the outcome of the National 3R Day, including the signing of the "*Declaration on the Promotion of 3Rs and Resource Efficiency towards Protection of Local Environment and Marine Ecosystems*" by ninety-nine private resorts as their commitment to progressively implement 3R and resource efficiency measures in their business operations.

VII. Major Achievements and Initiatives by Countries on the Implementation of Ha Noi 3R Declaration (2013–2023)

67. The Forum noted various achievements and initiatives by countries on the implementation of the Goals of the Ha Noi 3R Declaration (2013–2023). The Forum acknowledged that implementation of such goals will require: (a) systematic integration of 3Rs and resource efficiency into national development plans, including sectoral development plans – urban development, industry, transport, agriculture, water resources, public health and sanitation, among others; (b) science-based policy mechanisms; (c) new innovative partnerships between government, scientific and research organizations, private and business sector, and communities; (d) linking 3R policies to critical domains such as climate mitigation and adaptation, resiliency, energy and water security, and supply security of natural resources.

68. Afghanistan: 3R policy is still very basic and scattered. Current focus of waste management in Afghanistan is "reduction", such as an awareness campaign to reduce plastic bag usage, rather than recycling and reuse. Afghanistan recently developed policy for waste management and is planning to move to the implementation stage. Largely informal economy makes it difficult to make waste-related activities effectively controlled by the government. Due to major ongoing reconstruction activities, there is a huge interest in reuse of waste construction materials.

69. Australia: In Australia, waste management is the responsibility of state and territory governments, supported by national legislation. The Australian Government introduced the National Waste Policy: Less Waste More Resources in 2009 which foresees prevention of waste as a priority. To ensure proper management of packaging waste, the Australian Government introduced the Australian Packaging Covenant. There are a number of additional initiatives, such as Waste Less Recycle More, Love Food Hate Waste, which are run by states and territories and involve programmes to reduce waste and promote recycling of waste. 44% of organic waste in NSW was recycled in 2010–2011. The Resource Recovery Facility Expansion and Enhancement Program aims to increase recycling of household and business waste. There is additional regulation to protect the marine environment and require EPR. A major challenge for the Australian Government and waste professionals is the lack of information on the potential of waste as a resource and source of wealth generation, and on the classification of waste. Australia needs coherent policy to manage waste and resources across states, and strategies to avoid the generation of hazardous waste.

70. Bangladesh: Has implemented a number of projects related to 3R. Programmatic CDM using organic wastes of urban centres (Phourashava/Municipalities) throughout Bangladesh (in 64 districts) and implementation of 3Rs (Reduce, Reuse and Recycling) Pilot Initiative in Dhaka and Chittagong cities to reduce greenhouse gas emissions are selected examples. The 3R initiative has also been integrated into the national development plan of the country, particularly into the country's Seventh Five Year Plan (2015–2020). Challenges include the following: policy needs to be harmonized with other relevant policies to attract investments in 3R in the waste sector; interministerial coordination required to facilitate 3R related initiatives and Public Private Partnerships (PPP); lack of capacity of officials and staff to understand, monitor, review and document 3R-related projects; lack of technological know-how to promote effective 3R initiatives; lack of financial resources to promote and manage 3R-related initiatives; and opportunities for climate finance from developed countries lacking.

71. Bhutan: The achievements include policy interventions (5 sets) facilitating 3R initiatives. It has also introduced green tax and community initiatives in 3R. The critical challenges include weak enforcement, limited resources, infrastructure and weak coordination among institutions. Public participation is inadequate and there is a need for market-based policies to encourage 3R initiatives. Bhutan will amend its waste prevention and management regulation and pilot Zero Waste project and call for privatization. Awareness and outreach programmes play a critical role in 3R initiatives.

72. Cambodia: Has developed several pieces of legislation, policies and guidelines on waste management, eliminated all plastic bags flying in the streets, introduced a contest to encourage a clean and green city, and started decentralizing funding of waste management from national to local levels to implement pilot projects. Integrated Solid Waste Management (ISWM) is a key approach for reducing waste generation through the 3Rs, responsibility of whole society based on PPP. Cambodia has set several quantitative targets for waste management towards 2030. Cambodia has also developed a Green Industry Award. Cambodia has started to realize that the current waste collection system is not suitable for increasing and changing waste types and the country has increasingly limited land available for waste disposal.

73. PR China: (a) The "Twelfth-Five Year" planning objectives on MSW management have been fulfilled ahead of schedule. The proportion of safe disposal of MSW reached 91.8%. The treatment ability and operation level of safe disposal facilities has been greatly improved. (b) This year a MSW separation pilot was launched, continue to promote waste source reduction, reuse and recycling. (c) A food waste recycling pilot started in 2010. d) Promotion of construction and demolition waste recycling has also begun in recent years. e) Improvement of the full-calibre MSW management system.

74. Indonesia: Has implemented 3R in MSW in number of projects. Since 2012 a recycling waste bank business unit has been established. Also, in more than 10 cities landfill gas capture and utilization has been implemented. Green industry award established for 3Rs in industrial sector. Challenges faced by Indonesia include the following: MSW not in mainstream policy at national and local levels, lack of law enforcement, lack of capacity (both human and institutional), and lack of political commitment and will in some local governments.

75. Japan: Japan has demonstrated the establishment of a sound material-cycle society by monitoring indicators of resource productivity, recycling rates and final disposal amounts, for example. Recently, Japan has focused more on 2Rs – Reduce and Reuse. Japan also offered to share lessons on disaster waste management learned from the Great East Japan Earthquake in March 2011. Japan raised the following points regarding 3R guidelines for the country progress report: 1) Need for more clarification on the definition of terms such as e-waste; and 2) Need to improve the questionnaire style to make it more systematic, consistent, efficient and rigorous for better data collection.

76. Kiribati: Has implemented a number of projects related to 3R. Key projects include Container Deposit Scheme (CDL) and e-waste collection. Challenges faced include a lack of information on environmentally friendly products, lack of data, and importation of second-hand goods.

77. Republic of Korea: For its Reduce policy, the Republic of Korea has implemented a volume-based fee system, waste charge system, and industrial waste reduction programme since the mid-1990s. For Reuse system, a deposit-refund system for containers of soft drinks and alcohol, and an online exchange market for recyclable resources are in place. For Recycling system, EPR system for five products and four packaging materials, eco-assurance system to facilitate EPR and DfE for electronic products and automobiles, and collection and treatment of agricultural waste are in place. Current challenges include: 3Rs for industrial sector is rather lagging behind in comparison to MSW; need to change waste management law to promote the 3Rs for industrial waste; and an Act on the Promotion of Transition to Resource Recirculation Society is under preparation to encourage industrial activities contributing to resource circulation.

78. Lao PDR: Challenges faced by Lao PDR include low capacity of local people and institutions and lack of engagement of private investors in 3R activities.

79. Malaysia: has embarked on legislating its 3Rs effort. Mandatory separation at source will be initiated from the beginning of September 2015. With this initiative, all premises are expected to segregate their recyclable waste into three categories i.e. paper, plastic and other recyclables, in addition to the residual waste. The collection of recyclables will be done on a weekly basis by dedicated trucks, while residual waste will be separately collected twice weekly. The target of this programme is to achieve a recycling rate of 22% by 2020.

80. Maldives: Has endorsed a new National Waste Management Policy. The critical challenge is transportation of waste from the various islands. The future plan includes waste to energy options and the introduction of Regional Waste Management Centres.

81. Myanmar: Myanmar has developed a National Comprehensive Development Plan and one of its strategic thrusts is to conserve and protect the resource base, which includes sustainable waste management. A Sustainable Environment Management Plan has been formulated. City development committees are responsible for waste management. Two waste-to-energy plants are

planned in Yangon. The challenges faced by Myanmar are weak implementation, low awareness on risks of waste, weak technology, limited financial allocation and institutional capacity.

82. Mongolia: The major challenge is construction and demolition waste due to demolition of old buildings in Mongolia. About half of the population resides in cities. Mongolia seeks technical assistance from other countries in construction and demolition waste areas.

83. Niue: Major achievements include development of integrated waste management plan, waste oil collection system by private sector, consistent waste collection system, persistent organic pollutants (POPs) action plan, and small-scale recycling of aluminium cans. As a small island country, critical challenges include economies of scale, distance to markets for recycling, ad hoc approaches to waste management, capacity and expertise in waste management, rapid tourism growth and wastewater treatment. Major future actions include seeking donor funding in waste management including development of a waste transfer station, and a programmatic and strategic approach to waste management.

84. Nepal: Nepal has initiated several strategies for holistic waste and wastewater management that range from behaviour change communication and capacity-building to mobilizing communities as well as government staff, security personnel, NGOs and CBO particularly in Kathmandu Valley. Privatization of municipal solid waste and integrated wastewater management in Kathmandu Valley is also being prepared. A few sanitary landfill sites are also being built outside the Kathmandu municipalities. The use of plastic bags (less than 40 micrograms) within Kathmandu Valley has been banned. This has been carried out in connection with the "Clean Bagmati River" campaign. Nepal is also planning to introduce separate policies for e-waste management. Moreover, private medical colleges and hospitals are mandatorily required to take care of hospital waste. Similarly, pharmaceutical industries are required to follow GMP (General Manufacturing Practice) as per WHO guidelines. However, public participation in waste management is still not up to mark. There is a lack of technical, institutional and financial capacity in this sector in widening the scope and extent of "behaviour change communication".

85. The Philippines: Introduced the Ecological Solid Waste Management Act 2000 (RA 9003), which builds on the principle of the 3Rs. The government of the Philippines introduced an Eco-labelling and Green Procurement Program and regulation on Non-Environmentally Acceptable products and packaging (NEAP). The National Solid Waste Management Strategy, which was introduced to facilitate proper waste recycling, is showing success with at present 50 to 70% of solid waste being separated at source. There remains an issue of proper segregation of recyclable and recoverable waste materials at source because of limited technological and financial capacity, fragmented information and the need for a whole network of collection to optimize recycling. Recent price fluctuations of recyclables have affected the proper management of waste.

86. Palau: A deposit fee for beverage containers (plastic bottles, glass bottles and cans) has been established. $0.10 per container since 2011 is paid by the importers. The 10 cent deposit fee is split three ways: 5 cents for the redeemer of the container, 2.5 cents for the recycling fund, which is used for solid waste management activities, and 2.5 cents per container redeemed for the

operator of the redemption centre as compensation. Other initiatives are a composting facility, plastic waste to energy – 50 kg plastic to five gallons of bio-diesel, glass craft programme – melting glass bottles and making other glass items from glass waste. Palau reported that M-dock landfill life has increased due to the above initiatives.

87. The Russian Federation: Has to tackle a very large amount of waste which involves pre-sorting, landfilling and incineration. Recently the Russian Government introduced a source segregation waste programme. In Russia, around 400 recycling enterprises operate to recycle different waste streams. Russia has introduced federal laws for the proper management of waste. The unauthorized dumping of waste is a prevailing issue. Russia has introduced ecological fees to cover the expense of waste management and recycling. New legislation for Production and Consumption of Waste was introduced in 2014 based on a comprehensive and holistic approach for waste management. They are also promoting an awareness programme called "Ekolya" for promotion of source separation, and recycling of waste among youths.

88. Samoa: Has implemented a number of projects in 3R areas. These include J-PRISM (Japan Regional Solid Waste Management Project in the Pacific Region) where Samoa is one of the 11 project countries, and the focus is on activities related to promotion of recycling in partnership with an existing recycling company: (a) recovery and collection of cans and plastic bottles from piloted communities and areas; (b) proposed Container Deposit Levies for imported containers (canned and bottled products); (c) Shibushi City Model Project (JICA) project that promotes composting. Challenges include enforcement of laws and legislation; human resource and financial constraints; limited institutional capacity.

89. Solomon Islands: Packaging waste and plastics are one of the main problems in the Solomon Islands. The country has a National Solid Waste Management Strategy and Action Plan 2009–2014. Solomon Islands is currently reviewing this strategy and will develop a new strategy "National Waste Management and Pollution Control Strategy 2016–2025". A Waste Management Ministers' Forum was conducted. Waste Management Workshops and Waste Characterization Studies were conducted for the provincial centres. Aluminium cans and scrap metals are collected and shipped overseas for recycling. Under the J-PRISM Project, rehabilitation of the landfill has started, plus continuous implementation of waste minimization activities such as an eco-bag pilot project and eco-school programme. The major challenges include, but are not limited to, limited resources, behaviour of people, dealing with multiple waste streams and outdated or lack of regulatory frameworks.

90. Singapore: Has made significant achievements in promoting 3Rs and resource efficiency. It has applied 3R strategy very effectively. The critical challenges are land constraints and limited natural resources. Singapore has identified many future plans as part of the Sustainable Singapore Blueprint 2015 which includes striving towards a Zero Waste Nation and achieving a 70% recycling rate by 2030. There are plans to introduce modern waste management infrastructure and technologies. Lastly Singapore plans to build an Integrated Waste Management Facility to realize the Waste-Water-Energy Nexus for maximum efficiency.

91. Sri Lanka: Among others, Matale City has worked towards zero waste with a project called SUNYA supported by the European Union with partner cities from India, Nepal and Bhutan.

Through this project the city has implemented and conducted 3R awareness programmes in ten schools and government departments in the municipal limits, and also the Council has distributed two types of garbage bins for lower-income families. These initiatives were supported by ICLEI South Asia. Under the technical support from Waste Concern, Matale City municipality is running a nine ton capacity compost plant in Matale City.

92. Tonga: Developed waste management act in 2005 and hazardous waste act in 2010. A draft national waste management strategy will be approved soon. Many foreign aided projects exist for waste management and the 3Rs. Current challenges include limited human and financial resources and weak political support. To overcome these challenges, it is necessary to increase financial support from government, including a high-level segment for waste management and 3R policy, strengthen the existing coordination system among stakeholders, and make waste information publicly available.

93. Thailand: The Waste and Hazardous Waste Management Roadmap has been introduced on the national agenda. Major 3R projects include a zero waste project and awareness-raising programmes. The National Waste Management Master Plan has been drafted for 2016–2021. In this plan 3R concept is given as first priority for waste. 3R challenges for Thailand include: inadequate numbers of knowledgeable staff to operate large anaerobic digestion systems; slow growth of private investors and lack of understanding from the financial sector; difficulties in obtaining consistent source-segregated organic waste.

94. Timor-Leste: Despite being a young nation Timor-Leste has achieved several initiatives in establishing institutional set up and regulations. It has initiated a 4R programme and education on the importance of waste. It has also initiated research and development to identify local strategies. The challenges include: lack of expertise, technology, public participation, finance and coordination among institutions. The major plan is to initiate a Furnace Waste Melting System and to improve the overall waste management system. Polluter pays policies are also being planned.

95. Tuvalu: Diverts green wastes for composting. Aluminium cans are collected and exported for recycling through a private recycling company. Waste Collection Programme was developed and implemented for all islands with awareness programmes for waste segregation and waste management at household level, schools and communities. E-waste and hazardous waste collection and storage programmes have been initiated. Waste oil is exported to Fiji for recycling and waste batteries are also collected separately for recycling. Tuvalu Integrated Solid Waste Management Plan is being worked upon with an aim for a review and an independent waste policy will also be developed soon. Tuvalu is working towards a feasibility study for Waste Levy for Imports and Container Deposit Legislation (CDL). Food waste is sent to piggery. New initiatives in the region include Clean Pacific 2025 movement. The challenges faced are: lack of equipment, technology, lack of human resources and capacity-building, lack of training and awareness for 3R as well as managing hazardous wastes, problems of exporting recyclable waste, lack of funding and resources, no waste policy, no 3R policy, no adequate transfer and recycling station, no recycling facility, lack of national coordination, limited land space availability, lack of community behavioural change, lack of solid waste related database and transportation infrastructure.

96. Vanuatu: The government of Vanuatu introduced the National Waste Management (NWM) Policy, NWMS, Waste Management and Pollution Control Acts, SWM plans for local authorities and development of the NWM + 3Rs + policy. At the level of local authorities (Provinces and Municipalities), waste audits, a pre-paid bag system, market composting, a return system, control of dumpsite and one approved landfill were introduced. Natural Disasters, Landfill waste pickers, policy arrangements for 'return' system – export taxes for recyclables, lack of treatment facilities for hazardous materials like lead acid batteries, imports of second-hand materials – vehicles and tyres, e-waste management and use of non-biodegradable plastic bags are some major challenges faced by Vanuatu. In response to those issues, the government is revising the National Waste Management Strategy 2016–2017. The government plans to introduce "Klin Vanuatu", a public awareness campaign from 2016 onwards for different target audiences and plans to increase stakeholder private partnerships to promote 4Rs plus innovations, effective implementation of the Waste Management Act along with enhancing the logistic and technical capacity for waste management.

97. Vietnam: The country revised the Law on Environmental Protection (LEP) in 2014, which again emphasized the 3R principles in waste management. The revised LEP makes clearer responsibilities between ministries in waste management with regulation that all ministries have to collaborate with the Ministry of Natural Resources and Environment (MONRE) in development of waste management policies. Some new 3R policies include: (i) EPR regulation for five groups of products (batteries, electronics, lubricant oils, tyres and end-of-life vehicles), which will be effective from 1 July, 2016 for first four products and from 1 January 2018 for end-of-life vehicles; (ii) companies must provide a deposit when import scraps for recycling; and (iii) removing the ban on importing end-of-life ships for demolition for scrap material. The country has also adopted master plans of solid waste management for three river basins Dong Nai, Nhue-Day and Cau rivers.

VIII. Waste and Freshwater Nexus ~ 3R for Water Security in Asia and the Pacific

98. The background paper by Prof. C. Visvanathan showed that rapid economic growth and accelerated urbanization in Asia and the Pacific is increasing pressure on the supply of fresh water. Diminishing water resources, increasing water pollution and the lack of wastewater management capacity has pushed the region into a state of water insecurity, which has an increasing negative impact on food production, manufacturing and urban living. Urban wastewater treatment has received less attention compared to water supply and there is an urgent need to ramp up the capacity for wastewater management. 3R strategies can applied to improve water and wastewater management through an integrated approach.

99. There are many challenges in most countries in Asia and the Pacific, which include a lack of political awareness and low priority for national water policies, insufficient infrastructure in large growing urban agglomerations, including a lack of sanitation, sewerage infrastructure and water treatment facilities, especially in informal settlements that exist in many cities in developing Asia and the Pacific. Discharge of untreated water from industry and businesses into freshwater bodies compounds the issue. In summary, there is a lack of knowledge, infrastructure, policy and regulation and financial means to deal with the fast increasing risk of water insecurity. Nevertheless, the unsustainable management of water cannot continue. There are, however, also

signs for a paradigm shift with the potential of reusing of wastewater after treatment gaining increasing support in the policy and business community.

100. The Forum discussed the role 3R principles and practices can play in achieving sustainable water resource management, including supply of fresh water to agriculture, industry and households and the treatment and potential reuse of wastewater. Lessons learned from the solid waste sector need to be applied to the water sector. The 3Rs, in the context of water, offer effective tools for both demand and supply side management. Supply side management practices include recycling and reusing wastewater and improving wastewater treatment capacity by employing advanced treatment technologies. For demand side management, 3R strategies include reducing water use, water pricing, water saving technology, policy and regulation.

101. It was suggested that a holistic approach be applied to the whole metabolism of society including materials, energy and water on the input side and waste and emissions that leave the economy through different gateways including soil (landfill), water and air, while maintaining a strong focus on traditional 3R areas of materials efficiency, solid waste reduction, water and waste to water. It was noted that there is a strong nexus between water security and waste management. The example of India shows that this nexus is severe for the large population living in the river plains. The Ganga, for instance, provides water to about 40% of India's population across 11 states, serving an estimated population of 500 million people or more, which is larger than any other river in the world. In India, municipal sewage and industry have been identified as main point sources of river pollution which puts the water supply for millions of people at risk, while the country may be heading towards water stress.

102. The Forum agreed on the need for further research into the policy and institutional needs, technologies, infrastructure and financing needs as well as an analysis of drivers and barriers in municipal and national water and sewerage plans. It was noted that especially the notion of reuse has currency in the water domain as significant amounts of water can be used in a circular fashion once the necessary 3R infrastructure has been provided.

IX. EPR as an Innovative Policy Option for 3R Promotion in the Asia-Pacific region

103. Mr. Yoshinori Suga of the Japanese Ministry of the Environment, on behalf of the OECD Secretariat, presented the background paper on Enabling Policy and Regulatory Framework for Institutionalizing EPR – from OECD Experience. The OECD defines extended producer responsibility (EPR) as an environmental policy approach in which the responsibility of the producer goes beyond the post-consumption stage of a product lifecycle. By extending the responsibility of producers, EPR paves the way for resource recycling towards closing the material loop. The EPR approach is expanding, especially targeting products with high recyclability and high environmental impacts, e.g. electronics and packaging. The OECD presented in-depth case studies of around 40 EPR schemes covering five product groups. However, challenges such as diversity of goals and different contexts in which EPRs operate, lack of data and comparative analysis, are making it more difficult to identify best practices.

104. Many OECD countries have significant experience in the use and design of EPR, and while the Asia-Pacific countries are beginning to use EPR, they can learn from the experience in

OECD countries. The Forum was informed that a publication summarizing the lessons, as well as describing emerging experiences in developing countries and emerging markets, will become available in early 2016.

105. Ms. Ryu Hyejung of the Korea Environment Corporation (KECO) informed the Forum that the Korean EPR system imposes a certain quota for the collection/recycling of wastes from products or packaging materials on the producer. If the quota is not met, a fine is imposed on the business that is greater than the cost of implementing proper recycling. The legal basis is the Act on the Promotion of Saving and Recycling of Resources and KECO operates the programme. Other EPR instruments in Korea cover an Eco-Assurance System for electronics and cars, a Waste Charge System for hazardous and hard-to-recycle materials, and the traditional Deposit-Refund System. There is a clear role stated in the Law for each stakeholder, i.e. consumer, producer, local government, national government (Ministry), and KECO. As of 2014, the target items of the EPR Program consist of four types of packaging materials and five types of products. The "Recycling Act" was reviewed and revised in 2013, wherein "collection obligation" and "incentives for DfE and ELIS" were introduced. Recycling policies have played an important role in reducing waste generation at source and promoting the circulation of recyclable resources in the Republic of Korea. The Korean experience shows that in order to operate the Program more effectively, all entities need to be encouraged to participate in the Program voluntarily and proactively.

106. Mr. Hideki Minamikawa, President of JESC, Japan, shared the EPR design and guidelines of Japan. Rapid increase in municipal solid waste (MSW) occurred between 1955 and 1970, which was Japan's high economic growth period. The problem was addressed with the introduction of various technologies, e.g. waste-to-energy incineration, recycling and reduction. The recycling rate of municipal waste is 20.8% (FY2010) and that of industrial waste is 53.0% (FY2009). Early in 2000, the Sound Material-Cycle Society high-level policy goal was introduced and it is defined as a society in which used products would be reused, recycled, or converted into heat as much as possible to prevent them from becoming waste, and those not put to such cyclical use would be disposed properly without fail, so as to reduce the consumption of natural resources and minimize the burden on the environment. In the Sound Material-Cycle Society, the roles of producer, consumer and government are clarified, and EPR plays an important role. This SMCS initiative has witnessed progress towards three major indicators, namely resource productivity, recycling rates and final waste disposal volume. EPR on home appliances, small appliances and batteries, were gradually introduced. The recycling rate has been increasing for all home appliances except CRT TVs. To date, approximately 60% of all municipalities in Japan already take measures or are preparing to implement EPR for small appliances.

107. In 2004, South Australia enacted the Zero Waste South Australia Act and created the Waste to Resources Fund. Zero waste always complements the objectives under the "circular economy", wherein by-products and wastes from one process become inputs to another. Green industries, embracing the waste hierarchy notion, support the green and circular economy. Mr. Vaughan Levitzke, Chief Executive Director of Zero Waste SA mentioned that Zero Waste SA had successfully introduced various change programmes which have influenced householder behaviour. It has also provided research grants through unique collaborative models. The waste management and resource recovery industry is a significant sector of South Australia's economy. Zero Waste SA has made significant investment from waste levy funds in the industry since 2004.

It has built capacity, improved markets and assisted the development of new products and skills. Grants cover new infrastructure and support innovation – through grants – to solve emerging waste problems and influence regulatory practices. Waste management and remanufacturing has provided opportunities to contribute to the State's economic growth.

108. Prof. Jinhui Li, Executive Director of BCRC-China at Tsinghua University introduced the four environment-related laws of PR China that laid down the foundation for recycling and the need for EPR. Three pilot policies "old-for-new" policy in WEEE take-back, for urban mining, and for remanufacturing have been introduced in PR China. China has established a fund collected from producers and importers for the recovery, treatment and disposal of WEEE. Recycling amounts have increased considerably over the years. Challenges of EPR implementation remain: for example, legislation is yet to be completed, and only products in a catalogue are covered in the EPR. The policy process has not been so smooth. There is a lack of experience to implement uniform EPR procedures from central government to local government level, and for companies. It was suggested that EPR should be intensified to enhance eco-design and green production.

109. The Thai representative, Ms. Sunee Piyapanpong, expressed that EPR was a new mechanism for Thailand. Implementation of EPR will experience same kind of problems as in MSW management. LGUs do not have enough manpower and budget to manage these programmes. EPR should also absorb the informal sector into the scheme as they are currently the most active player in recycling. As for funding sources, it would be fair that both beneficiary (consumer) and producer should share the cost, while the government provides policy and regulatory guidance, support and coordination. Ms. Dato Halimah Hassan of the Department of Environment, Malaysia, on the other hand, told the Forum that hazardous waste was handled under a cradle to cradle principle in Malaysia. The main components of waste should find their way to be recycled. Reduce, reuse, recycle and recover (the 4Rs) should be observed in order to minimize waste. In the management of household e-waste, a successful EPR requires multi-stakeholder involvement, the inclusion of the informal sector, the presence of a sustainable financial mechanism, and sound legal and institutional frameworks.

X. Strengthening the 3R Knowledge Base in Asia and the Pacific towards effective Monitoring and Implementation of 3R at Local and National Level

110. Dr. Yasuhiko Hotta, Institute for Global Environmental Strategies, presented a draft outline, objectives and scope of the State of the 3Rs in Asia and the Pacific, the idea of which was introduced at the Surabaya 3R Forum in 2014. It was introduced as a collaborative initiative among member countries, 3R Forum Secretariat and experts, to assist the member countries of the Regional 3R Forum in Asia and the Pacific in improved decision-making towards effective implementation of Ha Noi 3R Declaration (2013–2023) and environmentally-sound waste management at local and national levels, including promotion of 3R as an economic industry, by improving data, information and indicators availability in all waste sectors for achieving a low-carbon and resource-efficient region. Then, Ms. Janet Salem from UNEP/ROAP presented resource use indicators to monitor the progress of sustainable resource use in the region developed and proposed by SWITCH-Asia. Dr. Emani Kumar of ICLEI also introduced Zero Waste Initiatives. The Forum welcomed these ongoing knowledge development initiatives; the State of the 3Rs in Asia and the Pacific was especially welcomed as an initiative to assess the progress

of 3R policy implementation with expectation to generate practical knowledge and lessons on a regular basis and in comparable manner and as a possible contribution from the region on waste and resource use indicators of SDGs. Member countries were requested to make contributions for the development of the State of the 3Rs in Asia and the Pacific.

XI. The Way Forward

111. The process of economic integration and technical cooperation in Asia and the Pacific aims to create opportunities for economic growth and employment and to increase the standard of living in Asian and Pacific economies. It is very important to design new initiatives that enhance trade, connectivity and investment in such a way that opportunities for sustainable resource management, waste minimization and low-carbon development are mainstreamed into development initiatives. This could take many forms, for example prioritizing investments into green sectors of the economy such as renewable energy, sustainable housing and transport and eco-efficient manufacturing and green cities. It could involve focusing connectivity on transport modes which have lower impacts on natural resources and climate, including public transport, prioritizing rail and sea for the transport of goods and services and focusing on low-emission technologies, all of which are objectives of a sound 3R strategy.

112. When trade volumes continue to increase, it will become important to create certificates and labelling systems that inform buyers about the sustainability performance of traded goods and services. The Forum notes the risk of reduced supply security of strategic natural resources and the threat of fast rising emissions and waste flows. Economies in Asia and the Pacific are highly vulnerable to price increases for natural resources (energy carriers, metals, food and fibre, and timber), which is further accentuated by accelerating climate change.

113. It was noted that institutions respond naturally to complex policy problems when there is a recognized problem, when there is something that can be done about it, and when there is willingness to act. In many countries in Asia and the Pacific, for good reasons, there is tension between environmental sustainability objectives and economic growth objectives in the public discourse. This perceived contradiction makes it more difficult to implement the ambitious policy goals of the 3Rs and other high-level policy initiatives, which include green growth, circular economy and sustainable production and consumption.

114. The Forum recognizes that the Regional 3R Forum has the potential to facilitate a public conversation and foster debate about the need to align environment and development outcomes and to highlight that, in fact, especially in the medium and long term, there is no contradiction between sustainable natural resource management, waste minimization, climate mitigation and economic growth. The 3R Forum, since its inception, has facilitated a partnership between the policy, business and science communities. It should now extend its remit to facilitate a broader public debate about the importance of sustainable resource management for the future prosperity of Asia and the Pacific region. The Sixth Forum in the Maldives has started this process by engaging the business community and general public.

115. The Forum suggests that governments could consider establishing a regional advisory panel of eminent scientists and community leaders to support the policy community by providing

evidence-based trusted advice for policymakers on how to improve economic prosperity and human well-being in the region through resource efficiency, waste minimization and sustainable natural resource management. A network of regional innovation centres for resource efficiency, waste and emission minimization could be established to drive the innovation culture in economies in Asia and the Pacific and provide practical examples and technologies that help countries to achieve their policy objectives in the domain of decoupling wealth from resource use and waste. This could be achieved by linking and enhancing the status of cleaner production centres that already exist in many countries.

116. The Forum suggests that subsidies that encourage resource use and contradict resource efficiency and waste minimization objectives, such as subsidies for natural resources (fossil fuels), should be phased out. Lower-income households should be directly compensated for higher prices.

117. The Forum promotes regional transformative policies, such as the creation of a regional cap and trade system for carbon emissions or efforts towards a more comprehensive ecological budget and tax reform that puts a price on resources while reducing labour costs. Such policies would need to be adapted to the particular economic and development context in each country and could be restricted to certain economic zones. They would be revenue-neutral and facilitate the implementation of the 3Rs.

118. The Forum advises that trade agreements and market liberalization in the trade sector should monitor the environmental impact of traded goods in terms of, for instance, their carbon or material and energy intensity, and this information should become a factor in establishing trade agreements. Imported goods should be produced according to 3R principles in their country of origin.

119. Regional financing mechanisms for projects and experiments that enhance resource efficiency and help minimize waste and emissions should be developed to support innovative projects and initiatives based on the principles of 3R. Regional private–public partnerships will further strengthen the ability to establish demonstration projects of eco-city precincts and eco-industrial parks in member countries to allow other countries to learn from best practice and foster bilateral cooperation among countries. A knowledge-sharing platform based on a university collaboration network should be established to allow policymakers to be kept up-to-date with the best available information. This could be enlarged to an Asia-Pacific research area comparable to the mission-directed research in the European Union, which supports centres of excellence that address very specific policy problems through research.

120. It was noted that specific effort was required by training and education institutions to design curricula and courses that further the 3Rs. This may include capacity-strengthening activities for local and city governments to enhance their ability to integrate 3R policy suggestions into mainstream policies.

121. The Forum recognizes the contribution of the 3Rs to achieving the sustainable development goals (SDGs) in the post-2015 development agenda: "*Transforming the World: The 2030 Agenda for Sustainable Development*". Goal 8/Target 8.4 and Goal 12/Target 12.5 explicitly address resource efficiency and waste minimization to be achieved through prevention, reduction,

recycling and use. Goal 8/Target 8.4 more specifically asks for improved resource efficiency in production and consumption to decouple economic growth from environmental degradation. All three aspects of the 3R will support the necessary improvement in resource efficiency required in Goal 8/Target 8.4 and will underpin and enable achievements in human development and poverty alleviation aspired to by the international policy community. Goal 12/Target 12.2 aims to achieve sustainable natural resource management and the efficient use of natural resources. Goal 6/Target 6.3 refers to improved water quality by reducing pollution, eliminating dumping of waste including hazardous waste and improving wastewater treatment capacity to increase safe water reuse globally, and 3R will play a profound role.

122. The Forum recognizes the importance of putting in place a follow-up procedure in between Forums to effectively monitor progress of implementation of 3R in each member country. Follow-up procedures may include an agreed set of indicators countries can report to at the next Forum. Prioritized action plans may be formulated at the Forum for countries to implement and report at the Forum, ensuring a highly interactive, participatory and effective Forum.

XII. Closing Session

123. H.E. Mr. Thoriq Ibrahim, Minister, Ministry of Environment and Energy, Maldives, expressed his deep appreciation to all the participants of the Forum for their active engagement and the vibrant discussion over the three days. He welcomed the successful adoption of the Malé 3R Declaration. He drew special attention to the importance of sustainable waste management, which is inherently linked to the wider economy and society. How we use resources and our lifestyle have implications on waste generation. From MDGs to Rio+20 to the post-2015 development agenda, waste management and sustainable consumption and production feature as important components of sustainable development. 3R provides the link between the two. It can improve overall quality of life, and have positive environmental and economic benefits. He concluded with his high expectation that the governments, private sector, civil society and academia had made great strides in promoting sustainable waste management in countries across the region, and could make many positive impacts through the Regional 3R Forum in Asia-Pacific.

124. Delivering the closing remark on behalf of the Ministry of the Environment, Japan, Mr. Masahito Fukami noted the successful conclusion of the Sixth Regional Forum and expressed appreciation to all of the participants, while highlighting the Declaration by the Maldivian resorts as a unique and truly important initiative. He extended special thanks to the Government of Maldives and UNCRD for their dedication to the success of the Forum. He congratulated agreement by the member countries regarding the State of the 3Rs in Asia and the Pacific, which has been supported by Japan and will be drafted in collaboration with UNCRD and the member countries. Given that Japan will host the G7 Summit in 2016, Mr. Fukami emphasized that Japan would take a leadership role not only in integrating the issues of 3R and resource efficiency into the Summit but also enhancing outcomes of the Regional 3R Forum and encouraging 3R actions.

125. After thanking the host government and the co-organizers, Ms. Chikako Takase, Director of UNCRD, noted how well the Government of Maldives used the occasion of hosting 3R Forum to pursue its own policies on 3Rs and sustainable development. She remembered that from the inception of this Forum, the host government was very clear about the focus of the Forum – 3R as

an economic industry – and the key sector of economy was tourism for the Republic of Maldives. From then on, it not only shaped the focus of the Sixth Regional 3R Forum, but the host government worked on engaging key stakeholders within the country and advancing national efforts on 3Rs and sustainable development. It culminated in the signing of the "Declaration on the Promotion of 3Rs and Resource Efficiency towards Protection of Local Environment and Marine Ecosystems" by ninety-nine resorts operating in the country and the announcement of the "Saafu Raajje" (Clean Maldives) Initiative to promote environmentally friendly and sustainable waste management practices within the islands of the Maldives on the day preceding the Forum, which was commemorated as "Maldives National 3R Day" and instituted as such for the years to come. She congratulated the host government for this effective way of advancing 3R policies by combining with hosting of the Forum. She noted that many countries seemed to be considering follow similar patterns and expressed gratitude for those considering hosting the Forum in the future. She hoped that the adoption of the Co-Chairs' Summary would be a stepping stone to the implementation of Ha Noi 3R Declaration (2013–2023) and, in turn, it would be a part of the efforts towards the implementation of the post-2015 development agenda by each country. She thanked all the participants for the successful organization of the Forum.

126. On the behalf of the co-organizers in Russian Federation, Mr. Vladimir A. Maryev, Director of International Centre for the Best Environmental Technologies (ICBET), Russian Federation, announced that the 2015 Global Forum of International Partnership for Expanding Waste Management Services to Local authorities (IPLA), a Rio+20 Partnership, would be held on 6 to 8 October 2015 in Moscow. He further invited all the 3R Forum participants to attend the IPLA Global Forum.

127. On behalf of the Government of South Australia, Mr. Vaughan Levitzke, Chief Executive, Zero Waste South Australia, officially announced that South Australia would host the Seventh Regional 3R Forum in Asia and the Pacific in 2016. In this regard, the participants of the Maldives 3R Forum witnessed a handing over from the host country, the Republic of Maldives, to the next host, the Government of South Australia.

128. Technical field visits were made to five different areas: (a) Tour of waste management system of Kurumba island resort, (b) Tour of waste management system of Gill Lankan Fushi island resort, (c) Tour of waste management system of Banyan Tree resort, (d) Tour of waste management system of Conrad Maldives Rangali island, and (e) Photo flight, followed by a tree planting ceremony on newly reclaimed land on Hulhumalé Island as part of an effort to make the Maldives 3R Forum carbon neutral under the leadership of H.E. Mr. Thoriq Ibrahim, Minister of Environment and Energy of the Republic of Maldives.

Annex 1: Declaration by Private Tourist Resorts in Maldives for the Promotion of 3Rs and Resource Efficiency Towards Protection of Local Environment and Marine Ecosystem

Maldives National 3R Day

16th August 2015

Malé 3R Declaration

"Resorts in Maldives for the Promotion of 3Rs and Resource Efficiency Towards Protection of Local Environment and Marine Ecosystem"

We, the representatives of tourist resorts of the Republic of Maldives, having met in Malé on 16 August 2015 at the Maldives National 3R Day being organized as an integral part of the Sixth Regional 3R Forum in Asia and the Pacific held in Malé from 17 to 19 August 2015,

Recognizing the importance of protecting the biodiversity, freshwater resources, and sustainable use of seas and ocean and their resources as fundamental to the sustainable development of the island communities,

Recognizing the role of pristine marine and coastal environment as indispensable means and resources for sustainable tourism development, thereby economic security of Small Island Developing States,

Taking into account the large range of impacts from climate change and potentially more frequent and intense natural disasters, and the increasing impacts of tourism activities to the fragile ecosystem and ecological assets (marine species, fish stock, coral reefs, mangroves, sea-grass bed, estuaries, coastal lagoons, and wetlands, among others) of Small Island Developing States,

Noting the critical challenges the small island countries face in terms of high population density, relative isolation, limited availability of land space, and lack of human, technical and financial resources that limit a range of options for climate mitigation, disaster reduction and environmentally sound management of emerging waste streams,

Underscoring the fact that plastic litter has become a critical concern in coastal and marine environment of small islands, and plastics in the marine environment progressively break down into micro-plastics (diameter < 5 mm) causing a range of impacts in the marine environment, including bio-accumulation of hydrophobic persistent organic pollutants (POPs) like PCBs, DDTs, HCHs and others from the plastics through ingestion or food-chain (fist to fish and fish to people),

Recognizing the multiple benefits of 3R (reduce, reuse, recycle) through savings of resource, water, energy and cost, thereby contributing towards new circular economic opportunities and green jobs with more environmentally sustainable tourism,

Noting the recommendations outlined in the *Declaration of Barbados and the Programme of Action for the Sustainable Development of Small Island Developing States*, *the Mauritius Declaration and the Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States*, the Rio+20 Outcomes Document – *The Future We Want*; Outcome of the SIDS Conference (Apia, 2014) – *S.A.M.O.A. Pathway*; and *the Hanoi 3R Declaration (2013–2023)* adopted at the Fourth Regional 3R Forum in Asia and the Pacific,

Noting further the calls made by the Heads of State and Government and high-level representatives at both Rio+20 and 2014 SIDS Conference for a 10-Year Framework of Programmes on Sustainable Consumption and Production (10YFP) affirming a common vision that promotes a whole of life cycle approach including resource efficiency and sustainable use of resources, extended producer responsibility (EPR) and the 3R concept in a number of key areas, including tourism industry,

Recognizing the significance of 3Rs and resource efficiency in post-2015 development agenda, and to that regard, the important role the private, business and industry sectors can play in mainstreaming 3R in their business operations and solutions, as Corporate Social Responsibility (CSR) and Extended Producer Responsibility (EPR), to many sustainability challenges faced by the Small Island Developing States,

express our good-will intention to progressively practice and implement following 3R and resource efficiency measures, but not limited to, in all aspects of our tourism and related business operations to protect the precious marine environment and ecosystem towards the better health, economy and social well-being of the people of the Republic of Maldives.

1. develop and strengthen internal management system and policies towards efficient use of resources, water and energy, and promote usage of all forms of renewable energy, including waste to energy, in order to achieve waste prevention and minimization;

2. in conformity with pertinent regulations and standards governing environmental quality, health and safety, protection of sensitive areas, protection of costal and marine environment and endangered species, siting, and land-use control, develop efficient and environmentally friendly waste collection, segregation and transportation to recycling facilities and disposal sites;

3. discourage use of any form of plastics in the resorts as a first priority; explore ways to utilize end-of-life plastics as a valuable resource and as an integral part of the waste reduction strategy contributing to circular economy;

4. consider investments for installing state-of-the-art sewage collection and treatment facilities to protect the coastal and marine environment and to prevent contamination of groundwater resources, which will in turn be of attraction to international tourists resulting in increased revenue generation;

5. promote use of compact detergents to reduce the nutrient level (BOD load) in wastewater as a by-product; promote wastewater reuse and recycling to achieve water efficiency and security;

6. take every preventive measure to protect coral reefs and other ecological assets from physical damage and pollution from toxic chemicals and hazardous substances;

7. work towards arresting all forms of soil erosion from the dynamic beaches with adequate soil conservation and vegetation measures; promote large scale composting from all organic and food wastes and use them for required vegetation measures, which will ultimately increase the resiliency and adaptability of the small islands against waves and natural disasters; and

8. explore every opportunity to tap various expertise, knowledge, technical know-how and best practices available in sustainable tourism sector by accessing various national and international sources or clearing house mechanisms such as the Global Sustainable Tourism Council, the Global Observatories on Sustainable Tourism of the World Tourism Organization, the Global Partnership for Sustainable Tourism, SCP Clearing House of the 10-Year Framework of Programmes on Sustainable Consumption and Production (10YFP), Regional 3R Forum in Asia and the Pacific, and the other United Nations bodies.