

Final Chair's Summary

Ninth Regional 3R Forum in Asia and the Pacific (3R as a Way for Moving towards Sufficiency Economy – Implications for SDGs)

04-06 March 2019

Venue: Royal Orchid Sheraton Hotel & Towers, Bangkok, the Kingdom of Thailand

Forum Chair

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I. Introduction

1. The circular economy represents a fundamental alternative to the currently predominating linear approach that is based on unlimited resource extraction and disregards the natural resources of planetary boundaries. A circular economy is a regenerative system in which resource input and waste, emission, and energy leakage are minimized by slowing, closing, and narrowing energy and material loops. This can be achieved through long-lasting design, maintenance, and repair, reuse, remanufacturing, refurbishing, recycling, and up-cycling. This is in contrast to a linear economy which is a 'take, make, dispose' model of production. The material needs to be revisited based on circularity principles rather than throw-away products. Worldwide there is a growing recognition of circular economic development approach as one of the key drivers towards achieving the 2030 Agenda for Sustainable Development and the underlined SDGs. While the Asia-Pacific countries are progressively addressing and adopting 3R (reduce, reuse and recycle) policies and programmes, including technological interventions, the region still faces a number of challenges in achieving sustainable consumption and production (SDG 12), among others. The extraction patterns of raw materials in the developing world are supporting unsustainable levels of per capita consumption and production in developed world. The resource intensive conventional economic development patterns along with indiscriminate demand for raw materials and natural resources have not only brought heavy environmental and social impacts, but also have challenged the lasting supply security of resources for the current as well as the future generations. A resource efficient and circular economic development model calls for a transition of the management of natural resources with a progressive minimization of waste in both consumption and production processes through a range of 3R policies and measures. With unprecedented levels of urbanization and emergence of new mega-cities, one of the defining features for the region's sustainability in terms of resource security will be to progressively adopt the low carbon, resource efficient and circular economic principles in all development sectors.

2. The 9th Regional 3R Forum in Asia and the Pacific with the theme of **“3R as a way for moving towards sufficiency economy – Implications for SDGs”** took place in Royal Orchid Sheraton, Bangkok, the Kingdom of Thailand from 4th – 6th March 2019. It aimed to address how 3R and resource efficiency could play a critical role in achieving **sufficiency economy, which advocates rationale use of natural resources that gives people better environment, quality of life and livelihood security as well as prudence and built-in self-immunity to cope with external shocks and global volatility through balanced development**. The philosophy of sufficiency economy was echoed by His Majesty the Late King Bhumibol Adulyadej of The Kingdom of Thailand. Sufficiency, meaning moderation and not to the extreme, could apply in terms of the sustainable use of consumption and production patterns. Sufficiency Economy Philosophy (SEP) advocates moderation, use of appropriate technology, and emphasis on bottom-up decision making and taking care of the environment. Thailand is overcoming the effects of its previous economic crisis with the help of SEP. Application of SEP for environmental management focuses on the manufacturer or consumer and tries to start production or consumption under the scope of income restriction or exhausted resources. It is directly linked to increase production control capability and reduce the risk of uncontrolled economic loss and environmental degradation. The objectives of the 9th Regional 3R Forum in Asia and the Pacific were: to address how the Sufficiency Economy Philosophy (SEP) can contribute to 3R policies and strategies, to identify and discuss about the applications of SEP for the implementation of 3R policies and programmes, to address various environment, social and economic benefits of SEP in considering SDGs, to discuss the importance of 3R technologies and Public-Private-Partnership (PPP) for circular economy approach towards SDG 12 to review and evaluate countries’ progress, initiatives, achievements and best practices in implementing the Hanoi 3R Declaration – Sustainable 3R Goals for Asia and the Pacific for 2013-2023.

3. The Forum was attended by more than 550 participants comprising high level government representatives and policy makers from relevant Ministries such as Ministry of Environment, Ministry of Urban Development, Ministry of Industry, Ministry of Energy, and Ministry of Natural resources and Environment, City Mayors/Local Government representatives, experts and international resource persons, including representatives of scientific and Research and Development (R&D) institutions in the areas of 3R/resource efficiency/waste management/life cycle assessment and management, representatives of UN and international organizations, including international financial institutions, multilateral development banks and donor agencies, representatives of the private and business sector and NGOs etc. and other stakeholders from thirty-nine countries including Afghanistan, Australia, Bangladesh, Belgium, Bhutan, Burnei Darussalam, P.R.China, Cambodia, Denmark, France, Germany, India, Indonesia, Japan, Kenya, Kiribati, Republic of Korea, Lao PDR, Malaysia, Maldives, Federated States of Micronesia, Marshall

Islands, Mongolia, Myanmar, Nepal, Pakistan, Palau, the Philippines, the Russian Federation, Samoa, Singapore, Sri Lanka, Timor-Leste, Thailand, Tonga, Tuvalu, Vanuatu, Viet Nam, USA.

4. Recognizing the importance of 3R, resource efficiency and circular economic development approach for achieving inclusive, resilient and sustainable cities in line with the objectives of the SDGs and the New Urban Agenda, the participating Mayors and local authorities of the Forum signed the voluntary and goodwill Indore 3R Declaration of Asian Mayors on Achieving Clean Water, Clean Land and Clean Air in Cities.
5. Recognizing the growing problem of plastics waste in the region and underscoring the multiple benefits of pursuing a circular economic development approach through effective 3R policies, programmes and institutions, the Forum discussed and adopted the goodwill, voluntary and legally non-binding Bangkok 3R Declaration Towards Prevention of Plastic Waste Pollution through 3R and Circular Economy (See Annex 1).

III. Opening ceremony

6. Welcoming the participants, H.E General Surasak Karnjanarat extended his deep appreciation to the Ministry of Environment, Japan and the United Nations Centre for Regional Development (UNCRD) for jointly hosting the event. He said that this Forum will be a useful platform to identify specific policy, technology transfer and waste business investment opportunity and to share 3R best practices among Asia and the Pacific countries. He also mentioned that the Forum will enhance networking and collaboration in the region. He expressed concerns that the problem of waste is a common challenge confronting the Asia Pacific region and the world. Thailand has announced the commitment to reduce single use of plastics, WEEE and plastic scraps from import and he emphasized that the Reduce, Reuse and Recycle (3R) principle will contribute to significant pollution reduction, improvement of energy and resource utilization efficiency as well as mitigation of climate change.
7. Mr. Tsukasa Akimoto, State Minister, Ministry of the Environment, Japan welcomed the participants to the Ninth Regional 3R Forum. He expressed his deepest appreciation to Ministry of Natural Resources and Environment, Thailand. He urged that proper waste management is urgent and an extremely important issue in the Asia-Pacific region where economic growth is of much significance. He said that it is possible to balance environmental conservation with economic growth. He mentioned that this year, Japan would host the G20 Ministerial Meeting on Energy Transition and Global Environment for sustainable growth. Japan will take the initiative to promote effective countermeasures for marine plastic litter in the G20 framework.

8. Mr. Kazushige Endo, Director, UNCRD expressed his appreciation to the Government of Thailand for hospitality and engagement in organizing the Ninth Regional 3R Forum in Asia-Pacific. He mentioned that the Forum will discuss about the Philosophy of Sufficiency Economy which could be suitable for global population to follow. He mentioned that the Forum will provide a platform to member countries to promote the implementation of the Ha Noi 3R Declaration –Sustainable 3R Goals for Asia and the Pacific for 2013-2023 which is indispensable for the achievement of the SDGs and its targets. He said that it is significant to discuss about the latest technological development related to the waste management, resource efficiency and circular economy, and is important to facilitate collaboration and partnerships among relevant stakeholders.
9. While addressing the forum participants, Ms. Armida Salsiah ALISJAHBANA, Under Secretary-General of the United Nations and Executive Secretary of ESCAP, mentioned that the ever-expanding volumes of waste have become a serious environmental, economic and health challenge. Asia-Pacific’s region of material footprint per unit of GDP is twice the world average. She also mentioned that by 2020, chemical production is set to increase by 45 percent and the amount of solid waste generated by our cities will double by 2025. She mentioned that The United Nations Economic and Social Commission for Asia and the Pacific has been working with partners at national and local level to develop solutions for sustainable waste management.
10. The Opening Session concluded with endorsement from the dignitaries that the Regional 3R Forum in Asia and the Pacific serves as an important platform to engage Asia Pacific Countries to collectively deliberate on issues concerning mainstreaming 3Rs in the overall policy, planning and development processes and shaping strategies towards achieving the SDGs.

IV. Keynote Addresses

11. Mr. Suvat Chirapant, Deputy Secretary General of Chaipattana Foundation made a presentation on Natural Resources and Environmental Management through Sufficiency Economy Philosophy. Sufficiency Economy Philosophy has a close relationship with natural resources and environment management. Unsustainable communities face several challenges. The concept of Sufficiency Economy Philosophy (SEP) was initiated in Thailand in 1974. However, during the economic crisis in 1997, SEP became a guiding light and Thailand’s development compass. Subsequently SEP became a new rural development strategy, since the beginning of the 9th Socio-economic Development Plan in 2002. SEP’s three main

pillars are (i) Moderation which means sufficiency at a level of not doing something too little or too much at the expense of oneself or others (ii) Reasonableness, which implies that the decision concerning the level of sufficiency must be made rationally with consideration of the factors involved and (iii) Risk Management, implying the preparation to cope with the ensuing impact and changes in various aspects by considering the probability of future situations. The two main conditions of SEP are Knowledge and Virtue. The SEP approach is considered to be of great help in achieving the Sustainable Development Goals. There should be a balance between production and consumption.

12. Mr. Upendra Tripathy, Director General of International Solar Alliance, in his presentation on Renewable Energy in the context of circular economy- Implications towards sufficiency economy and SDGs said that renewable energy is a part of the circular economy concept which can be categorized into three major heads: off-grid, under-grid and grid-connected. Carbon dioxide emissions are both due to natural and human sources. Natural sources include decomposition, ocean release, animal and plant respiration, organic matter decomposition, forest fires, and volcanic eruptions. Human sources come from activities like industrial production (burning of coal, oil, natural gas), deforestation, transportation, construction in infrastructure sector, cooling and heating in buildings. Human sources have disturbed the natural carbon balance. This is because natural sinks remove around the same quantity of carbon dioxide from the atmosphere that are produced by natural sources. This has kept carbon dioxide levels balanced and in a safe range. But human sources of emissions have upset the natural balance by adding extra carbon dioxide to the atmosphere without removing any. Renewable energy, being clean and green, is interlinked to circular economy and sufficiency economy. Renewable energy is a part of the circular economy concept. As the share of renewable energy goes up in the global energy basket, technologies will drive down the cost of renewable energy, enhance efficiency and also promote circular economy. Sufficiency economy will also have a boost and will be easier to reach out that will help in achieving SDGs much better and faster. By implementation of various parameters of circular economy, a part of SDGs can be accomplished to benefit economy, society and environment. This will in turn promote human well-being for both current and future generations. To strengthen interconnection between circular economy, renewable energy, SDGs and Sufficiency economy, issues related to Ideas, institutions and actors need to be identified and addressed. Policy makers have to perform, reform and transform. Only then 1.2 billion people without access to electricity can get access. 2.4 billion people without clean energy fuel can get access to clean cooking.
13. Prof. Hidetoshi Nishimura, President of Economic Research Institute for ASEAN and East Asia made a presentation on Challenges and Good Practices for the 3R and Circular Economy in ASEAN and East Asia Region. He stated that with rapid economic growth, resource consumption has been greatly increasing in

ASEAN region. In order to address the challenges of depleting resources, the ASEAN Vision 2020 was formulated in December 1997. The geo-economic, geopolitical, and technological landscape has changed tremendously since the ASEAN Vision 2020 was adopted. The ASEAN Vision 2040 seeks to assess the challenges ASEAN region faces and sets out a vision for the next 2 decades and the strategies to achieve it. ERIA in collaboration with the Ministry of Foreign Affairs of the Government of Thailand initiated the ASEAN Vision 2040 Project. Resource efficiency through circular economy concept is crucial for the future of manufacturing industries and is critical to support the development of local capacity for a sustainable ASEAN region. The key aspects of a new integrated paradigm should be addressed in a cross-sectorial manner. Issues such as taxation, social benefits, licenses, ecosystem payments, and employment conditions should be addressed to reduce vulnerability and enhance competition among key stakeholders. 3R approaches are effective entry points. For the paradigm shift, key innovations, technical and financial models are important for the region-wide success of circular economy.

14. Mr. He Fengyang, Mayor of Jieshou city, Anhui Province, P.R. China made a presentation on The Road to the Development of Circular Economy –Jieshou Model. He stated that in 2018, the gross regional product (GRP) of Jieshou was Chinese Yuan (CNY) 21.6 billion, with a year-on-year growth of 11.1%. In recent years, the circular economy industry of Jieshou has maintained a rapid growth with annual average output value and tax revenue increasing by more than 40%. The rate of contribution of the circular economy to the industry of Jieshou is always above 70%. In 2018, the output value of the circular economy industry of Jieshou was CNY 61.57 billion, and the tax expenses amounted to CNY 1.85 billion, which were respectively 34 times and 26 times compared to those at the beginning of the establishment of the industrial park. The circular economy industry of Jieshou plays an exemplary role in the development of resource recycling industry. Due to the consistent efforts of the circular economy industry, more than 40,000 families have achieved prosperity; the rural per capita net income in Jieshou has increased by more than 10% and many multi-millionaires and enterprises worth of at least CNY 10 billion appear. The four success factors identified are (i) **environmental protection**: the development of circular economy can totally control the impact on environment within the limit specified by national rules and regulations, (ii) **innovation**: the sci-tech innovation potential in the circular economy is unlimited, (iii) **scale**: it is an inevitable course for an enterprise to transform from small-sized and scattered operation to collectivized operation and (iv) **normalization**: the profitability of non-normative enterprise stems from the externalization of its internal cost.

V. Circular economy towards sufficiency economy ~ Implications for SDGs

15. Sufficiency economy philosophy and its implications in achieving the SDGs have been reflected upon by several presenters. In a society specific societal functions such as energy food need to be delivered using different means. There is a need to link 3R for narrowing, slowing and closing loops. Sufficiency economy philosophy is a thinking process and progress with a right mix of moderation, reasonableness and resiliency. Increasing the connection between circular economy and climate change is need of the hour. Circular economy is an enabler for climate policy. A right mix of these factors has an impact on sustainability through balancing 4 dimensions of life vis-à-vis economy, society, environment and culture. For realizing the potential of 3R through sufficiency economy, there is a need for systemic approach mainly through regulation of economic drivers: jobs, security of supply and action plan at an international level that would initiate ground action.
16. The Chinese case study revealed the circular economy approach towards sufficiency economy and explained the importance of incorporating the circular economy approach in the material flow network. End of life vehicle (ELV) generation in China is projected to increase substantially by 2050. In September 2016, the state council drafted comments on the administrative measures on the recovery of ELV. The most effective regulatory core is the economic incentive that ensures high collection rate. Based on the available data, P.R. China needs to develop its own approach to handle the ELV, not simply copy/duplicate other countries' experience. The management information system, including reception, reporting, auditing, and funding subsidy, is quite helpful to support the ELV recycling in P.R. China. The extended producer responsibility (EPR) implementation in P.R. China is not smooth and lacks very close relationship between the producers and the recyclers. The integrated framework of circular economy for ELV management should be initially built and supervised by the higher levels of government and the revision of administrative measures on the recovery of ELV need to be properly enforced. The collection and recycling network for ELVs should be more effective and standardized. For sustainable functioning of the vehicle industry, cost internalization and EPR principle should be strengthened for producers of vehicles. The ELV recycling industry is confronting the technology and pollution control upgrading mechanisms. Chinese circular economy is based on material flow framework.
17. A presentation on 3R policy, plans for SEP and best practices of Thailand highlighted that the philosophy of Sufficiency Economy seeks to achieve balance and sustainability at all levels. In order to achieve the vision of “Thailand, a nation of Stability, Prosperity, and Sustainability”, the 20-Year National Strategy is setting out frameworks and directions for all the public sectors to follow. The Green Growth Strategy is one of the six national strategies that will direct the country’s development towards sustainability and achieving the sustainable development goals. The Thai government needs to take lead in green procurement

to promote green marketing mechanisms. In Thailand the circular economy principle for sustainable plastic production and consumption is applied along with the existing 3R practices including material recovery practices, organic waste utilization, biodegradable recovery practices and waste to energy (WtE) practices.

18. The Forum discussed a wide range of issues around 3Rs in Asia and the Pacific including the role of circular economy in understanding the context of sufficiency economy and the supply security of resources such as natural resources, primary and secondary raw materials and minerals, in achieving the SDGs. The circular economy concept is present in a very niche market and it is extremely important to attain a paradigm shift from waste thinking society to a material thinking society. The forum noted the Chinese and Thai experiences on circular economy and Sufficiency Economy Philosophy (SEP) in the field of 3R. The possible impacts of a progressive transition to the circular economy in Asia-Pacific - socially, economically and environmentally - under the 2030 Agenda for Sustainable Development were also briefly discussed. Better institutional capacity to promote government and international collaborative research programmes for strengthening basic statistics, material flow and waste accounting in support of whole-of-value chain approach is a key enabler towards circular economic development. The forum also deliberated on the need of a framework to measure the impact of transition to a circular economy. Development of reliable data sets and scientific methodologies are extremely important to consider transitioning to a circular economy. Best practices/cases of well-designed policies and programmes, institutional arrangements and capacity building and technology transfer programmes, both at a national and international level were also shared with the forum. The forum also felt that indexing of countries based on circular economy data was necessary.
19. The Forum recognized that sufficiency economy and circular economy are inherently linked and mutually reinforcing in bridging the economy and ecology towards achieving the SDGs.

VI. Circular economic utilization of plastics waste ~ Implications towards SDGs

20. A presentation on reducing plastic waste through the circular economy approach showed that the material consumption has increased sharply over the past four decades, accounting for more than 50% of world consumption, while material productivity has not improved. The journey of plastic waste from terrestrial ecosystem to marine ecosystem mapped the plastic management chain. The 3 major drivers vis-à-vis economic growth, increase in population and urbanization affected the management of plastic waste. A paradigm shift from linear model of “take make waste” to a circular economy approach was essential to achieve the sustainable development goals. Industry led market transforming interventions and projects, better labeling, sustainability reporting and declarations on packaging are the way forward.

21. A case study of circular economy in the context of the plastic industry highlighted the issue of plastic waste in Thailand as evidenced in the United Nations SDGs. Thailand ranks 5th in the country list of worst plastic offenders to mismanage plastic waste. A total of 2 million tons of plastic waste is generated in Thailand, out of which 1.5 million ton is either incinerated or landfilled. To reverse this trend, the coalition of public private partnership (PPP) is essential. Nine months of Public Private Partnership arrangement in Thailand in the plastic waste management and resource recovery sector has resulted in creation of new products & markets. Some of these products are: Upcycling of PET bottles to shirts and bags by PTT Global Chemical Plc. (GC), plastic road by DOW and wood plastic composite made from PCR of HDPE bags.
22. The presentation on the plastics economy in South Australia introduced the forum to the Beverage Container Deposit Systems facility in South Australia. The system has a long track record of high quality post-consumer PET and has maintained highest price in local and international market despite China's restriction on import of plastic waste. The system mostly handles PET and also HDPE. The scheme of refundable deposits (10c/ container) since 1977, guarantees an income for handling this material. As far as single use plastics are concerned, the policies dealing with it should consider a mix of cost, new business opportunities, risks and its impacts. we will have to regulate/ incentivize change for circular economy and ban single use plastics wherever it is sensible/possible (eg single use plastic bags ban in- SA; NT; WA; NSW; Qld), invest in alternatives (eg. compostable), design and act more strategically about where plastics are used, mandate recycling targets mandatory (EU), build better Extended Producer Responsibility (Australian Packaging Covenant), institute container deposits on beverage containers (SA, NSW, NT. Qld. WA. etc.), mandate labelling for recycling (ARL) and impose tax on virgin plastic as in the UK.
23. In the era of Fourth Industrial Revolution (Industry 4.0), the New Plastics Economy Global Commitment (2018) shows that many major public and private sector are increasingly advocating the benefits of circular economic model in closing the loop on plastics production through innovative reuse with technological interventions. In regard to this, the forum deliberated about the major gaps (in terms of policy, institutional, technological, and financial and data/information) in Asia-Pacific region in achieving the true potential of business and economic opportunities towards circular economic utilization of plastic waste. The implementation of the policies and regulations as well as creation of waste plastic management infrastructure coupled with capacity building through regional knowledge-base (database, experts, indicator monitoring, information sharing and awareness) are the major challenges which need to be mitigated to achieve the specific targets committed under SDGs in the region. The forum also discussed the importance of circular economic utilization of plastic waste in contributing to the achievement of SDG 11 (sustainable

cities and communities), SDG 12 (sustainable consumption and production), SDG 14 (life below water) and SDG 15 (life on land). The key enabling factors to achieve full scale utilization of plastics waste to prevent their open dumping and open burning, including dumping into oceans were briefly discussed and to what extent countries have addressed – a) building market potential; b) engaging private sector; c) developing PPP models; and d) technology transfer – towards circular economic utilization of plastics waste. Japan shared their plan to set “Resource Efficiency and Marine Plastics Waste” as the agenda at the G20 Environment and Energy Ministerial Meeting this June and expressed their willingness to lead cooperative actions to deal with this issue.

24. The forum deliberated on improving the availability of data, information, indicators, and knowledge-base (information, experts and institutions) in areas of plastics waste and how the credible use of those information and knowledge-base for sound management of circular economic utilization of plastics waste can be achieved. The forum presented the critical lessons in moving towards circular economic applications for managing plastics waste and deliberated on the state of 3R technological interventions in addressing the growing problem of plastics waste management in the region. Financial sustainability requires the suitable financial mechanisms that are viable for Asia-Pacific countries for managing plastics waste.

VII. Sound material flow and accounting towards sufficiency economy

25. Sound material flow analysis towards sufficiency economy is important. The material flow analysis looks at the economic system as an input-output process. There is a need of a coherent accounting of material use in the global economy. The International Resource Panel (IRP), a scientific forum recognizes policy interventions considering human wellbeing and economic growth with minimum stress on natural resources. The United Nations lifecycle initiative is a hot spot analysis tool to better enable the policy makers to make a paradigm shift to the circular economy approach.
26. A presentation on the trans-boundary movement of recyclable resources described the current management system and practices in Asia-Pacific. Sufficiency economy, waste management systems and practices in Asia and the Pacific are very relevant. Sufficiency Economy at national level starts with a national administrative and development plan that encourages and enables people to live their lives and to cooperate with others in development based on the Philosophy of Sufficiency Economy. P. R.China is not able to secure the waste paper domestically. China is one of the major importer of waste paper. In 2016, China’s import of waste paper were 50.8% of the total global import. Demand of waste paper exists for producing carton boxes. China strictly regulates its forest because of deforestation. Similarly, in 2016, 14 million tons

of plastic waste was traded in the world. More than 60% of plastic waste was sent to China, because most of imported plastic wastes by Hong Kong were re-exported to P.R. China. After China restricted the import of plastic waste, many Southeast Asian countries, such as Thailand, Vietnam, Malaysia, Philippines and Indonesia faced problems. Exporters of plastic wastes for recycling do not have good quality control, while importers also do not care about the quality of imported waste. As a result, waste which is not good for recycling are disposed off, or burned without pollution control. From the viewpoint of sufficiency economy, there is possibility that unsorted and/or uncleaned plastics will be regulated under the Basel Convention but such amendments may create a burden to small counties, where it is not able to invest in sorting and washing facilities. Some special arrangements should be considered, in the context of “3R+Return”, which has been promoted in Pacific islands countries.

27. The Forum also discussed the status of e-waste management. The electronics industry is extremely important in regards to technological development and creating job opportunities. However, the industry uses scarce natural resources as raw materials in their production cycle. In 2017, 44.7 metric tons of e-waste was generated which is expected to increase to 52.2 metric tons by 2021. Global E-waste monitor shows a co-relation between the purchasing power parity and electronic industry.
28. The Forum further discussed the **Lessons from Global Materials Resources Outlook to 2060**. These lessons are implied in the context of Circular Economy, Sufficiency Economy and SDGs. The global economy is expected to increase threefold in the coming years; however, the global growth is expected to slow down. There is a structural change that is shifting activities away from material intensive sectors. Despite structural and technological change, global materials use will double between now and 2060. This exacerbates a wide range of environmental impacts, and is on a collision course with meeting the objectives of the Paris Climate Accord. While recycling becomes more competitive over time, it is not sufficient to shift the balance between primary and secondary materials use. Given the stark differences between materials, there was a need for greater granularity within resource efficiency policies, motivated by environmental concerns. A greater coherence is needed between resource management and climate policies, as well as other policies, such as trade and innovation. Recycling is growing at a faster rate than mining but it remains only a small share in the world economy.
29. Achieving the 2030 Agenda for Sustainable Development and the SDGs will require increasing economic efficiency and material wealth being integrated with social and environmental objectives to preserve the capital base of our economies and societies for future generations. To this regard, the Forum discussed the most promising policy uses of sound material flow and accounting. The Forum mentioned that despite

technological and structural changes, the material consumption was expected to double by 2060. The discussion also focused on the importance of sound material flow and accounting to provide a basis for policy relevant, analytically sound and measurable indicators to circular economic development and sufficiency economy.

30. In order to realize a sound material cycle society internationally, the appropriate management of transboundary movement of wastes in each country is necessary. The forum further discussed the systems to build effective international cooperation in achieving sound management of transboundary movement of recyclables and wastes (in line with the provisions under the Basel Convention).
31. The Forum also deliberated on the significance of effective collaborative government-industry-academia partnerships (both national and international) to strengthen basic data and information base, sound material flows, material and waste accounting to achieve circular economic development and sufficiency economy (SEP). The Forum suggested for assignment of responsibilities based on polluter pay principle and precautionary principle.

VIII. Technology as a driver for clean energy and green industry towards sufficiency economy ~ Implications towards SDG 7, SDG 9 & SDG 12

32. The technology-oriented session focusing on clean energy and green industry, which are vital components to achieve sufficiency economy, was participated by international organizations, governments, and international cooperation agencies. The session unanimously highlighted the significance of micro, small, and medium enterprises (MSMEs) in the economy of Asian countries with 97 to 99% industries belonging to MSME category. In case of Thailand, 42% of GDP is earned by SMEs with annual growth rate of more than 5%. MSMEs are the backbone of economy of Asia Pacific countries. However, MSMEs face the challenges of access to finance in terms of subsidies and green credits and lack of enabling policy environment for them to utilize best available technologies for energy efficiency and evolve as green industry. The major technology interventions identified were renewable energy, waste water treatment and recycling, energy efficiency, biomass as fuel and source of clean and affordable energy (SDG7), and rain water harvesting. In case of agriculture, advanced irrigation technique such as drip irrigation was pointed out especially in water scarce countries such as Afghanistan. Biomass waste technologies also provide solution to disaster waste management. In case of Japan, biomass waste mainly wood was reused for energy recovery and in construction. Biomass has great potential as renewable and affordable energy source with more than 1 billion tonnes of annual agriculture waste.

33. The Forum urged that there is an urgent need to create Asia Pacific wide technology and financing platforms for SMEs to be resource efficient and move towards sufficiency economy. UNIDO is promoting Private Finance Advisory Network (PFAN) which would address commercial and financial aspects of a project to be investor ready.
34. UNIDO's Resource Efficiency & Cleaner Production (RECP) program with more than 65 centres in 51 countries has assisted thousands of SMEs in achieving waste minimization and improving competitiveness leading to sustainable industrialization (SDG9). Based on JICA's experience, incentives and certification systems could encourage SMEs to adopt green industry concept. Economic Research Institute for ASEAN and East Asia's (ERIA) Circular Economy Readiness Self-Assessment Tool could help industries to appraise their level and take necessary measures to move towards circular and sufficiency economy. National strategies and action plan such as in Japan could help in local revitalization and job creation by engaging local authorities to contribute to greening of SMEs and utilization of biomass energy. Strategy and Industrial Development 2017-36; Thailand 4.0; focuses on improving competitiveness, human resource development, and adoption of environmentally friendly technologies. The countries in Asia Pacific could learn from such national strategies supported by ministerial policies and help industries integrating 3R and resource efficiency in their operations and supply chain and promotion of sustainable consumption and production (SDG 12). Need for innovative technologies and their localization for easy adoption by the local industries, increase in understanding of local authorities, integration of 3R in product life cycle right from design stage, enabling policy and regulatory framework, infrastructure and access to finance can help industries in harvesting technological advantages to achieve circular and sufficiency economy.

IX. Roundtable Dialogue Public-Private-Partnership (PPP) to Advance 3R in Asia and the Pacific ~ International Partnership for Expanding Waste Management Services of Local Authorities (IPLA)- a SDG Partnership)

35. With an objective to advance 3R in Asia and the Pacific region by promoting public-private-partnerships (PPPs) and private investments in waste management sector, a Roundtable was organized in line with the objectives of International Partnership for Expanding Waste Management Services of Local Authorities (IPLA) - a SDG Partnership. The Roundtable provided an opportunity for the private sectors to share their state of art 3R technologies and expertise with the Government representatives.

X. Major Achievements and Initiatives by Countries on the Implementation of Hanoi 3R Declaration (2013~2023)

36. There is clear evidence from the progress made by participating countries that the Regional 3R Forum in Asia and the Pacific is assisting and guiding them to mainstream 3R policy in member countries. There is a steady progress in legislation and policy development in many member countries related to source separation, composting, waste-to-energy technologies and emerging waste streams. However, the countries are also faced with a number of issues and challenges in moving forward. These include and not limited to the lack of proper collection, transportation, and treatment capacity for waste, lack of land for sanitary landfill, a lack of legal arrangements and rules for solid waste management, lack of public awareness, lack of technical know-how to promote 3R initiatives and lack of involvement by the private sector. Weak enforcement of legislation, limited financial resources, lack of waste management infrastructure, inadequate public participation and weak coordination among institutions and government agencies are also contributing factors for impeding the progress. Developing a business case for recycling of waste streams to enable the engagement of the business community to create businesses in the recycling and waste management sectors is seen as a high priority. Despite these issues and challenges, all the participating countries have demonstrated some progress, a selection of them stated below. It is of paramount importance that the Regional 3R Forum in the Asia and the Pacific continue to provide policy guidance and support these countries to ensure such momentum is sustained.
37. **Afghanistan**: All provincial municipalities of Afghanistan are responsible for Municipal Solid Waste (MSW) management and other sanitation activities has started waste segregation campaigns and bans on single-use plastic bags to reduce the MSW generation. The Directorates of sanitation of all municipalities are also aiming to utilize organic waste by composting or energy recovery by setting up community-based and individual composting plants and anaerobic digestion plants. The major force involved in the waste recycling of Afghan cities are the informal rag pickers. The Directorate of Sanitation plans to formalize all these rag pickers and create a bond between the formal rag pickers and the waste recycling facilities. The Directorate has also involved the private sector to provide the door to door collection facilities throughout the city. This will result in increased collection efficiency, removal of waste collection points from the communities and job creations. Recently, five major cities of Afghanistan are developing urban design frameworks and will consider solid waste management aspects. The Ministry of Urban Development and Land is working on this. Solid waste management plans are develop in 20 major municipalities. Following policies and regulations are developed: -SWM Policy, clinical waste regulation, urban solid waste regulation and hazardous waste regulation.

38. **Australia:** All state governments in Australia have agreed to build a National Waste Policy focussing on circular economy and waste hierarchy. National waste report summarising Australian data will be released every year. Despite of lot of work done in implementing 3R waste hierarchy, waste generation continues to increase. Critical focus areas are infrastructure investment in waste recycling, government procurement, education, services for remote areas, and disaster waste management Trials for plastic waste into roads.
39. **Bangladesh:** The Seventh Five Year Plan (2015–2020) of Bangladesh includes 3R strategies and programmes for waste management and low-carbon sustainable development to integrate with the SDGs. Ministry of Industry of Bangladesh has taken up a number of projects and initiatives to implement HaNoi 3R Declaration like introducing national awards for 3R industry, formulation of 3R guidelines, establishing 3R eco-industrial parks, capacity development projects for 3R industries and green- ship recycling projects. Some of the initiatives are: enhancing integration and articulation of stakeholders and designing institutional arrangements; support in formulation of Waste to Energy Management, National Strategy and explicit financial incentives and operational guidelines. Some initiatives have also been taken on a large scale (Waste to Energy Industry) keeping in view the total 47,000 Tons/day waste that will be produced in urban areas of Bangladesh in 2025.
40. **Bhutan:** In Bhutan, The National Integrated Solid Waste Management Strategy, 2014 emphasizes on the processing and treatment of Organic Component of Waste through: Composting, Bio-gas and home composting. 3Rs as part of educational curriculum is introduced in the schools. Waste and Climate Change Project for a period of four years (March 2017 till March 2021) has been initiated. The outcome of the project is to come up with the national and city level waste management strategy, reducing current ambient air quality (PM10) to an acceptable limit, particularly in Thimphu City and industrial town of Pasakha. Managing waste through “Pay as You Throw Approach” or “Big Bin Small Bin” approach is one of the important strategies which will be implemented in the 12th Five Year Plan. The National Integrated Solid Waste Management Strategy, 2014 will be implemented to strengthen waste management system and to attain zero waste by 2030 in Bhutan.
41. **Cambodia:** In Cambodia, the Ministry of Environment in cooperation with UNEP and IGES is finalizing the National Waste Management Strategy and Action Plan, to be enacted in 2019. A sub-decree on Municipal Solid Waste Management and Plastic Bag Management have been enacted to build sustainable cities by encouraging “zero waste”. National Industrial Development Policy (NIDP 2015-2025) has been implemented to support industrial symbiosis in industrial parks. Tax incentives are being considered for green technologies products that are either imported or produced locally. In the field of 3R, many campaigns have been conducted with wide participation from all stakeholders including government, private, society

communities, academia, and development partners. With the newly drafted law on investment and national resources and environmental codes, the consideration of 3R and resource efficiency are being prioritized with more specific mechanism required cooperation with all the line ministries having mandate and public participatory approach from all the stakeholders in the society.

42. **Federated States of Micronesia:** The Federated States of Micronesia (FSM) is guided by its Strategic Development Plan (SDP) which is equivalent to a Sustainable Development Policy. Strategic Goal 2 of the SDP addresses the need to improve and enhance human environment through the application of waste management and pollution: 3R system of reduce, reuse, and recycle. Additionally, the country has in place an Environment Act and implemented National and State Solid Waste Management Strategies. Moreover, some of the states have developed Recycling Acts that address recycling issues; recycling regulations are in place and the focus is on recovery of recyclables and shipping overseas for processing and recycling. Through partnership with the private sector, a materials recovery system with facility is in place. More importantly, three out of the four states have implemented Container Deposit Legislations (CDL) systems. Public Recycling Bins are put in all states and “No Plastic Bag” law has been implemented in Yap, and Pohnpei.
43. **India:** Ministry of Housing and Urban Affairs (MoHUA), Govt. of India is implementing Swachh Bharat Mission (SBM) or Clean India Campaign in Urban areas of the country. Swachh Bharat Mission (Urban), with one of the objectives of municipal solid waste management in all 4041 towns/cities are under implementation upto October, 2019 (2014-2019) in all the States/UTs. MoHUA is implementing the SBM by providing the viable gap funding/ grants to the States/UTs in urban area of the country. Bureau of Indian Standard (BIS), Govt. of India has published IS 383:2016 to permit the use of manufactured aggregates namely recycled aggregate (RA) and recycled concrete aggregate (RCA) in lean concrete, PCC and RCC by any concerned from Construction & Demolition waste in urban areas. Govt. of India has notified Solid Waste Management Rules, 2016 which is applied to every urban local body, outgrowths in urban agglomerations, census towns as declared by the Registrar General and Census Commissioner of India, notified areas, and notified industrial townships. Govt of India has also notified Plastic Waste Management Rules 2016, e-waste (Management) Rules, 2016, Bio-Medical Waste Management Rules,2016, Construction and Demolition Waste Management Rules, 2016 and Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. As per the Rule, every Municipal Corporation and the authorities in the rural area have been asked to recycle, reuse and handle the plastic in such a way that no harm is caused to the environment. Government of India is taking various initiatives to make the waste to energy plants in the country financially viable. As per the latest amendment to the Electricity Tariff Policy 2006 by Ministry of Power, it has been made mandatory for the State Electricity DISCOMs to

purchase all power generated from municipal solid waste at the rate determined by appropriate authority. Ministry of Rural Development of India is also contributing to the causes of circular economy, solid waste management and improvement of natural resource management, including the 2030 Agenda for Sustainable Development.

44. **Indonesia:** The Government of Indonesia enacted a law regarding industrial affairs with a special issue related to resource efficiency i.e. Green Industry as one of national industry goal. In Indonesia, the National Policy and Strategy on Households Waste and Waste Linked-Household Management are aimed at addressing the issues of municipal solid waste. EPR Modelling in Bali is aimed at reducing plastic and carton packaging waste by building collaboration between national government, local governments, producers, retailer, recycling industries, financial institutions, and community. A framework is being built to develop a solid waste data system. A Refused Derived Fuel Project is initiated in Cilacap city. Indonesia is developing a mechanism “Waste Bank Mechanism” to promote circular economy with the involvement of communities (informal sector). Waste Bank is a kind of solid waste management facility managed by community to collect recyclable separated solid waste. Waste Bank sell the waste to recycling industries, and the money (benefits) will go to the community.
45. **Japan:** Japan established the Fundamental Law for Establishing a Sound-Material Society in 2000. Based on the Fundamental Law, Japan issued the 4th Fundamental Plan for Establishing a Sound Material-Cycle Society in last June. The plan aims to unify “Environmental aspect”, “Economical aspect” and “Social aspect” and try to move into Circular Economy. The plan also set the goals related to Resource productivity, Cyclical use rate and Final disposal amount. Japan also has the plan to issue Plastic Resource Circulation Strategy toward next G20 to be held in Japan in June 2019.
46. **Kiribati:** Kiribati has an existing recycling system known as “Te Kaoki Maange” that recovers beverage aluminum cans, PET bottles and lead-acid batteries using the container deposit legislation (CDL). The facility is also used as a storage yard for the end of life vehicles (EOL) and other bulky wastes including e-waste. Kiribati has also a banned of importation of single use plastic bags and nappies of plastic contents. Kiribati has also drafted national waste management strategy in 2008 and plan to revise the strategy in 2019 as part of the ongoing projects. Part of this work will also look into establishing an integrated strategy that not only focus on solid waste but also considers hazardous chemicals and waste. The strategy uses the 3R concept as a guiding principle. In addition to the draft waste management strategy, there are also ongoing weekly cleanup activities led by governments and organized annually where the private sector is actively involved.

47. **Lao PDR:** Lao PDR is promoting 3R at generation sources to control and minimize the amount of waste generated. The financing of Solid Waste Management services has been made stronger to manage waste collection and transfer. An Act is issued to cover the general MSW management, treatment, recycling, and resource recovery at the national level. There are also regulations issued on source reduction, segregation of waste at source, collection, transportation, landfills, incineration, as well as industrial waste, healthcare waste and others management. Some of these are Environmental Protection Law and Five Year National Social Economic Plan (2016-2020) on Solid Waste Management which aims to encourage citizens, including children, and the private sector to reduce waste at the source by following the 3R concept. The Ministry of Natural Resources and Environment in cooperation with JICA has started an Integrated Municipality Solid Waste Management Project in Lao PDR to deal with the issue of solid waste management.
48. **Marshall Islands:** In the Marshall Islands, the Majuro Atoll Waste Company was established in 2007. The company works under the Ministry of Works, Infrastructure, and Utility, aiming at addressing the issues of Waste Collection and Landfill Management. The National Solid Waste Management Strategy is in the development process. A Waste to Energy project is initiated and is under feasibility study by the Asian Development Bank. Majuro Atoll Waste Company is working in collaboration with partners under the Clean School Programme to strengthen the educational awareness programs to change public behavior towards waste. In the Marshall Islands, there is a ban on the use of styrofoam cups, plates and plastic in year 2016. Container Deposit Legislation was launched in 2018.
49. **Maldives:** Waste Management Regulatory framework of the Maldives includes (a) Waste Management Regulation of Maldives which is implemented by EPA (B) Works under the National Waste Management Policy of the Maldives including analysis of existing legal framework (c) draft of National Waste Management Act. The National Waste Management Masterplan includes establishment of 5 regional waste management facilities with the provision of waste to energy. The National waste management strategy is based on 3R and PPP (Polluter Pay Principle) Other works in the Masterplan includes introduction of extended producer responsibility, continuous works on public awareness and waste management training and adoption of new technologies and solutions for medical and hazardous waste. Also Maldives has a new policy initiative in place to eliminate single use plastic and ocean plastic.
50. **Malaysia:** The Government of Malaysia has taken several legislative and governance related initiatives that inter alia include (i) Solid Waste & Public Cleansing Management (Scheme for Commercial, Industrial & Institutional Solid Waste) ii) Solid Waste & Public Cleansing Management (Licensing) (Undertaking or provision of collection services for Commercial, Industrial & Institutional solid waste 2018; Enhancement

of Public Awareness – promoting 3R programmes at school and community – increasing cooperation with NGOs and agency reorganization; re-engineering waste facilities and maximum use of high technology. As a way forward, Malaysia has set up several future targets to be achieved by 2020. These include: 40% landfill diversion, 30% recycling rate, developing reliable database, extended producer responsibility (EPR), separation at source in industry, commercial and institutional.

51. **Mongolia:** The Government of Mongolia has adopted an amendment of National Program on Improvement of Waste Management - Regulation of Hazardous Waste collection, transportation, recycling and disposal. Ulaanbaatar City Solid Waste Management Master plan-2020 has been adopted to reduce the quantity of municipal waste being generated. The Mongolian National Association of Waste Recycling Industries and the Governor's Office of Ulaanbaatar, started activities on development of Eco-Park for waste recycling. Projects such as domestic waste segregation facility at Narangiin enger disposal site built by KOICA are implemented to ensure source segregation. Separation of recyclables from municipal waste is well developed with the help of the system ‘‘Buyout points’’. Green Development Policy aims to ‘‘Promote a sustainable consumption and production pattern with efficient use of natural resources, low greenhouse gas emissions, and reduced waste generation’’. UNIDO Project on Demonstration of BAT and BEP in Open burning Activities in Response to the Stockholm Convention in POPs. Asian Development bank has implemented a project on ‘‘Development of Health Sector of Mongolia -5’’ to build healthcare waste storage facility and incinerator for disposal of health care waste.
52. **Myanmar:** National Waste Management Strategy and Master Plan for Myanmar (2018-2030) has already been drafted. This strategy includes six goals and one of them is ‘‘Substantively prevent waste through 3Rs and thereby establish a resource circular society’’. Procedures on Transboundary Movement on Hazardous Waste Management and other wastes and National Regulation of hazardous waste management are drafted. Phase I of Project on Hazardous Waste Management will get completed in March 2019 and Phase II will start in 2019 as a 5 year project. In the Hazardous Waste Management plan, information campaign and inventory for waste electrical and electronic equipment (WEEE) are included and will be implemented in Phase II of the project.
53. **Nepal:** In Nepal, the National Policy on SWM was formulated in 1996 to address the emerging SWM problems due to urbanization. Solid Waste Management Act 2011 mandates by local governments to take the responsibility to promote reduce, reuse, and recycle (3R), including segregation of MSW at source. It has provision for the involvement of the private sector, community-based organizations (CBOs), and non-government organizations (NGOs) in SWM through competitive bidding. Nepal has enacted ‘Plastic Bag Reduction’ and Regulations Directives and has prohibited the use of plastic bags thinner than 20 micron in

Kathmandu Valley. Major projects and programs to promote 3R in Nepal are Secondary Towns Integrated Urban Environment Improvement Project (SLFS in Birgunj), Resource Recovery Facility at Nuwakot (for Kathmandu Valley, based on PPP), Regional Urban Development Project (SLFS in 4 Municipalities of Far Western Nepal) and Global Partnership for Output Based Aid (GPOBA) for Solid Waste Management in Pokhara, Ghorahi, Lalitpur, Tansen and Dhankuta Municipalities. The government has imitated “Clean Bag Initiatives Campaign” in active participation of community people.

54. **Pakistan:** In Pakistan, there are national policies on 3R such as Pakistan Environmental Protection Act (PEPA) 1997 which prohibits discharge of waste in an amount or concentration that violates the National Environmental Quality Standards (NEQS). It also directs that an Initial Environmental Examination (IEE) and an environmental impact assessment is to be filed with the Environmental Protection Agency (EPA) for review and approval before the initiation of construction at a site where there is the likelihood of causing environmental damage. Currently, the Lahore Waste Management Company (LWMC) is exploring the potential of generation of biogas from cattle dung. A plant has already been set up at with the aim to generate biogas and provide it to the residents of the respective villages.
55. **Palau:** Palau is in the process of constructing a new landfill site, executing the planned activities within National Solid Waste Management Strategy (2017-2026). All the existing open dump sites and M-dock landfill will be put to rest. Policies such as Beverage Container Recycling Law and Plastic Use Reduction Act are introduced at local and national level for prevention or reduction of waste streams. For promotion of 3R programs, National Solid Waste Management is working with local governments and community groups to promote community learning and development (non-formal education) on 3R and sustainable waste management. Composting, Beverage Container Deposit Program (Redemption Center), Plastic to Energy Project, Glass Crafting, Scrap Metal Program and Tire Shredding Program has been introduced to meet the sustainable development goals.
56. **The Philippines:** The Philippines has introduced a policy: Republic Act No. 9003 or the Ecological Solid Waste Management Act of 2000 Program, Manila Bay Rehabilitation, Boracay Rehabilitation and SWM projects for local government units (LGUs) to reduce the quantity of municipal solid waste generated. To encourage private sector participation, The Philippines has introduced programs such as Philippine Environment Partnership Program (PEPP), Environmental Compliance Assistance Center (ECAC) and Sustainable Clean Cities & Eco-friendly Schools. Waste-to-Energy facility for highly urbanized cities and highly urban municipalities has been established. It has started eco-labelling of products to promote greening of the value chain. The Government has extended its support to two eco-industrial parks namely, Philippine Economic Zone Authority (PEZA) in Baguio City and in Laguna city. To promote the use of

agricultural biomass waste, The Philippines has adopted a The Philippines' Department of Science and Technology (**DOST**) gadget: energy adaptor (NEA) that could convert gas-fed generator into a methane or biogas generator; energy facilitated adopter (EFA) that could convert a gas-fed generator into a liquefied petroleum gas (LPG) generator. Under RA 9003, 27 cities have issued a ban on use of single use plastics from all departmental stores. This year, a Draft Policy on Waste Electrical and Electronic Management and Environmentally Sound Management of Waste Electronic and Electrical Equipment is adopted to deal with the issues of e-waste. The local government units/municipalities have integrated the waste scavengers into the recycling chain to formalize the informal sector.

57. **The Republic of Korea**: In Korea, 'Volume-based waste fee system' is introduced. It is a unique nationwide "Pay as You Throw" system that plays an important role to encourage households to reduce discharge of waste. The government has been carrying out policies to prevent the use of disposable products since 1994 by law. However, the policy instrument has been transformed to boost voluntary involvement of the stakeholders. Likewise, eco-friendly packaging is being encouraged via voluntary agreements and provision of incentives. The products that have adopted the Design for Environment (DfE), are certified with an eco-labelling and are promoted preferentially to be bought by public entities etc. as a means of waste prevention at source. In 2019, Korea is to introduce a Management System of Resource Recirculation Performances that encourages businesses to voluntarily recirculate resources and to reduce waste generation, and the landfill/incineration levy that is imposed when recyclables go to landfills or incineration facilities by the enactment of the framework act on Resource Recirculation and Master Plan for Resource Circulation for Achieving Circular Economy.
58. **The Russian Federation**: The Russian Federation has adopted a strategy for the development of the Waste Recycling Industry up to 2030. Laws for Eco-Industrial parks and Secondary Material Resources are developed and introduced for adoption. In Russia, landfilling of wastes that contain useful recyclable components is prohibited. The President of Russia has instructed the Russian Government to stimulate production using secondary material resources and create a unified state information system for waste accounting. Additionally, a project for separate collection of MSW is implemented. A strategy for Development of Industry for Sorting, Recycling and Treatment of Waste for the period until 2030 is formulated. There is an implementation of territorial schemes of waste management on the regional level. At the end of 2018, National Project Ecology has been adopted, the plan of action is based on circular economy principles.

59. **Samoa:** The country has shown progress by endorsing Waste (Plastic Bag) Management Regulation 2018 to ban importation, use, manufacture, and exporting plastic shopping bags, packing bags and plastic straws. The initiative is a long term plan of the government to ban Styrofoam by year 2020. Samoa also endorsed its National Waste Management Strategy 2018-2023 which is an integrated plan that includes both solid and chemical and hazardous wastes. Waste levy legislation to support recycling is underway. Samoa government also supports private sector for leasing of government lands to support local recycling; and supports Private-Public-Partnership (PPP) to operate and manage landfill site. Furthermore, Samoa Recycling and Waste Management Association (SRWMA) was established in 2018 and launched its Strategic Plan 2018-2023 to include e-waste, plastics, used oils waste streams amongst others. Other supporting initiatives include JICA-Samoa Bilateral Relationship through J-PRISM which supports capacity development on solid waste management including 3Rs principles and applications. For Goal 9 of the Ha Noi 3R Declaration relating to 3Rs in Industrial waste, Samoa completed its Mercury Initial Assessment (MIA) as national obligation under the Minamata Convention which presents outcome of hazardous and chemical wastes assessment. For Goal 11, regarding 3Rs in Rural Areas, Samoa through its GEF6 UNDP-GoS funded project on strengthening multi-sectoral management of critical landscape supports local NGOs and farmers to promote agriculture biomass waste & livestock waste through reuse and recycle measures. However, critical challenges faced as in the case of most SIDs are: policy and legislation reforms to ensure appropriate legislations and strategies to support 3Rs and circular economies; lack of resources and appropriate 3R technologies; waste integration and mainstreaming; capacity building and training on 3R; awareness and involvement of general public on proper waste management; and geographical isolation and connectivity to access recycling markets. Future plans involves: development of Waste Levy (CDL) legislation; recycling projects at national and community levels; awareness and training for general public and private sectors including strategic waste management consideration for synergies to align with the key thematic areas of development such as climate change, biodiversity conservation, land degradation and so forth.
60. **Singapore:** Singapore aims to achieve a recycling target of 70% by 2030 from its current 61% and is working towards becoming a Zero Waste Nation by reducing its consumption of materials and reusing and recycling resources. The Government, community and businesses will come together to put in place infrastructure and programmes to make zero waste a way of life. Initiatives relating to the management and treatment of food waste, implementation of an extended producer responsibility approach in the management of e-waste as well as mandatory reporting requirements for tracking packaging waste generation and developing packaging waste reduction plans will be rolled out progressively to reduce the amount of waste disposed of.

61. **Sri Lanka:** In Sri Lanka, the National Solid Waste Management Policy formulated in 2007 is revised and will include liquid and gaseous waste, and with emerging waste streams. National Policy on Cleaner Production is already being formulated. Ministry of Mahaweli Development & Environment has banned HDPE (High Density Polyethylene) lunch sheets, shopping bags, carry bags and expanded polystyrene lunch boxes as a waste reduction measure. The Sri-Lankan Government provides tax concessions for import of biodegradable product manufacturing machinery, raw material and semi-finished products. Ministry of Provincial & Local Government has made it compulsory for all local authorities to collect only segregated waste. Waste management project at Aruwakkalu (Puttlam district) is introduced to build the landfill site with modern technology to recycle solid waste with a capacity of 1200 MT per day. Pilisaru Project implemented by the Central Environmental Authority provides facilities and infrastructure to local authorities for composting, biogas generation, plastic recycling etc. Three sanitary landfills are under construction. Colombo Municipal Council is composting all biodegradable wastes and has initiated construction of waste to energy project for western province for residual waste. Ministry of Mahaweli Development & Environment has successfully initiated the introduction of zero waste concept. Concepts of Green Procurement, Green Accounting, and Green Reporting have been introduced by Ministry of Mahaweli Development & Environment. Landfilling of non-degradable and non-recyclable wastes with capacity of 100MT/day in Dompe is initiated by Central Environment Authority. Ministry of Agriculture, Irrigation, Fisheries and Aquatic Resources Development has introduced to riverine management strategies to reduce marine litter flowing from countryside in association with community based organizations, city and local councils. In order to motivate Government sector and private sector institutions, Government of Sri Lanka and responsible institution for environment management including universities have programs for awarding few types of award as “Green award”, “Green productivity award”, “Research and Development award” To promote 3R concept and circular economy within the country. Ministry of Mahaweli development and environment has taken initiative to establish recycling items collecting centers in country wide to expand the capacities on 3R, and to achieve 3R waste goal.
62. **Thailand:** Since the Hanoi Declaration was adopted, the National 3R Strategy and Law for promotion of 3R were drafted to promote system 3R implementation. During 2014-2017, the Master Plan on Waste Management, Action Plan for Thailand Zero Wastes were issued and implemented nationwide. The Zero Waste Project, Clean and Green City Projects, and Government Green Procurement were initiated as 3R flagship programs. Thailand put various efforts to cope with plastic wastes and marine debris issues. In 2018, voluntary based agreement with private sectors was conducted to ban plastic cap seals from drinking water bottles over 2600 million pieces per year and campaign for reducing plastic bags in 12,000 department

stores, convenient shops and local fresh markets. The Roadmap on Plastic Waste Management (2018-2030) was also drafted which aims to apply Circular Economy Principle for sustainable plastic consumption and management and to ban or phase out single use plastics such as micro beads, oxo-containing plastics and cap seals in 2019, and styrofoam food containers, plastic bags (thickness <36 micron), plastic straws and single-use plastic cups by 2022. The Altruistic Heart: We love doing well with our heart program to protect the Environment was conducted to reducing plastic waste and foam boxes. In which the program, there are 5 programs to reducing plastic waste and foam boxes such as 1) Reduce plastic bags and foam boxes in the governmental offices 2) Campaign the reduction of plastic bags in fresh markets and supermarkets 3) Ban plastic bags, plastic bottles, plastic cups, and foam containers in Natural Parks 4) Limited the use of plastic bags and foam containers in zoos and 5) Set priority action in 24 coastal provinces. 3R Learning centers were established in every province to promote 3R knowledge hub and networking. Voluntary based programs for E-waste separation and collection with Bangkok Metropolitan Administration (BMA) and other municipalities have been taken up. Also, draft MSW Act and draft Waste Electrical and Electronic Equipment (WEEE) Act are under approval to ensure system management of solid waste through 3R principles. In industrial sectors, pollution prevention programs, cleaner production and clean technology have been promoted to 20-key industries by capacity building and Code of Practice (COP). Eco-industrial Complex Project in 15 Provinces (18 areas) and 34 Eco-Industrial Estates have been studying, planning and developing.

63. **Timor-Leste**: The country of Timor-Leste faced a number of environmental issues such as sea level rise, inundation, flooding, drought, erosion and ineffective waste management. Timor-Leste has a 4R (Reduce, Reuse, Recycle and Returning) Programme. In recycling, there has been work on plastics, rubber and broken tyre recycling initiatives. The country promotes the use of biodegradable bags in reducing plastic waste. The fourth R is about returning, such as composting, returning fertilizer to the soil (nature) and collecting metals, then re-exporting them to countries of origin. New initiatives taken by the country in the area of 3R are the implementation of a “Zero Plastic Policy”, introduction of the Green School Program and Green Villages. Public awareness on waste management remains the main issue, hence there are public programs introduced to spread awareness on the importance of the protection of environment and its impacts to the health. For example, “Every Friday is cleaning day” and healthy village awards, as two examples of activities. There has been an increase in the financial budget of the states towards waste management of the country.
64. **Tonga**: In Tonga, Environment Management Act 2010, Environment Impact Assessment Act 2003 and Environment Impact Assessment Regulation 2010 are aimed at addressing the specific issues of waste

management. National Implementation Plan on Persistent Organic Pollutants (POPs) was launched to coordinate the pollution control measures and to control the management of hazardous wastes and chemicals. Awareness programs relating to waste minimization is organized in both primary and secondary school under the GEF/PAS, uPOPS and reduction clean school initiatives.

65. **Tuvalu:** 3R is envisioned as one of the goals of the Department of Waste Management to achieve Ha Noi goals in accordance with the Tuvalu Integrated Waste Policy and Action Plan 2017 – 2026. Tuvalu Energy Efficiency Act has been introduced to promote green and socially responsible procurement, International Waters (IW) Project – Pilot Project for pig waste management and composts, (TKIII) National Strategy for Sustainable Development 2016 – 2020, Tuvalu Government Roadmap 2015-2019. Green Waste to Compost programme (Saugaavaka Project) - Waste Levy Regulation, and user pay system is introduced to deal with EPR policies. The central government in association with local governments and NGOs has set up Katoaga Recycling Company that recycles scrap metals and aluminum cans. Waste Management Act 2017 and Waste Regulation 2018 has been enforced to deal with marine littering pollution. Currently gender is considered in all 3R programmes mainly in community based activities. Tuvalu is engaging more youth in collection, compacting and storage of collected cans from the public to create jobs that will lower the number of unemployment in the country which leads to a high crime rate.
66. **Vietnam:** In Vietnam, National efforts are recognized to introduce the EPR mechanism, which were enacted from July 2016 to deal with many kinds of e-waste. Waste to Energy plant has been implemented in the country in 2017. The Nam Son Waste Treatment Complex, a state-of-the-art facility, can convert waste into energy. The National Strategy for Integrated Management of Solid Waste until 2025, and Vision toward 2050 has been enacted. The objectives are in line with the concept of 3R- 85% of MSW will be recycled, reused, recovered for use as an energy source or to produce organic fertilizer by 2020 and 90% by 2025, capacity building for market based approach mechanism for waste management will be develop.

XI. Leadership Programme for Senior Policy Makers on Circular Economy

67. The participants recognized the progressive alignment of the Regional 3R Forum in Asia and the Pacific with the objectives of circular economy in addressing the 2030 Agenda for Sustainable Development and SDGs which not only call for equitable economic growth, but also provide an important political and implementation framework to advance circular economic development and sufficiency economy in the region. The Asia-Pacific region is the most rapidly urbanizing and industrializing region in the world. Waste management in many Asia-Pacific countries must deal with increasingly complex waste streams including industrial waste, electronic waste, plastics in coastal and marine environment, construction and demolition

waste, and chemical waste that add critical dimensions to the region's sustainability. The Ha Noi 3R Declaration (2013-2023) provides an important basis and framework for Asia-Pacific countries to voluntarily develop and implement 3R policies and programs, including monitoring mechanisms, towards transitioning to a resource efficient and zero waste society. It also aims to help bi-lateral and multi-lateral development agencies and development banks in assessing the sustainable needs and challenges to better devise their existing as well as future capacity building programmes and technical assistance in the areas of 3Rs and sustainable waste management.

68. The Circular economy is a systemic solution approach and generates 4 technological needs - (i) Advanced collection, sorting and recycling apps, sensors, robots (ii) efficient materials processing machine learning, artificial intelligence (iii) production to support design for circularity 3D printing, disassembly, repairability and (iv) interactive platforms apps, websites. The necessary digital technologies already exist but the challenge is to make them available and integrate them into the systemic approach that leads to sustainability. Products can have a digital replica to study their behavior through the circular material chain. Digital twins are used to model and optimise production systems and their application has been demonstrated for construction materials and is being explored for other material types. The blockchain technology will allow us to develop a track record for products and their parts. If the blockchain information is coupled with the physical materials, it would provide the information flow to support building a circular economy. There is a need to strengthen the contacts between digital and circular economy experts, who must showcase the opportunities of blockchain, internet of things, artificial intelligence, big data, product identification, collaborative platforms, and develop common approaches. Besides technologies, it needs innovative enterprises, involvement of research institutes, a stimulating policy environment and access to finance. There is a need to build an exchange of experience to learn from each other and host international dialogues to ensure that a circular economy does not create a group of closed local economies, but rather becomes a global system of various economies collaborating together. There was thus a need for running leadership programs so that the thinking process of the senior policy makers changes and there can be smooth transition towards circular economy through Industry 4.0.

69. South Australia is making a significant contribution to the circular economy where the government, industry, community, research and education sector actively collaborate. South Australia is uniquely positioned to demonstrate the circular principles in the areas of recycling and resource recovery; water management; climate change; smart cities; innovation and renewable energy. The Global Leadership programme on Circular Economy is an initiative of Green Industries South Australia. The leadership programs for transitioning into a circular economy approach are the unique practitioner's program which

give business and government leaders the practical skills to make a difference in the circular economy. So far South Australia's achievements are: 31% of wastewater generated in South Australia is recycled, nearly 8 giga litre (GL) of stormwater is harvested per year for reuse, 57% of South Australia's energy comes from renewable sources and more than 84% of waste generated in South Australia is diverted from landfill. The 4 major themes in the leadership program include circular economy policy and practice, community and society, industry and water management. The leadership program is ideal for experienced professionals, public sector managers, academics, and business and industry leaders from diverse backgrounds who are involved in sustainability, urban planning, industrial efficiency, renewable energy, and waste and water resource management amongst other areas. The learning program includes expert presentations, case studies, peer discussions and networking with business and policy leaders which is an extremely crucial link for a smooth transitioning into a circular economy approach.

70. In Japan, circular economy applications are not only limited to waste reduction practices but also to improve the efficiency of circulation of all the natural resources. Their main goals are decoupling economic activities from the consumption of resources and also designing new models on economic, natural and social capitals. The Japanese philosophy of town planning includes creation of life that coexist with nature that leverage the charm of the region with wisdom and ingenuity utilising four types circularity in tourism industry: ecotourism, agriculture tourism, health tourism, art and culture tourism.
71. Nagoya city in Japan focuses on transformation of waste policy and protection of nature. In Nagoya, households separate waste into 9 types which has resulted in reduction of landfill by promotion of recycling. In the process of promoting circular economy, economic development has acted as the governing factor, but it was inseparable from the support and safeguard of institution, law, technology, idea and other social factors. The forum got some insights into the Japanese recycling economy, including the development of the industries.
72. The Forum took note of the Japanese Sound Material Cycle Society as a successful case for the promotion of Circular Economy. In the 1960s, the public health issues and environmental pollution, waste was discarded on roadsides or vacant plots and it piled up in unsanitary conditions risking public health. Rapid increase in waste generation along with the economic growth and structural change to heavy chemical industries resulted in serious environmental pollution. In regards to this, Public Cleansing Act (1954) was initiated to oblige the municipalities to collection and disposal of waste and the national and prefectural governments to provide financial and technological support to municipalities. Subsequently, Waste Management Act (1970) was introduced as a basic system for industrial waste management, with clear definition of waste generators and waste disposal service businesses. It introduced various technological

standards for both disposal activities and facilities. It also marked a rapid increase of subsidies from central to local governments for solid waste disposal facilities. In the year 2000, Basic Act for Establishing a Sound Material-Cycle Society was initiated with an objective to promote 3R through reduction in natural resource consumption and reduction in environmental impacts. Six key points for establishing the sound material cycle society include - (i) showing a clear and specific image of “a Sound Material-Cycle Society”, (ii) defining useful wastes which can be recyclable resources, and specifying in the law, (iii) deciding the priority for waste management (iv) defining the respective roles of Government, Municipalities, Businesses and Citizens (v) establishing the fundamental plan and (vi) formulating concrete implementing measures. The 4th Fundamental Plan for Establishing a Sound Material-Cycle Society and its four underlying pillars vis-à-vis Regional Circular and Ecological Sphere have been described as - (i) Proper Waste Management and Environmental Restoration, (ii) International Resource Circulation, (iii) Resource Circulation throughout the entire Lifecycle and (iv) Disaster Waste Treatment Systems.

73. The Japanese case highlighted 4 indicators and targets for progress monitoring. These are resource productivity, final disposal amount, resource based cyclical use rate and waste based cyclical use rate. The major objectives of the African Clean Cities Platform which was established in April 2017, by the Ministry of the Environment of Japan and JICA, aim to contribute to the achievement of Sustainable Development Goals (SDGs) and facilitate investment of public-private sectors by improvement of ability of organization and human resources and sharing experiences and knowledge on municipal waste in each African country.
74. The case of Republic of Korea on Resource Recirculation Society towards Circular Economy also was presented to the Forum. Republic of Korea enacted the framework act on resource circulation in January 2018 with an emphasis on minimization of landfill/incineration and maximization of recycling activities. Keeping in view the resource recirculation goal, the framework imposes a waste disposal charge when it is incinerated or landfilled (\$9-27/ton). Under the act, the master plan as a policy document is prepared for Resource Circulation for Establishing the Circular Economy. The goal of the policy framework is to establish a circular economy system to reduce waste generation per GDP by 20%, increase the circulation rate from 70.3% to 82% and to reduce the landfill rate from 9.1% to 3%. One of the four major tasks of the framework is to achieve the goal of production. The main activities are to improve the resource productivity, waste reduction at production stage and eco-designing of the products considering circulation. The second major task is consumption: to reduce the use of disposables, encourage resource efficient consumption and creating a resource circulation culture. The third task is to innovate the waste management system by improving collection and segregation methods, intensify hazardous waste management and reduce the

amount of waste going to the landfill. The fourth and the final task is recycling. The framework encourages material recycling system that promotes high value-added recycling and cultivates the recycling industry.

75. Resource Efficiency towards Circular Economy in Thailand reflects on the issue of plastic waste management in Thailand. Every year, 2 million tons of plastic waste is produced in Thailand but only 0.5 million tons is recycled/recovered. Transitioning to circular economy will catalyze the most transformational, economic, social and environmental changes since the first industrial revolution. Consumers can take an active role in achieving sustainability through a complete circular economy approach by taking sustainable actions in their daily life in consumption and waste management phases. Completing the loop of circular economy would contribute to sustainable outcome. An end-to-end process is extremely necessary for a successful circular economy intervention through collaborations i.e. Upcycling the Oceans, Thailand (UTO) & networking, developing upcycled or value added products as well as bioplastic products as alternative, and by turning waste to materials.
76. The Forum discussed several key questions. There was a general consensus that circular economy should become a growth model for Asian economies in the 21st century. Sustainable development is high on Asia's agenda, but how this change will come about remains highly contested. It was suggested that a paradigm shift is necessary to raise the quality of economic growth, while offering rich rewards across societies for businesses and citizens, moving away from the linear economy model of "take, make, and dispose". The challenge of transitioning to more sustainable growth models is complicated by widespread debate over its nature, from both economic and business perspectives. The forum noted that there is a growing optimism about the potential of the 'circular economy' (CE) as a new model for sustainable growth in Asian countries. A circular economy is one in which products are recycled, repaired or reused rather than thrown away, and in which waste from one process becomes an input into other processes. For much of the world, especially Asia, creating pathways towards regenerative development, which decouples growth from the consumption of finite resources, helps rebuild capital and represents a new terrain.
77. The existence of circular activities in Asian countries provides excellent political 'entry points', which could enable governments, the private sector, civil society and other actors to promote innovative economic models. The CE could provide a powerful narrative, helping to build momentum around a set of ideas that can be applied in and tailored to multiple sectors or cities.
78. Material demands are indeed substantially lowered as a result of products cycling through the inner loops before being recycled at the end of productive use, and as a result of cascading and metabolizing organic materials such as food waste, animal manure and human waste. Today China is attempting to enact another

policy-driven economic transformation by rebalancing its growth to ride higher on the value chain and be more socially redistributive and environmentally sustainable. Policy can further help in areas of consumer and investor education, providing overall guidance – for example by stipulating remanufacturing as a new strategic industry – that can aid financial forecasting and instill confidence among financiers. The Organisation for Economic Co-operation and Development’s (OECD) work on CE modelling tools to enhance the evidence base and determine the impact of different policy levers should make it easier to bring CE practices into economic and industrial planning. Overall, Asia is still an attractive market to investors, due to the potential for high returns, scale and growth in general.

79. The Forum also discussed the issue as to how a strategic shift to circular economic development approach could offer countries in addressing the 2030 Agenda for Sustainable Development and other international agendas and agreements such as the New Urban Agenda, the Paris Climate Agreement, the Addis Ababa Action Agenda, and the Sendai Framework for Disaster Reduction.
80. The Forum deliberated on the fact that circular economy model has a lot to contribute to these agendas: providing a profitable opportunity to move away from resource-intensive processes, whilst maximizing the use of existing assets and creating new revenue streams. The forum also discussed about, how the transition from a linear to a circular economy would require a joint effort by stakeholders from all sectors. Industries can contribute to the transition by developing competencies in circular design to implement product reuse, and recycling, and serving as trend-setters of innovative circular economy business models. Policy makers can support the transition by promoting the reuse of materials and higher resource productivity by rethinking incentives and providing the right set of policies and access to financing. Major Groups and other Stakeholders also play an important role in promoting the transition to a circular economy by mobilizing broad forces to carry out practical actions and putting pressure on businesses and governments to accelerate implementation. In the concept of a circular economy, waste and pollution do not exist by design, products and materials are kept in use, and natural systems are regenerated. Thus, it provides opportunity to accelerate implementation of the 2030 Agenda. The concept of circular economy was repeatedly mentioned as a key solution during discussion. The circular economy holds particular promise for achieving multiple SDGs, including SDG 6 on water, SDG 8 on economic growth, SDG 11 on sustainable cities and SDG 12 on sustainable consumption and production. Increased recycling and scaling up safe reuse of wastewater can support manufacturing and other opportunities, and can close resource loops to reduce water wastage, that in turn would help in achieving SDG 6.
81. The need to empower our cities to implement 3R and resource efficiency measures as an integral part of urban development strategies or city development plans was also discussed. The Sustainable Development

Goals (SDGs) have assigned an important position to resource efficiency. Currently the extraction and consumption of natural resources is not only an ecological challenge but also an economic and social issue. The usage of natural resources especially raw materials in the entire value chain - from extraction to end-of-life - leads to environmental threats like GHG emission, pollutants in various media viz. air, water and soil, and risks to ecology and biodiversity. The forum deliberated that resource efficiency is closely linked to the concept of “circular economy”, which has also gained prominence as a policy goal for sustainable development in recent years. Resource efficiency is a strategy to achieve the maximum possible benefit with least possible resource input. Fostering resource efficiency aims at governing and intensifying resource utilization in a purposeful and effective way. Resource efficiency has the potential to improve resource availability that is critical to the growth of industries, which translates into reduced price spikes due to supply constraints or disruptions. By using resources more efficiently, or by utilizing secondary resources, industries can improve competitiveness and profitability, since material cost is typically the largest cost for the manufacturing sector. The steps to achieve a circular economy are an important part of resource efficiency; however, resource efficiency encompasses a wider range of strategies through the entire life-cycle of products. It is important to emphasize that post-consumer waste is a significant renewable energy resource.

82. The Forum also discussed the need to strengthen our scientific insights to the role of 3R and circular economy in protecting the urban ecosystem, thereby enhancing resilience of cities. Industrialized growth spurs urban density and increased consumption. The combined effects of urbanization, industrialization and globalization have deeply influenced the development of cities around the world. The role of cities is consistently emphasized in the circular economy policy discourse, yet it is not clear how stakeholders interact in socially oriented transition in the urban arena, particularly given the fact that the urban production-consumption system influenced by factors not only situated within but also beyond the city region. Cities can play a pivotal role in creating an enabling environment through regulations and incentives, but the private sector needs to collaborate and explore the cross-sectoral synergies required to achieve a circular model. There are immense opportunities for public-private collaboration in achieving goals that might not otherwise be possible for cities to accomplish alone. Cities are embedding circular thinking in their procurement processes, placing the onus on the private sector to come up with new business models that are both economically viable and ecologically sustainable. This could potentially result in a situation whereby circular products and services become the new market standard. Similarly, urban-industrial symbiosis programmes can deliver greater impact in creating a resource efficient vision for a city.

83. The forum deliberated that in contrast to an unsustainable linear economy, a Circular Economy is restorative and regenerative by design and can be seen as a practical solution to the emerging resource crunch which has resulted in growing tensions around geopolitics and supply risks, contributing to volatile and insecure conditions. The circular economy can help to stabilise these issues by decoupling economic and urban growth from resource consumption. Key principles of the Circular Economy include: to preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows, to optimise resource yields by designing for remanufacturing, refurbishing and recycling to keep materials and components circulating and contributing to the economy, and to foster system effectiveness by revealing and designing out negative externalities.
84. 3R and circular economy are good policy options and measures for the Asian countries in achieving better synergy in their efforts towards clean water, clean land and clean air. Resource challenges are particularly dominant in fast-expanding cities in the Southeast-Asian region and include inefficient infrastructure systems leading to energy blackouts, urban flooding, lack of waste recycling and increasing emissions and air pollution. The forum discussed the relationship between circular economy and sustainable development. The underlying principle of Circular economy covers resource-efficiency, but do not put a great emphasis on material flows and the players' interactions in the value chains in the production-consumption system. The circular economy, therefore, provides a practical approach to realize sustainable development.
85. The currently used systems of food, water and energy provision and waste treatment for material recovery are on an unsustainable course. Policy and decision makers are concerned that climate change impacts, overuse of land, increasing inequality and other urban challenges threaten our food, water and energy security and place pressure on future cities globally, particularly in the Asian region. It was also agreed that the importance of circular economy approach has frequently been acknowledged and there was now increasing recognition of the dynamic interplay of resources and their supply systems in the urban context. It provides as an opportunity for a 'policy nexus' to better integrate planning and resource management within and across urban boundaries and sectors.
86. The Forum discussed the emerging trends in 3R policy implementation across Asian countries and the enabling factors for such leadership and achievements. The forum strongly mentioned that 3R practices have been proven and are workable and effective to improve waste management strategy in many parts of the world. Reduction strategies have been proven effective in Korea and Singapore where waste generation has reduced approximately by 22% and 10% respectively. The Forum deliberated on the drivers for success. There are mainly four factors which drive the success of 3R implementation. These include human drivers, economic drivers, institutional drivers and environmental drivers. Human drivers involve population

growth factor which results in increased waste generation. Additionally, human drivers also include human wellbeing and human attentiveness towards the practice of 3R. The increase in population has resulted in an increase in waste generation which indirectly has caused higher pollution to the environment. In order to ensure human wellbeing, the third human driver namely human awareness is essential. Therefore, in the sense of 3R practice the underlying contributor of human driver basically would result in voluntary participation among public and private sectors. It is generally due to the awareness to ensure that pollution i.e. waste generated, can be minimized. This is seen in Singapore, Japan and Korea, where 3R practice is high due to the high participation in 3R activities. Therefore, this issue needs to be tackled via dissemination of information on the importance of 3R practices. It is achievable through education and campaign to create awareness, thus would create positive response in cooperating and participating in 3R activities.

87. The Forum deliberated on the critical lessons drawn from the G-STIC process, the Green Industry South Australia's Global Leadership Programme, Japan's Sound Material Cycle Society and Republic of Korea's Resource Recirculation Society for Asia-Pacific to advance in the Fourth Industrial Revolution (Industry 4.0). Industry 4.0 refers to a set of diverse and complex automation processes that are currently being used in the industry. The Forum agreed that the Industry 4.0 is extremely crucial to make the transition from a linear to a circular economy. Major entry points to forward the integration of these two rapidly evolving technological and business fields are resource use & management and waste management through waste minimization. Raw material extraction, processing, and production companies can use Industry 4.0 technologies more efficiently, while the same technologies can be used for more efficient resource management and turning waste into 'new' raw material, closing the material cycle. Major policy changes at the business level, and local, national, and international governance levels are needed that include the exchange of expertise at an inter-regional and inter-continental level, development of infrastructure and business activities, with a strong role for eco-innovative small and medium-sized enterprises and the shift from waste thinking to materials management for circularity. The Forum recognized that it would be difficult to achieve circular economy without the 4th Industrial Revolution, and we cannot have a socially useful and sustainable 4th Industrial Revolution without advancing the circular economy.

88. The Forum also discussed the role of young leaders/entrepreneurs in the areas of circular economy innovation and new business models, also defining the role of local and national governments in this regard. Building leadership capacity in the circular economy is of utmost importance in meeting the United Nations Sustainable Development goals. In order to promote circular economy innovations and new business models, both local and national governments have a major role to play. National Governments in Asian countries should promote a culture of entrepreneurship and startups in their countries by mentoring,

nurturing and facilitating startups throughout their life cycle by providing support for innovation and entrepreneurship. National and local governments together with institutions that promote strong investment and financing policies in the development of circular economy have a significantly important role to play. They orient social capital to invest in projects of circular economy in the ways such as circular economy planning, governmental investment, industrial policies and price leverage. Governments at all levels may facilitate setting up of industrial parks in their cities, and analysing current policies of circular economy in their countries.

89. All this will require a 360-degree approach by setting up research parks, incubators and startup centres across the country by creating a strong network of academia and industry bodies. Equally important is the creation of Trust Funds at national and regional levels with the help of donors and global and regional financial institutions to help startups gain access to funding. At the core of the initiative is the effort to build an ecosystem in which startups can innovate and excel without any barriers, through such mechanisms as online recognition of startups.

90. Circular economy is a new type of higher industrial morphology, which has its core ideas like focusing on various development relations such as integrated planning and protection, efficiency and equitability, total volume and structure, and present and future generation, constructing a new type of industrial system characterized by innovation, openness, integration, conglomeration and sustainability and eventually forming a sound recycle of economic development, social advancement and ecological civilization. The overall requirement of promoting the development of circular economy in Asian countries is to uphold the idea of circular economy of 3R (reduction, recycling and reuse), thus pushing forward the culture of resource-saving and energy-saving in the whole society and improving use efficiency. It is advisable to select priority fields and strategic points with comparative advantages nationwide and some development base for pilot trials and key breakthrough, thus embarking on the road of circular economy development with local characteristics. There should be integrated plan of circular economy developments covering all aspects and all strategic points of the society. In order to promote full development of circular economy, young entrepreneurs may take up demonstrative projects and enterprises of circular economy.

91. Regional differences exist between continents. We need to build an exchange of experience to learn from each other. An international dialogue is necessary to ensure that a circular economy does not create a group of closed local economies, but rather becomes a global system of various economies collaborating.

92. In order to advance circular economy, there is a need to promote both horizontal (among line Ministries and agencies such as – environment, industry, urban development, public works, agriculture, mining,

tourism, etc.) and vertical cooperation (between cities and national governments for circular economic development policies and programmes to trickle down from central to local level as part of sustainable urban development strategy).

93. The Forum deliberated that for achieving the goals of circular economy and 3R, people participation is extremely important as has been done in India, for instance, by making a mass movement under “Swachh Bharat Abhiyan” (Clean India Mission) as affirmed the commitments in Indore 3R Declaration (2018).

XII. Reporting of Pre and Parallel Events

94. 8th International Conference on Sustainable Waste Management (IconSWM) was the first official pre-event of the 9th Regional 3R Forum in Asia and the Pacific and was held during 22-24 November 2018 in Acharya Nagarjuna University (ANU), Guntur, Andhra Pradesh, India. The two days conference was followed by a day long field visit to Bio-medical waste treatment plant, Compost plant, Bioremediation plant and C&D Waste recycling plant on 25th November. The objective of the 8th IconSWM was to promote Waste Management as Economic Industry towards Circular Economy. The Conference also aimed at setting up research collaborations between Indian and Foreign universities in the areas of waste management. The exhibition was participated by industries, R&D Institutes and ULBs from India and Japan. In all twenty-two countries participated in the conference and the exhibition. It was also participated by organizations such as UNCRD, UNIDO, UNEP and EU delegation. There were five plenary sessions and thirty-seven technical and special sessions during which two hundred twenty technical papers and seventy posters were presented in the conference.
95. In Plenary Session-1 of 8th IconSWM moderated by Mr. C. R. C Mohanty and Prof. Sadhan K Ghosh narrated the status of waste management and circular economy in India, new legislation notified by Govt. of India in 2016 and put emphasis on business models for waste management in developing countries. A presentation was made on a study on phosphorus recycling from sources such as steel slag, sewage sludge to be used as nutrient for soil. In plenary session II, presentations were made keeping in view the theme of resource recirculation, sufficiency economy philosophy and best practices for waste management.
96. In plenary session III of 8th IconSWM, the major discussion points revolved around resource recovery, green practices and successful examples from developed countries. Plenary IV, the dignitaries spoke on the

importance of a circular economy approach, handling and treatment of combustible waste and the issue of plastic waste management. In Plenary Session V, the key issues such as marine plastic waste and e-waste management were discussed. The major outcomes of 8th IconSWM-2018 included (i) 10 collaborative research initiatives between Foreign Universities and Universities of A.P. (ii) Initiation of MoUs of three Indian Universities with foreign Universities and (iii) International Society of Waste Management, Air and Water (ISWMAW) and IconSWM agreed to do mentoring of two SWM projects in Andhra Pradesh. The organizing committee of IconSWM finally announced that the 9th IconSWM-CE would be held during 27 – 30 November 2019 at Kalinga Institute of Industrial Technology (KIIT), Bhubaneswar, Odisha, India.

97. 3R International Scientific Conference on Material Cycles and Waste Management (3RINCs) was established in 2014 to discuss latest academic findings on material cycles and waste management in Asian countries. 3RINCs was held in Bangkok from 27th February-1st March 2019. The conference was attended by more than 300 participants from 17 different countries. In the technical sessions, there were 100 oral presentations and 40 poster presentations including 18 sponsor exhibitors. The keynote speakers discussed about the latest information and future direction of waste management and material cycles in Thailand, Korea and Japan. In order to address the challenges of municipal solid waste management and renewable energy production, the subject of Waste-to-Energy (WtE) was discussed in detail by several stakeholders including governments, academia and private sectors in Asia. It was noted that the development and implementation of WtE projects essentially would need technical, financial, and social support. The forum mentioned that disaster waste management (DWM) has been treated as just “debris clearance” after disaster events have been neglected from national disaster preparedness. There was a need for incorporating and implementing DWM under the existing governance structure both in disaster risk and waste management system. Equally important was the felt need to strengthen international and regional networking on DWM by utilizing growing local resources and experiences such as Nepal, Indonesia and the Pacific region.
98. This session discussed challenges and opportunities for developing 3R Policy Indicators to monitor the progress of 3R Policies. The session also shared practical challenges faced by Pacific Island Countries to develop sub-regional 3R Policy Indicators due to insufficient data and lack of consistency. It suggested to prioritize for specific emerging issues such as micro-plastics, food loss, construction and demolition wastes. A special session on Guide Line (GL) development for waste management in collaboration with “IGES Centre Collaborating with UNEP on Environmental Technologies (CCET)” was conducted to recognize the current situation of waste management faced in developing economies.
99. The second parallel event of 9th Regional 3R Forum in Asia-Pacific was organized on 5 March 2019 to have the government and experts’ consultation to review the first draft report on the State of Plastics Waste in

Asia and the Pacific – Issues, Challenges and Circular Economic Opportunities” on 5 March 2019, which is being prepared under the Second Phase of State of the 3Rs in Asia and the Pacific. The consultation looked into various components of the Draft Report, namely Material Cycle of Plastic, Status of Plastic Waste, Plastic Pollution and its Impact, Major Policy initiatives and Responses and the Way Forward.

100. A key message, which emerged from the consultative discussion on the status of plastic waste in Asia and the Pacific region, was an appreciation of the common problem associated with the plastic pollution impacting the terrestrial, aquatic and marine ecosystem, socio-economic and livelihood, natural capital and ecosystem services in the region. The meeting also indicated an expression of interest by the participating countries to address it using 3R approach & principles of circular economy by addressing issues and challenges across the plastic value chain by formulating, enforcing and implementing production, consumption and waste management strategies, policy and regulatory framework with uniform and harmonized standards (processes, products and recycling) across the region. This will be achieved through identification of data gaps (policy, regulatory, technology, institutional & behavioral) to establish baseline (city, national & regional) in order to design and implement short and long term policy, regulatory, technology and institutional interventions aimed to change the behavior of plastic consumption waste generation and waste management in the region. The countries agreed to cooperate at all levels to address plastic pollution in order to achieve targets committed under SDG 12 (sustainable consumption and production), SDG 14 (Life Under Water), SDG 6, 11 & 15.

101. A meeting of NGOs was held at The Ninth Asia and the Pacific 3R Citizens Forum Creating Sustainable Lifestyle and Sustainable Community through 3Rs to Achieve SDGs. Eight organizations from 6 countries gathered together to share their experience and knowledge. They focused on the global goals of reducing plastic waste in the ocean and also reducing and recycling food waste. Through activities that take advantage of the characteristics of the region, “the Regional Circular and Ecological Spheres” have been established.

102. As an integral part of the 9th Regional 3R Forum in Asia-Pacific, an International 3R Exhibition was inaugurated by H.E. General Surasak Karnjanarat, Hon. Minister, Ministry of Natural Resources and Environment, Thailand. A number of private and business sector representatives had showcased and demonstrated the state-of-the-art technologies and equipment in 3R and resource efficiency areas.

XIII. The Way Forward

103. The Asia- Pacific continues to be the most economically dynamic world region and is experiencing high economic growth, rapid urbanization, industrial transformation and further increasing natural resource consumption, waste and emissions. The region however faces serious challenges due to natural resource depletion, waste accumulation, urban pollution and natural disasters and climate change underscoring the need for urgent action to increase economic resilience and prosperity. The international policy and business community is committed to the 2030 Agenda for Sustainable Development and the SDGs, the New Urban Agenda, the Paris Climate Agreement, the Addis Ababa Action Agenda, the Nairobi Mandate, and the Sendai Framework for Disaster Reduction to align economic, social and environmental objectives. There is an increasing need for Asia-Pacific countries to continue to integrate sustainability objectives, policies and programs including the 3R's, the sufficiency economy philosophy, circular economy and resource efficiency into their national development plans shaping the macroeconomic policy agenda of the future.

104. The success of steering regional economic and social development in Asia and the Pacific towards achieve achieving the aspirations of the 2030 Agenda and the Sustainable Development Goals, will depend to a great degree on the sustainability outcomes of future production and consumption patterns of countries in Asia and the Pacific. The Asia-Pacific region today consumes about half the amount of natural resources worldwide with commensurate amounts of waste and emissions but produces only one third of the global GDP. As economic activity increases environmental pressures are increasing undermining the potential for further economic prosperity and human wellbeing and increasing economic and environmental risk. There is a big opportunity therefore to invest new technologies and practices that can revitalize existing industries and build new industries and employment opportunities to will allow the economies of the Asia and the Pacific to be more competitive, minimize costs and achieve environmental and resource conservation. The regional 3R forum identifies that innovation systems, new technologies, policies and practices will be indispensable to promote environmental and social sustainability and competitiveness of the industry and business in the Asia-Pacific and for supporting efforts to enable SMEs to contribute to the sustainable development goals. Such technologies, policies and practices should contribute to a better valuation and utilization of natural resources. New policies are needed to operationalize the internalization of the environmental and social externalities of the production and consumption process.

105. By pursuing a regional economic development path based on sufficiency economy principles, and , resource efficiency and circular economic practices, countries and cities can embark on the path of low-carbon and green growth, including realizing eco-efficient infrastructures in key development sectors such as urban design and planning, building, transport, mobility, food, energy, water and waste systems. System change for resource efficient and circular economic development will provide significant opportunities for

green business and green employment opportunities. The engagement of the private sector and the finance industry, including the SMEs, will depend on well-designed policy frameworks and incentives that grow the knowledge base, expertise, technical skills and services that need be activated in pursuit of sustainable production and consumption and ultimately the achievement of sustainable development. Broad awareness of the benefits of circular economic development is important and will be supported by government policies and programs, including financing decisions.

106. The Asia-Pacific region will benefit from a sufficiency economy approach which will help to achieve the Sustainable Development Goals by creating a balance between production and consumption, technology innovation and lifestyle aspirations. By implementation of various parameters of SEP and circular economy, a part of SDGs can be accomplished to benefit economy, society and environment. This will in turn promote human well-being for both current and future generations. To strengthen interconnection between circular economy, renewable energy, SDGs and Sufficiency Economy, issues related to ideas, institutions and actors need to be identified and addressed. Policy makers have to perform, reform and transform.
107. The region needs to increase resource efficiency through circular economy which is crucial for the future of manufacturing industries and is critical to support the development of local capacity for a sustainable Asia-Pacific region. There are many existing opportunities for economically attractive resource efficiency in the short term and in the long-term a regional economic development strategy based on circular economy and resource efficiency will be superior to business as usual in terms of economic and employment outcomes and environmental sustainability.
108. Policy, regulatory, technology, institutional & behavioral changes are required to change the behavior of plastic consumption waste generation and waste management in the region. National and local governments together with institutions that promote strong investment and financing policies in the development of circular economy have a significantly important role to play. Building leadership capacity in the circular economy is of utmost importance in meeting the Sustainable Development Goals. The national and regional banks need to take necessary initiatives in financing 3R start-up companies and industries.
109. As Asia-Pacific countries continue to transition their industries and economies grow, financing the implementation of 3R policies, programs, including infrastructure development, will be of critical importance to reduce the volume of all waste streams – MSW, plastics, chemicals, e-waste and hazardous wastes, etc. in living environment and natural ecosystem, and in mitigating negative environmental impacts.

In moving towards zero waste societies, the countries need to explore new sources of funding to finance development of appropriate 3R infrastructures (e.g., state of art waste collection and processing facilities, resource recovery facilities, recycling industries, eco-industrial zones, science parks, etc.), to promote collaboration among key stakeholders and active participation of citizens.

110. In achieving inclusive, resilient and sustainable societies, the Regional 3R Forum in Asia and the Pacific should continue to provide a strategic platform to discuss and share best practices in 3R areas, including technologies to deal with new and emerging issues of concern in both resource and waste management.
111. In Asia-Pacific region the UNESCAP intergovernmental and multi-stakeholder platform can promote strong cooperation between various initiatives related with the sustainable management of natural resources, resource efficiency, 3R and relevant areas. The UNESCAP, the UNCRD, the UNEP, the UNIDO as well as regional offices of other UN Agencies, Funding agencies and programs need to work collaborate more closely to ensure that the results and recommendations of various streams of work, including analytical work, capacity development and convening initiatives, are coordinated, synchronized, mutually reinforcing and complementary.
112. There is enormous potential to leverage the fast growing human capital of Asia and the Pacific towards a regional development path of sustainable industrial and urban development to reduce inequality, increase material standards of living, and create new industries and employment based on the principle of creating continuous wealth from natural resources through the circular economy. This will a triple dividend of increased prosperity, equity and social coherence and environmental sustainability. Steering Asia and the Pacific towards sustainable development will not occur spontaneously but will require the collective effort of the policy community, the business community and the people of Asia and the Pacific to embark on a circular economy development path.
113. Aligning the development programs of ASEAN, SACEP and other sub-regional intergovernmental organizations with the objectives of the Sustainable Development Goals to yield complementarities between the visions and objectives of economic development plans at regional and national level and the 2030 agenda will further accelerate success of sustainable development of the region. Strengthening the scientific evidence base for decision making through collaborative regional research programs will further enhance sustainability outcomes.

114. Policy coherence refers to the alignment of policy portfolios, particularly regarding that environmental issues should be addressed together with economic and social issues in an integrated and balanced manner by promoting and addressing interlinkages among the Sustainable Development Goals, in particular to SDG 8 on productive employment and decent work. The world of work can contribute to resource efficiency and the circular economy if there is a systematic transition made to environmental sustainability at all levels. The world of work can contribute to the Asia Pacific countries' efforts because creating and maintaining decent jobs and fostering environmental sustainability are inseparable. As the ILO is celebrating 100 years in 2019 the Guidelines for a Just Transition Towards Environmentally Sustainable Economies pursue the mandate on social justice to provide policy guidance and practical solutions for the job opportunities the circular economy can bring for countries at all stages of development and work together to facilitate exchange of best practices and transfer of innovative technologies.
115. Advancing circular economy in Asia-Pacific will require tremendous technological interventions, including application of frontier technologies such as IOT, 3D printing, Industry 4.0, robotics, nano-technology, green chemistry, machine-machine interactions and cloud computing, among others. To this regard, the Asia-Pacific region needs to progressively move forward in creating a strong science-policy-business interface in the domain of resource and waste management.

XIV. Closing Session and Remarks

116. The Russian delegation made an announcement expressing their intention to host the 10th Regional 3R Forum in Asia-Pacific in 2020.
117. Mr. Kazushige Endo, Director, UNCRD expressed his appreciation to the Government of Thailand for great hospitality and organization of the Ninth Regional 3R Forum “3R as a Way for Moving towards Sufficiency Economy – Implications for SDGs”, in which there were 7 Plenary Sessions, 4 Country Breakout Sessions, Mayors Signing Ceremony of the Indore 3R Declaration, 3 Parallel-Events and an International 3R Exhibition. He mentioned that the Forum program covered a range of topics such as sufficiency economy, circular economy, plastic waste, wide range of 3R waste management techniques, and best practices in the implementation of SDGs. He thanked the government representatives for adopting the *Bangkok 3R Declaration towards Prevention of Plastic Waste Pollution through 3R and Circular Economy*. He also thanked the drafting committee for hard work to finalize the Chair's Summary. He expressed his appreciation to the Thai Government, national and city governments, international organizations, development partners, experts, and stakeholders to make the 9th 3R Forum in Bangkok a grand success.

118. Mr. Yasuo Takahashi, Vice Minister of the Environment, Japan, emphasized his expectation of further development of this Forum to be able to share more information actively, not only on 3R activities but also on a wider range of activities for the transition to a circular economy, and expressed his gratitude to the Ministry of National Resource and Environment of Thailand for all of their hospitalities.
119. Delivering the final closing remarks, H.E. General Surasak Karnjanarat, Minister of Natural Resources and Environment, Thailand, thanked all the participants for the grand success of the 9th Regional 3R Forum in Asia and the Pacific with useful discussions on solutions to deal with resource circulation, pollution, and environmental management. He also noted a number of issues concerning plastic and plastic waste management, marine debris, and trans-boundary movement of resources, plastic products and wastes which were discussed in the Forum. In addition, key mechanisms in achieving sustainable development and SDGs by applying sufficiency economy, circular economy principle and 3R concept were identified and addressed. He expressed confidence that the knowledge and experiences shared in the Forum would be valuable to identify specific policies, programme and initiatives to strengthen 3R implementation in countries, including strengthening regional cooperation. He further hoped that key suggestions and recommendations emerged from the Forum would be a vital input to the next high-level meetings and to related international cooperation frameworks. He finally expressed his deep appreciation to keynote-speakers, national and local authorities, panelists, researchers, NGO representatives and private sector for sharing their valuable knowledge, insights and experiences on 3R, and declared the closure of the Ninth Regional 3R Forum in Asia and the Pacific officially.

Annex 1: Bangkok 3R Declaration Towards Prevention of Plastic Waste Pollution through 3R and Circular Economy

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**Bangkok 3R Declaration¹
Towards
Prevention of Plastic Waste Pollution through 3R and Circular Economy**

Preamble

The 2030 Agenda for Sustainable Development – and the underlying Sustainable Development Goals (SDGs) adopted by the Member States of the United Nations, represent a plan of action for people, the planet and prosperity and reflect the commitment of the countries to shift the world onto a sustainable and resilient path. Through adoption of the Agenda, the Member States called for, among others, a world in which consumption and production patterns and use of all natural resources are sustainable. The 2030 Agenda for Sustainable Development and the SDGs not only call for equitable economic growth, but also provide an important political and implementation framework to implement 3R (Reduce, Reuse, Recycle) and resource efficiency measures to achieve circular economic development and sufficiency economy.

¹ Bangkok 3R Declaration is a good-will, voluntary and legally non-binding.

The Asia and the Pacific region is the most rapidly urbanizing and industrializing region in the world. Though the unprecedented scale and speed of the urban industrial transformation coupled with enhanced production and consumption have lifted millions of people out of poverty, this presents challenges for the countries in the sustainable environmental management of their natural and ecological resources. At the same time, the growing volume and diversification of various waste streams have compounded these challenges. Waste management in many Asia-Pacific countries must deal with increasingly complex waste streams including industrial waste, electronic waste, plastics in coastal and marine environments, construction and demolition waste, and chemicals that add critical dimensions to the region's sustainability.

The policy and scientific community in the region have recognized the large challenges of resource supply security, increasing waste and pollution, and climate change as critical constraints to future growth and rising material standards of living in the region. One of such critical challenges is the rising level of plastics in the coastal and marine environment, in particular the presence of microplastics (diameter <5 mm) in oceans and inland waters which are unintentionally ingested by many aquatic animals, posing a serious threat to the food safety of fishery and aquaculture products, and thereby affecting both human health and food security.

Today plastic materials are present in nearly all spheres of modern life, starting from simple packaging, clothes containing synthetic fibres, containers, drinking bottles and vehicle parts and tyres to various life-supporting medical equipment. Their manufacture, use and discharge have significantly increased the amount of plastic waste, including plastic marine litter in oceans which is detrimental to the ecosystems, biodiversity, fishing and tourism industry and potentially human health. When improperly managed, plastics can make their way into the aquatic environment by land disposal or direct runoff and disintegrate into macro (> 25 mm), meso (>5 mm) and micro plastic (< 5 mm). Plastic, predominantly single use plastic, makes up approximately 80-85% of the total number of marine litter items, measured through beach counts. At the same time, once leaked into the marine environment, valuable plastic materials that could have been brought back into the economy through implementation of 3R (reduce, reuse and recycle) and circular economic development principle are also lost.

Unless well-coordinated preventive, collective and corrective measures are taken at the national, international, business and consumer levels to discourage the use of single-use plastics, and encourage the use of environmental friendly alternative materials, recycling and the adoption of sustainable production and consumption practices in using plastics and managing plastic pollution, and promote environmentally sound waste management on the whole stage of the collection, treatment and disposal to minimize the leakage of plastic waste into the ocean, and adoption of Extended Producer Responsibility principle for packaging products. Plastics pollution will pose a serious challenge to the sustainability of the coastal and marine ecosystem of the region. Given that the problem of marine litter is also transboundary in nature, joint international actions at the sub-regional and regional level are needed to promote 3R and circular

economic development principles so as to prevent and reduce plastic marine litter, and work towards achievement of the SDG 14.

Declaration

We, the representatives of Asia-Pacific countries², city government representatives, international organizations, non-government organizations, private sector and industry groups, and professionals in the field of 3R, circular economy and waste management, having met at the Ninth Regional 3R Forum in Asia and the Pacific, held in Bangkok, the Kingdom of Thailand, from 4 to 6 March 2019,

Reaffirming our commitments towards achieving *the 2030 Agenda for Sustainable Development* and the underlined *Sustainable Development Goals (SDGs)*, including Goal 14 which calls for the conservation and sustainable use of oceans, seas and marine resources for sustainable development and its Target 14.1 which calls for the prevention and significant reduction of marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution,

Reaffirming our commitments to implement the *10-Year Framework of Programmes (10 YFP) on Sustainable Consumption and Production Patterns* in line with SDG 12, including all its underlined Targets which call for inter alia achieving the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment, and substantially reducing waste generation through prevention, reduction, recycling and reuse, and achieving sustainable management and efficient use of natural resources,

Noting the United Nations Environment Programme initiative on marine litter, in particular the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA), which aims to reduce significantly the amount of litter reaching the marine and coastal environment by the prevention or reduction of the generation of solid waste and improvements in its management, including collection, treatment, disposal, and recycling of litter,

Underscoring the importance of implementing various 3R policies and programmes, including necessary infrastructure development, to achieve the *Sustainable 3R Goals of the Ha Noi 3R*

² Afghanistan, Australia, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, Federated States of Micronesia, India, Indonesia, Japan, Kiribati, Republic of Korea, Lao People's Democratic Republic, Malaysia, Maldives, Marshall Islands, Mongolia, Myanmar, Nepal, Pakistan, Palau, the Philippines, the Russian Federation, Samoa, Singapore, Solomon Islands, Sri Lanka, Timor-Leste, Thailand, Tonga, Tuvalu, Vanuatu and Viet Nam.

Declaration (2013-2023) which provides a common and regional vision and framework for moving towards a resource efficient and zero waste society,

Noting the outcome of the Maldives 3R Forum (2015) that 3R as an economic industry offers competitive solutions to many urban environment and development issues, including issues of plastic waste, provided 3Rs and resource efficiency are integrated into macroeconomic and development policies,

Noting the objectives of the *Adelaide 3R Declaration towards the Promotion of Circular Economy in Achieving Resource Efficient Societies in Asia and the Pacific under the 2030 Agenda for Sustainable Development (2016)* which calls among other things the need for strengthening coordination among countries and within countries to progressively adopt and implement circular economy plans, a whole-of-value chain approach, strategies and tools to reduce, reuse, and recycle natural resources in production, consumption and other life cycle stages, enabled by extended producer responsibility (EPR), environmentally friendly design, low emissions technology, ecological budgeting, financial incentives and investments, taking into account the prevailing economic conditions,

Recognizing the role of pristine coastal and marine environment as significant means and resources for sustainable tourism development, thereby safeguarding the economic security of Asia-Pacific countries, especially Small Island Developing States (SIDS),

Taking into account the fact that improper management of plastic wastes have considerable impacts on biodiversity, water and air quality, economy including tourism industry and society,

Noting the challenges of plastic waste pollution have become critical issues world-wide, especially where marine plastic litter in marine crosses continents in ocean currents, thereby the shared concern for all countries,

Underscoring that plastic waste pollution has become a critical concern in the urban and coastal marine environment of the Asia-Pacific region, including the small island developing states (SIDS), and that most plastics do not truly degrade but break down into numerous smaller particles and remain hundreds of years into the future causing a range of impacts in coastal and 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 (fish to fish and fish to people),

Reaffirming the commitment of East Asia Summit (EAS) Leaders' Statement on Combating Marine Plastic Debris which include improving and promoting the environmentally sound management of plastic waste and resource efficiency through land - and sea - based activities, and welcome ASEAN+3 Marine Plastics Debris Cooperative Action Initiative to enhance cooperation on combating marine plastic debris, adopted by ASEAN related Summits held in November 2018,

Noting the outcome of the Special ASEAN Ministerial Meeting on Marine Debris, held on 5 March 2019 in Bangkok, Thailand, which welcomed the ASEAN Framework of Action on Marine Debris. The Framework comprises four priority areas namely; 1) Policy Support and Planning 2) Research, Innovation and Capacity Building 3) Public Awareness, Education and Outreach, and 4) Private Sector Engagement,

Recognizing the importance of multiple benefits of 3R and circular economic development approach through savings of resource, environment, energy and cost-effectiveness towards prevention and reduction of plastic waste,

Reaffirming that the Regional 3R Forum in Asia and the Pacific has contributed to promote 3R and circular economy policies in Asia and the Pacific region.

Express our voluntary commitments to:

1. *Identify* gaps in the existing laws and institutions and regulations, and further reinforce the ongoing 3R and sustainable waste management actions and measures towards the issue of plastic waste, including single-use plastics;
2. *Develop* effective 3R policies, programmes, including infrastructure development in order to upscale the reusing and the recycling towards circular economic utilization of plastics, and to prevent leakage into the coastal and marine environment;
3. *Support* various innovative solutions for new and sustainable business models which would promote greening the supply chain and multi-use alternatives, including alternatives to single-use plastics products such as reusable, environmentally friendly biodegradable products, and eco-design of plastic products;
4. *Support* necessary research and development programmes on bio-based alternatives which would promote environment friendly bio-economy bringing in new sustainable business and employment opportunities while influencing consumer behavior towards green procurement;
5. *Strengthen* international agreements, policies, and cooperation towards efficient reduction and impacts of plastic waste pollution by reducing single-use plastics, promoting plastic waste recycle as resources, recyclable materials and waste-to-energy, among others;
6. *In conformity* with pertinent regulations and standards governing environmental quality, eco-systems, health and safety, protection of sensitive areas, costal and marine environment and endangered species, sitting, and land-use control, *promote and implement*

environmentally friendly waste collection, segregation, transportation, recycling and final disposal;

7. *Promote* various public awareness programmes and campaigns in order to *discourage* the use of single-use plastics as a first priority; *build* an effective after-use plastic economy and *explore* ways to utilize end-of-life plastics as a valuable resource, which would help to make a transition towards circular economy;
8. *Promote* sharing of knowledge and best practices on the effective management of marine litter in the region and *support* the establishment of a regional knowledge hub for the purpose;
9. *Consider* mobilizing dedicated funds and investments for cost-effective plastic waste management technologies and plastics waste recycling facilities with an objective to protect the local environment and ecosystem, including coastal and marine environment which will in return attract international tourism resulting in increased government revenue generation and local employment opportunities;
10. *Promote* multilayer collaborations and partnerships such as the public-private-partnerships (PPP), as called upon by the Surabaya 3R Declaration (2014) and ASEAN+3 Marine Plastics Debris Cooperative Action Initiative, in order to implement various 3R programmes towards the prevention and proper management of plastic waste, including the marine debris; to this regard, *strengthen* regional cooperation in addressing the issues of single-use plastic products, including their detrimental impact on coastal and marine ecosystem; and
11. *Recognize* the importance of monitoring marine litter, and thereby, explore, develop and *harmonize* methods on counting beach litter items (such counts are internationally accepted as a reasonable indicator of the composition of marine litter towards informed decision making).
12. *Attach* significance of 3R and circular economy, 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 Asia-Pacific countries.

Express our resolve to implement necessary 3R and circular economy policy and measures in Asia and the Pacific to prevent plastic waste pollution, including marine littering.

