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**IMPLEMENTATION OF THE HA NOI 3R DECLARATION (2013-2023) IN ASIA
AND THE PACIFIC**

(Position Paper for Plenary Session 1 of the Provisional Programme)

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incorporate with input from the Fifth Regional 3R Forum in Asia and the Pacific**

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Position paper on the implementation of the Hanoi 3R Declaration

Sustainable 3R Goals for 2013–2023

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Draft

Foreword

This discussion paper has been put together by the CSIRO for the UNCRD to support the Fifth Regional 3R Forum in Asia and the Pacific, which is focused on the implementation of the Hanoi 3R Declaration. This document builds on previous work including previous meetings of the Regional 3R Forum in Asia and the Pacific¹, the UNEP report *Resource Efficiency: Economics and Outlook for Asia and the Pacific*², the UNEP report *Capacity Building and Policy Needs Assessment on Sustainable Consumption and Production*³, the *Handbook for Policy Makers*⁴ and the report by ADB and IGES *Toward Resource Efficient Economies in Asia and the Pacific*⁵.

There are many thematic and substantive overlaps between the concepts of resource efficiency, sustainable consumption and production, and green growth and green economy. The concepts of reducing, reusing, and recycling (the 3Rs) figure prominently as tools to achieve sustainable development in Asia and the Pacific. The 3Rs support local and regional implementation of resource efficiency and waste minimization policies and they establish an explicit link between waste and emissions and the whole supply chain of natural resource use.

¹ Regional 3R Forum in Asia and the Pacific, launched in 2009, is a joint initiative of UNCRD and the Ministry of the Environment of the Government of Japan. See outcomes of all previous Forums and the Chairs' Summaries as a reference at www.uncrd.or.jp/env/spc/.

² United Nations Environment Programme (2011). *Resource Efficiency: Economics and Outlook for Asia and the Pacific*. Melbourne, CSIRO Publishing.

³ United Nations Environment Programme (2012). *SWITCH-Asia Policy Support Component: Capacity Building and Policy Needs Assessment on Sustainable Consumption and Production Final Report*. Bangkok, United Nations Environment Programme.

⁴ United Nations Environment Programme (2012). *Sustainable Consumption and Production: A Handbook for Policy Makers*. Bangkok, United Nations Environment Programme.

⁵ ADB and IGES (2007). *Toward Resource-Efficient Economies in Asia and the Pacific: Reduce, Reuse and Recycle*. Asian Development Bank, Manila.

This document lays out a number of principles for policy implementation and provides examples of the state of policy development.

Introduction

The world has become a different place at the start of the twenty-first century. New challenges for public policy in the domains of sustainable natural resource use, resource efficiency, and sustainable waste management have become prominent on the national policy agenda of many countries around the world.⁶ This can hardly be a surprise when considering the increasing difficulty of sourcing the primary resources that fuel economic activity and underpin human well-being in a timely manner and at affordable prices.⁷ The supply security of resources has become a major issue for the resilience of national economies. At the same time the amount of industrial and household waste has rapidly increased in many countries as they have become more affluent. New waste streams have emerged and waste management facilities are challenged by the sheer volume of waste flows. Fast growing carbon emissions and their impacts on climate add to the political challenges. It is very clear that current ways of producing and consuming are at a crossroads. Economic development and growth needs to be substantially decoupled from environmental pressures, natural resource use and environmental impacts to enable and secure the future prosperity of nations.

The Asia–Pacific region is a special case because of the rapid and large scale process of industrialization and urbanization the region is engaged in. Asia and the Pacific have to deal with a multitude of objectives that include progress in economic development and material standards of living, improvement to public and private infrastructure, poverty alleviation, and the fair distribution of the proceeds of fast economic growth. These objectives need to be aligned with the goals of resource efficiency, minimizing waste flows, and mitigation and adaptation to climate change.⁸

A variety of policy concepts have emerged to tackle this set of challenges. They include the notion of resource efficiency and decoupling – achieving more with less, the objective of sustainable consumption and production, changing investment pathways to support a green economy and green growth. The notion of 3R figures prominently among the family of policy concepts that aim to progress sustainable development. The 3Rs address the whole supply chain of natural resources from extraction through manufacturing and household consumption, to final disposal of waste and emissions. They offer practical strategies for resource efficiency (reduce), for extending the lifetime and usability of

⁶ United Nations (2012). ‘The Future We Want’. Outcome document adopted at Rio+20.

⁷ McKinsey Global Institute (2011). Resource Revolution: Meeting the world’s energy, materials, food and water demands.

⁸ United Nations Environment Programme (2011). Resource Efficiency: Economics and Outlook for Asia and the Pacific. Melbourne, CSIRO Publishing.

infrastructure and goods and materials (reuse) and for a circular economy in which wealth can be generated from waste flows (recycle).

The consensus reached at the Fourth Regional 3R Forum in Hanoi that led to the Hanoi 3R Declaration⁹ has been an important step towards supporting public policies that aim for resource efficiency and waste minimization at regional, national and city level. The objectives identified in the 3R Declaration inspire policy discourse in Asia and the Pacific, and provide guidelines for the policy and business communities, for city governments and the general public. The agenda for the next decade is about achieving the implementation of the goals that are outlined in the 3R Declaration to support economic prosperity, well-being, and economic competitiveness in Asia and the Pacific, based upon good resource and waste management.

Natural Resource Demand and Waste in Asia and the Pacific

At the beginning of the twenty-first century Asia and the Pacific has become the largest user of natural resources – biomass, fossil fuels, ores and industrial minerals, and construction minerals – overtaking the rest of the world. Most of the growth in global use of natural resources in recent decades has come from Asia and the Pacific and was fuelled by unprecedented economic development, urbanization, a growing middle class and poverty reduction.

Domestic material consumption – a main headline indicator from material flow accounting – shows that Asia and the Pacific is currently using 38 billion tons of materials (see Figure 1) and is on a steep upward slope for natural resource consumption.

⁹ UNCRD (2013). Hanoi 3R Declaration. Sustainable 3R Goals for Asia and the Pacific.

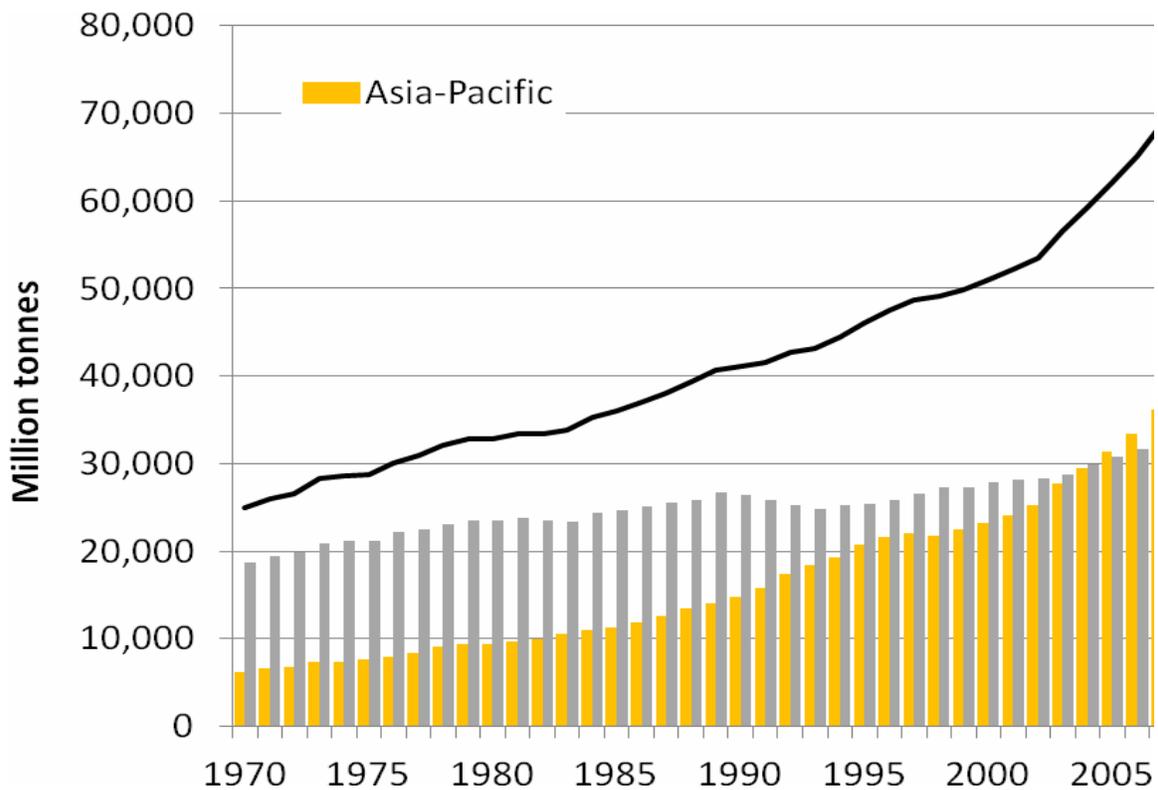


Figure 1 Domestic Materials Consumption for the Asia-Pacific region (yellow), the Rest of the World (grey) and the World (black), for the years 1970 to 2008

Data source: UNEP (2013) Recent Trends in Material Flows and Resource Productivity in Asia and the Pacific. Bangkok, United Nations Environment Programme.

The domestic availability of natural resources in Asia and the Pacific is in decline. More and more, fossil fuels, ores and even crops and meat need to be sourced from outside of the region. The physical trade balance, a measure of the physical volume of trade, shows Asia and the Pacific as a net importer of one billion tons of materials per annum (see Figure 2). The region's dependence on natural resources from abroad is growing. At the same time, world market prices for many natural resources are rising and becoming more volatile, therefore hampering economic prosperity and human development in Asia. As a consequence, many governments in the region have implemented policies that encourage improvements in resource efficiency to help reduce the region's dependence on imports.

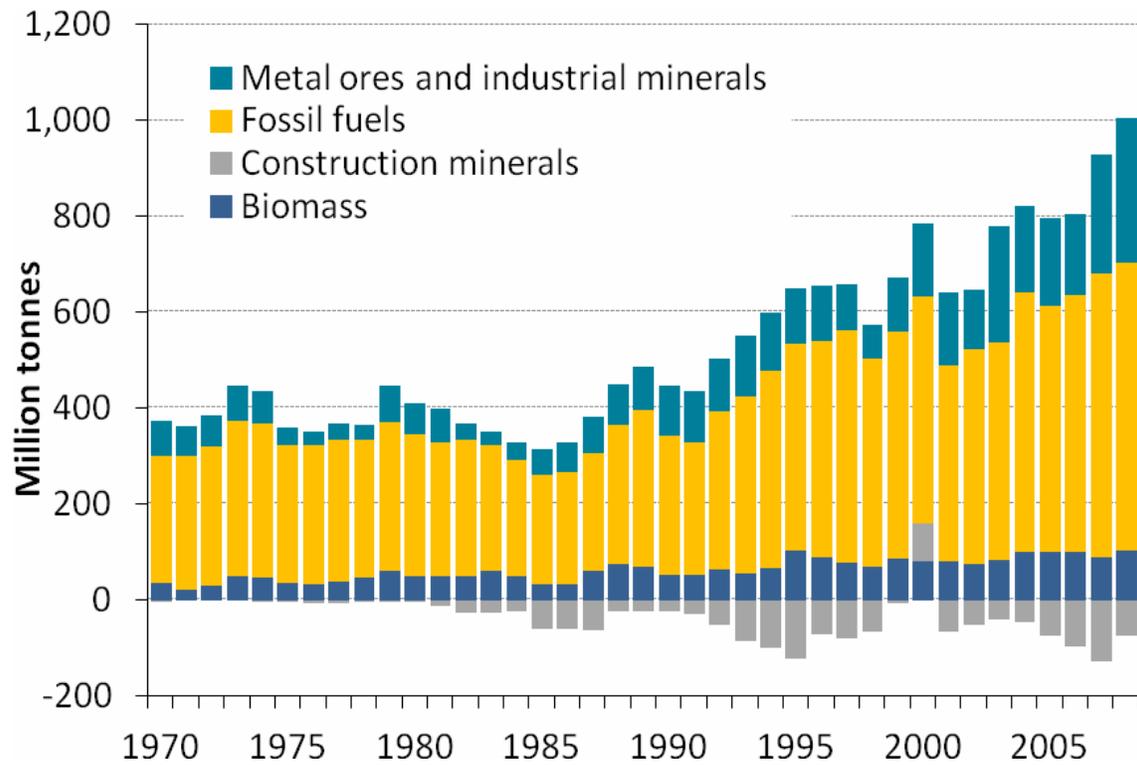


Figure 2 Physical Trade Balance for the Asia-Pacific region by major category of material for the years 1970 to 2008

Data source: UNEP (2013) Recent Trends in Material Flows and Resource Productivity in Asia and the Pacific. Bangkok, United Nations Environment Programme.

Despite the fact that many countries are improving the efficiency of natural resource use the overall picture is one of declining resource efficiency in Asia and the Pacific. The material intensity of the Asia-Pacific economy has been rising since about 1990 (see Figure 3), suggesting that more natural resources are now needed per dollar of economic activity. This result of a loss in aggregate efficiency is caused by a large shift of economic activity from very resource efficient countries such as Japan and South Korea to less efficient countries such as China, India and countries in South-East Asia. This suggests that policy frameworks for resource efficiency require further strengthening to offset the growth dynamic and industrial prices in the region.

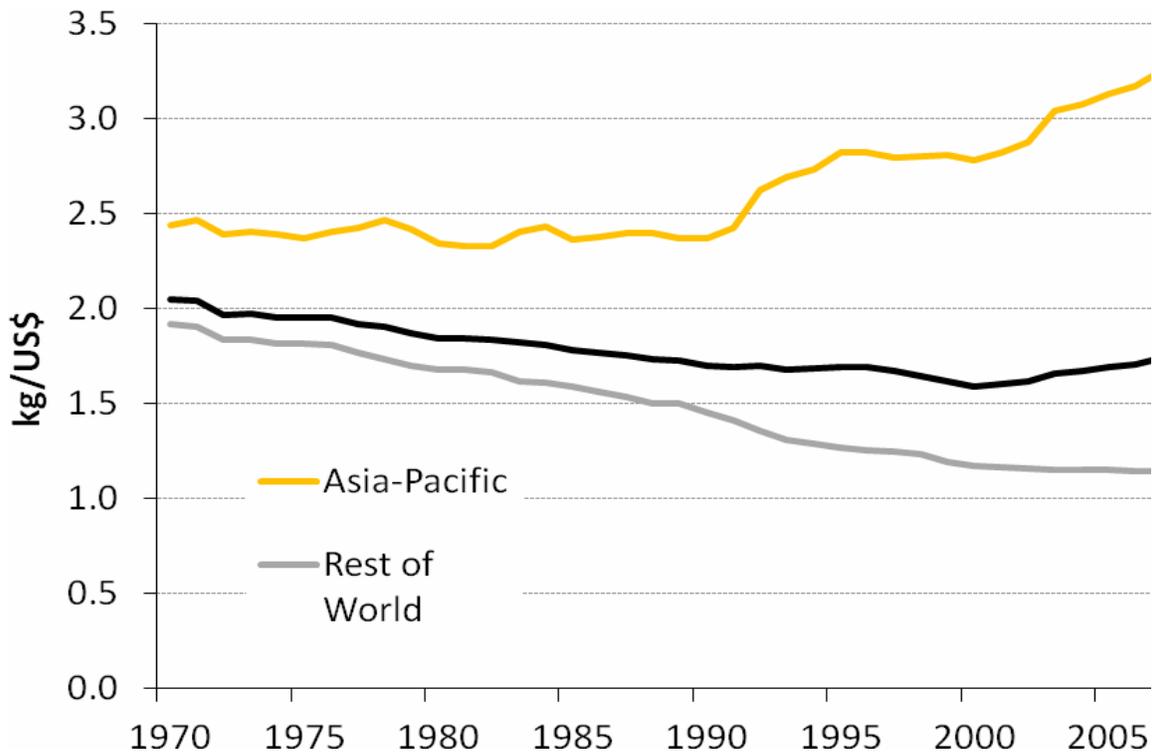


Figure 3 Material intensity for the Asia-Pacific region, the Rest of the World, and the World, for the years 1970 to 2008

Data source: UNEP (2013) Recent Trends in Material Flows and Resource Productivity in Asia and the Pacific. Bangkok, United Nations Environment Programme.

Greenhouse gas (GHG) emissions may be expressed both as direct emissions (those produced in a country) and embedded emissions (those produced by a country to make goods or services for domestic consumption). Table 1 shows large differences between direct GHG emissions and GHG footprint (embedded emissions) for a range of countries in the Asia-Pacific region. The difference is particularly significant for Australia, because of Australia’s large export sector. China, the Republic of Korea, India and Indonesia also have larger direct emissions than embedded emissions, indicating that some of the emissions that occurred domestically should be attributed to foreign consumption. Japan shows the opposite situation, indicating that it has externalized major resource and emission-intensive activities.

Table 1 Per capita GHG emissions and GHG footprint for selected countries in 2000/2001

	Direct GHG emissions (t CO ₂ -e)	GHG footprint (t CO ₂ -e)
China	3.9	3.1
Japan	10.7	13.8
India	2.1	1.8

Australia	28.9	20.6
Indonesia	2.8	1.9
Republic of Korea	10.4	9.2

Source: UNEP (2011) Resource Efficiency: Economics and Outlook for Asia and the Pacific. Melbourne, CSIRO Publishing.

Amounts of solid waste have increased in the Asia-Pacific region due to increasing industrial capacity, and changes in urban lifestyles. Municipal waste has increased substantially, requiring increased capacity for urban waste management and treatment. Figure 4 illustrates the rapid growth of solid waste in Asian cities.

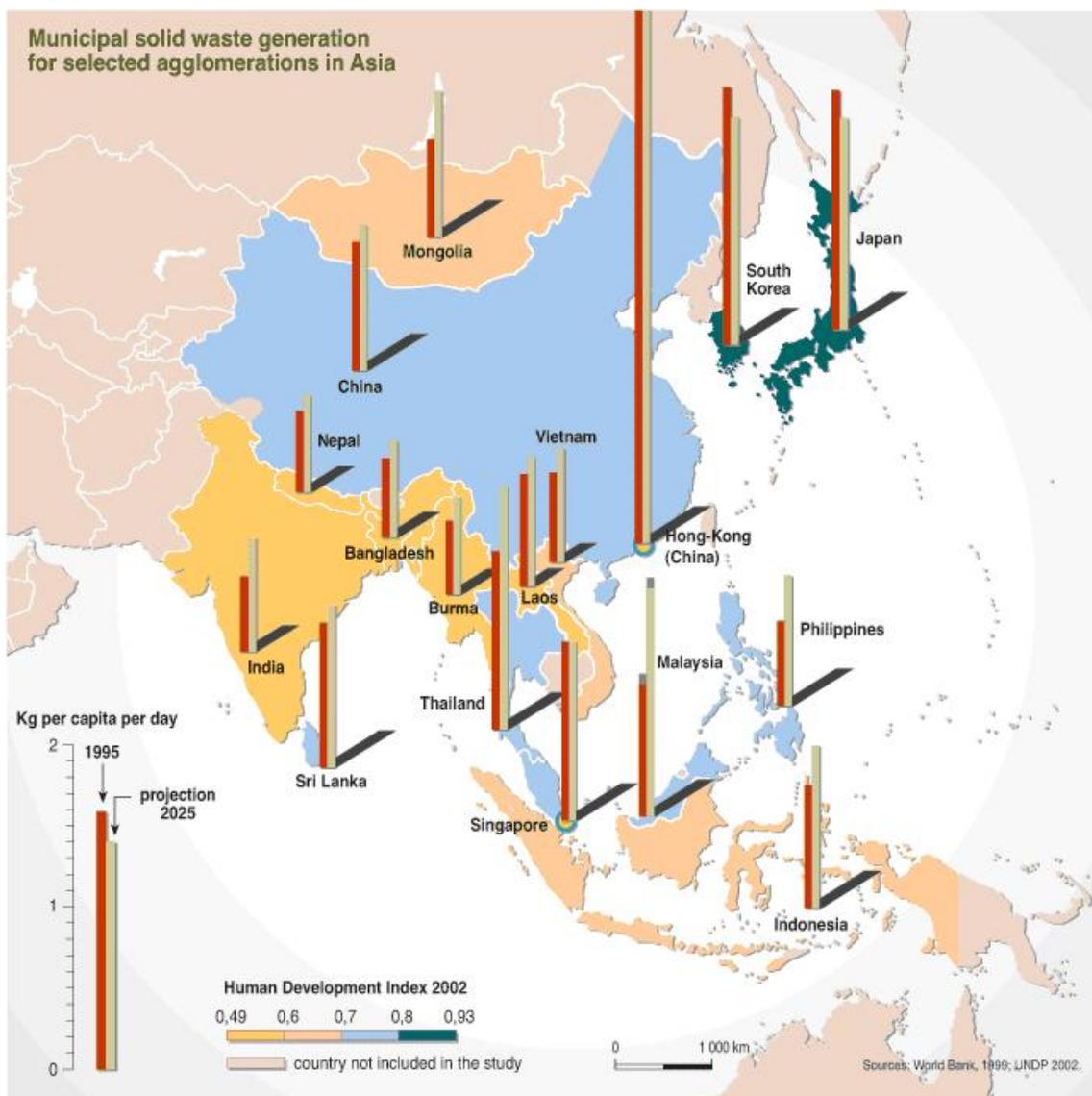


Figure 4 Municipal solid waste generation for selected large cities in Asia

Source: UNEP/GRID Arendal (2010) Vital waste graphics. Retrieved from www.grida.no/publications/vg/waste.

Data on recycling rates in Asia and the Pacific region are sparse but are expected to be lower than in OECD countries and rely to a higher degree on the informal sector for both collection and dismantling. There is significant potential for increasing recycling rates, especially for metals and plastics, and governments in the region are focusing on policies that encourage recycling and a circular economy.

Part 1 Analysis of current policies and policy capacity for 3R implementation in Asia and the Pacific

Many of the issues addressed by the 3Rs are not going to be resolved spontaneously but will require well designed policies to achieve the objectives set out in the Hanoi 3R Declaration and agreed to by governments. In this part of the document we look at the role of public policy in resource efficiency and waste minimization, and we assess current policies and the capacity for policy implementation in Asia and Pacific.

At the outset it is important to note that institutions ‘naturally’ respond to environmental problems when the causes and consequences of the problem are well understood, when something can be done to resolve the problem, and where there is willingness among key stakeholders and constituencies to act upon the problem.

Causes and consequences of a problem need to be understood: major determinants of system or resource condition, resilience, and impacts of different trajectories are well known

Something can be done to resolve the problem: resources or assets are subject to human influence, and damage is reversible

There is a willingness to act upon the problem: formal or informal arrangements can be crafted that result in perceived net benefits to key constituencies

Policies for resource efficiency and waste minimization are characterized by a high level of complexity of the issues and actors involved. The 3R principle is very broad and touches a large number of policy domains including primary industry policy (Departments of Agriculture, Mining, and Natural Resources), manufacturing policy (Departments of Industry), infrastructure policy (Departments for Infrastructure), and environmental policy (Departments of the Environment) with important linkages to the areas of economy, trade, and social policy.

This suggests that a high level of coordination among different players is required to avoid contradictory and duplicated policies. In many countries in Asia and the Pacific a

whole of government approach to resource efficiency and waste minimization is only about to emerge and more needs to be done to establish the level of collaboration among government agencies to align 3R policies with other domain policies. There is also a need for strong leadership through a coordinating agency to allow for smooth policy implementation. In principle, many developing countries in Asia are well placed to provide such coordination through their national development planning processes. In some countries the lead agency for the national development plan has also a coordinating role for the 3Rs and for the related policy domains of sustainable consumption and production (SCP) and green economy.

It is important to acknowledge that there are different dimensions to the policy capacity for the implementation of the 3Rs in Asia and Pacific. To gain a full picture, different aspects of the policy process need to be addressed. Four main phases of the policy cycle can be distinguished; each needs to receive equal attention from the policy community to enhance the success of 3R policy implementation.

- Firstly, the process of **problem framing**, where the broader community perceives a problem or an opportunity which often triggers a response from the policy community
- Secondly, the phase of **policy framing**, where the policy community identifies the need for a specific set of actions that become the fundamentals of a policy statement
- Third, the **implementation of a policy**, which aims to change incentives and behaviours of businesses and households
- And finally, **evaluation and monitoring** of the effectiveness and efficiency of a policy.

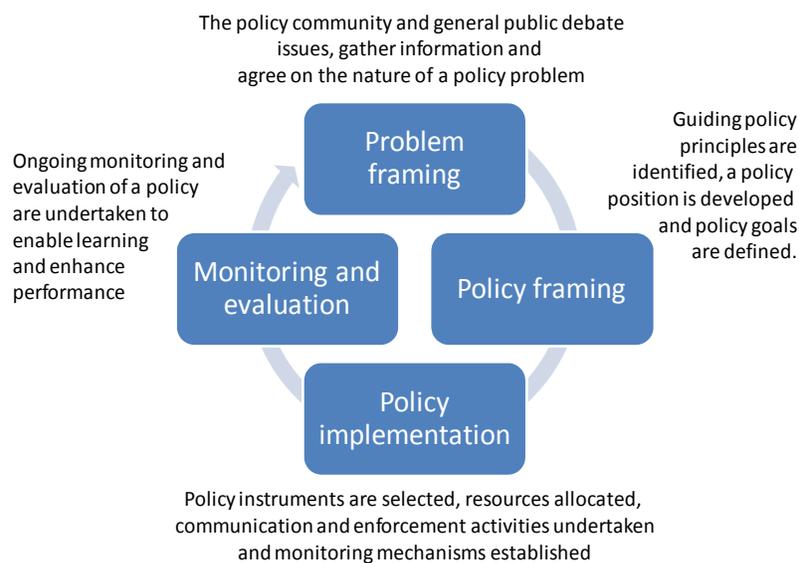


Figure 5 The policy cycle

Problem framing

In many countries in Asia and the Pacific, the importance of resource efficiency and waste minimization is not well recognized by the broader public, and neither is there a common view in the business and policy community. The main objectives of many countries are economic development, improving material standards of living (from individual and national points of view), employment and social security. These important development goals are often seen to be in contradiction with environmental objectives. In many countries, independent of development status, economic goals are in general perceived as more important than environmental goals. As a consequence, the broader public may not perceive that there is a problem that needs to be addressed.

A lack of public support for environmental policies may limit the ability of the policy community to address these issues. It also makes it less likely that businesses will integrate sustainability objectives into their strategies and plans. This is an important impediment to the success of the 3R initiative and needs to be addressed through a larger regional and national dialogue about the importance of resource efficiency and waste minimization in achieving aspired development outcomes. Because of a changing economic context of compounding issues including supply security for critical resources and climate change, there is no longer a contradiction between using natural resources efficiently and reducing waste flows, and economic development. Especially for countries which have eroded their local resource base, dependence on imports of natural resources has become a main focus of economic planning. In a number of countries the policy community has recognized that achieving environmental sustainability will underpin the success of economic goals such as growth, employment, and prosperity.

It is hard to say whether the growing understanding of the importance of natural resources and ecosystem services is equally acknowledged in different policy domains and government agencies in Asia and the Pacific. In many countries government agencies responsible for environment, water, and climate change have long championed environmental sustainability and have more recently engaged in policy initiatives around resource efficiency and waste minimization. Increasingly, other government agencies are coming to the table and many countries in Asia and the Pacific have made the sustainability of natural resources and ecosystems a central element of their national planning process, thereby going beyond what local public opinion would prioritize.

Policy framing

Despite lacking broad public support for the importance of the 3Rs, the development of policies that address the issues of resource efficiency and waste minimization has been a

remarkable success story in many countries in Asia and the Pacific. During the past two decades, a great number of countries have been able to establish high-level policy objectives as well as sectoral policies that address the issues. The majority of countries have policies and institutions that support cleaner production, they have waste policies that often cover industrial, commercial and household waste, and they have policies that address urban air pollution. Developing countries have, especially more recently, begun to mainstream environmental sustainability objectives into their national development plans and have successfully reduced the contradictions between economic, social and environmental goals that have existed in earlier plans. Quite a number of countries have gone beyond traditional policy domains of cleaner production and waste management and have introduced a whole supply chain perspective in how they frame the policy problem of resource efficiency and waste minimization.

Examples of such integrated policy approaches include the sound material cycle principle of the Japanese government and the law for the promotion of a circular economy in China. These are public policy responses that are very advanced when looked at from a global perspective. Not many countries have invested in such comprehensive policy responses to the fundamental problems that are presented by growing natural resource demands and waste flows.

Japan has been an international leader in its effort to achieve resource efficiency and waste minimization. The Fundamental Law and Plan for Establishing a Sound Material Cycle Society was introduced as early as 2000 and was amended in 2008. The framework law and implementation programme aims to move the country toward a recycling based approach in product design, manufacture, use and disposal. Targets have been agreed upon and they are evaluated and updated on a regular basis. Japan has also been instrumental in driving the global agenda of resource efficiency in the Group of Eight (G8) forum.

China was one the first countries to embrace the principle of circular economy as a new approach to economic and industrial development. The Circular Economy Promotion Law was instituted in 2009 and marks a move towards a new economic development approach based on radically improved efficiencies in natural resource use and large reductions in waste and emissions. The circular economy principle aims to decouple economic growth from natural resource use and environmental degradation.

Efforts to institute cleaner production policies in China reach back to the 1990s as a response to the serious pollution problems the country had started to face with accelerating industrialization. China has also made significant efforts to establish targets for energy efficiency and reduced urban air pollution in the context of its 12th Five Year Plan (2011–2015), which also addresses water use efficiency. The fact that China has surpassed the United States as the largest producer of municipal solid waste has earned

comparatively little attention. Policies have focused on improving solid waste treatment and increasing incineration capacity. China has had dedicated waste prevention laws since 1995 and more recently adopted the China WEEE (Waste Electrical and Electronic Equipment) regulation in 2011.

Waste management policies in India are another example of a set of very comprehensive and advanced policies. Policies for municipal waste emphasize the resource value of waste and promote composting and energy recovery. The Indian e-Waste regulation is based on the extended producer responsibility principle and requires industries in India and abroad to take responsibility for the end-of-life treatment of their consumer goods.

Another good example is the national policy on cleaner production in Indonesia which was adopted in 2003 to encourage companies to implement 3R principles. In 2004, the Indonesian Cleaner Production Centre was established; it has since provided training to businesses, improving their capacity for eco-efficient production. The growing population and changing consumption patterns in Indonesia have, similar to many countries in the region, meant a surge in municipal waste generation. The predominant waste management method in Indonesia has been land filling, where most landfill sites in cities are open dumping areas. Uncontrolled dumping of waste has been a widespread problem in rural parts of the country.

In response, the 2006 strategy for solid waste management in Indonesia focuses on the promotion of the 3Rs. Indonesia has set a target for reducing the amount of solid waste by 20% in 2014 to be achieved through the implementation of 3R principles.¹⁰ The Waste Management Law of 2008 includes additional provisions for solid waste reduction and recycling. Policy objectives include the refurbishment of outdated landfill sites, and the Indonesian government is also conducting several pilot projects to support the implementation of the 3Rs and to support local governments in developing 3R facilities.

Policy implementation

The ‘bigger picture’ of economic and environmental policy goals supporting each other has not yet been sufficiently recognized by the civil society sector, and by policymakers at regional and city level. This has meant that the ambitious goals in national policies have not been successfully implemented in many countries. There are numerous barriers to the implementation of resource efficiency and waste minimization policies, including the lack of a knowledge base for issues and policy responses, a lack of human resources, financial constraints, and in some circumstances a lack of political will. Because of these constraints policy implementation at the regional and urban level has been a patchy process, with some regional areas and cities leading the implementation of 3R policies

¹⁰ ICCSR (2010). Waste Sector. Indonesia Climate Change Sectoral Roadmap, Indonesia.

while others lag behind. Improving policy implementation needs to be an important objective for the decade ahead.

Since the establishment of its Circular Economy Law the Chinese government has promoted the circular economy as the main principle for policy reform, has invested in legislation, supported pilot projects, and is starting to build capacity to monitor progress within the framework of the national development plan. The Circular Economy Promotion Law requires the development of supporting legislation and its proponents are engaged in a process to identify the major tasks and measures necessary to achieve effective implementation of the law. The Chinese Circular Economy Law is also a good case study for the difficulties that arise in policy implementation, which include sourcing appropriate levels of funding for the initiative, supporting innovation and technological advancement in the context of an industry structure which is only changing very slowly, and most importantly the poor environmental awareness of the public and private sector and the lack of effective enforcement mechanisms.^{11, 12}

Today, the Cleaner Production Promotion Law of 2003 governs the implementation of all cleaner production activities in China. The cleaner production law encourages resource efficiency and pollution reduction at the individual company level but also supports efforts at the inter-firm level and regionally through the introduction of eco-industrial areas. Cleaner production is supported by demonstration projects, training and promotion centres and more recently through the establishment of the National Cleaner Production Centre. Cleaner production audits have become compulsory and are carried out for major polluting enterprises. Enterprises are encouraged and have started to establish voluntary arrangements with local government to improve their resource efficiency and waste management beyond compliance with national and local standards, which marks a major step for the success of cleaner production in China.¹³ Challenges do remain, however, including a lack of economic incentives, a lack of environmental enforcement and the large initial capital costs for resource efficient and waste reduction technologies which are a particular constraint for small and medium-sized enterprises (SMEs).¹⁴

India faces similar problems in policy implementation to China. Implementation, especially at the regional and local level, is a challenge in a country the size and

¹¹ Geng, Y. (2009). Circular economy policy of China: Role of policy research towards a shift from institution building to implementation, Presentation, Chinese Academy of Sciences, UNEP.

¹² Xue, B., Chen, X., Geng, Y., Guo, X., Lu, C., Zhang, Z. And Lu, C. (2010). Survey of officials' awareness on circular economy development in China: Based on municipal and county level, *Resources, Conservation and Recycling*, 54, 1296–1302.

¹³ Andrews-Speed, P (2009). China's ongoing energy efficiency drive: Origins, progress and prospects, *Energy Policy*, 37, 1331-1344.

¹⁴ Shi, H., Peng, S.Z., Liu, Y. and Zhong, P. (2008). Barriers to the implementation of cleaner production in Chinese SMEs: government, industry and expert stakeholders' perspectives, *Journal of Cleaner Production*, 16, 842–852.

complexity of India. Local authorities lack the financial and human resources to provide effective services to urban and rural residents, let alone to look after the comprehensive collection of the recyclable waste fraction. Industries often lack the awareness and lack incentives and regulations to reduce their waste, and to dispose of waste through appropriate channels.

We find similar significant gaps between national policy and practice at the local level of government in Indonesia. Natural resource and environmental policies are the responsibility of provinces and municipalities and the Ministry of Environment has a coordinating role but no responsibility for implementation. This creates difficulties for the implementation and enforcement of the ambitious national policy agenda at the local level because of limited financial and technical resources at this level of government.

Evaluation and monitoring

Many countries in Asia and the Pacific have not yet been able to build the institutional capacity to evaluate the effectiveness and efficiency of existing 3R policies and to monitor progress of the 3Rs. There is a need to build partnerships between government agencies, statistical offices and academia to develop information systems, data sets, and indicators that will enable the measurement of policy success. In principle, the national development planning process and the institution and review processes built around it could provide an ideal framework for the evaluation of 3R goals and objectives depending on whether they are spelled out in any detail in the national development plan. The different objectives of the 3Rs – national resource efficiency, eco-efficiency of industries, waste and emissions intensity – can be measured based on the United Nations System of Integrated Economic and Environmental Accounts (SEEA) and some of the data sources have already been made available internationally. They could provide an entry point for national governments for a quick and ready review of policy effectiveness based on headline indicators such as domestic material consumption (DMC)¹⁵ and material footprint¹⁶ and resource efficiency.

One important aspect of evaluation would be the efficiency of the policy implementation process with regard to the financial and human resources invested relative to the achievement made.

It needs to be noted that for developing nations in Asia and the Pacific, the overall amount of resource consumption and waste generation will continue to rise as the

¹⁵ West, J. and H. Schandl (2013). Recent Trends in Material Flows and Resource Productivity in Asia and the Pacific. Bangkok, United Nations Environment Programme.

¹⁶ Wiedmann, T. O., H. Schandl, et al. (2013). The Material Footprint of Nations – Reassessing Resource Productivity. Proceedings of the National Academy of Sciences, www.pnas.org/cgi/doi/10.1073/pnas.1220362110.

countries' industries modernize and cities grow. It is important though to reduce the environmental pressure and impact per unit of economic activity through investment into resource efficiency and waste reduction, which should be the short and medium term goals.

Part 2 Building regional capacity for the implementation of the 3Rs

Part two of this document presents a set of principles or characteristics that could support the implementation of the Hanoi 3R Declaration (2013–2023), and is organized by goals and sectors. What would be required for a successful implementation? How should policies and activities be sequenced and which time frames appear achievable for implementation of the Hanoi 3R Declaration?

Building regional capacity for the implementation of the 3Rs

- **Leadership and co-ownership**

Implementing new policy objectives, especially when they challenge the conventional view, requires a high level of leadership and coordination through a lead agency. Ideally, the lead agency for the national development plan could play such a coordinating role. Strong leadership, wherever it may be situated, will ensure that 3R objectives are mainstreamed into sectoral policy domains and are not crowded out by the specific requirements of those policy domains. While strong leadership is a prerequisite for successful policy implementation it is of similar importance that line agencies buy-in and take ownership of the 3R objectives beyond compliance requirements. In many cases, integrating resource efficiency and waste minimization goals into sectoral policy areas such as transport, urban planning, agriculture or industry policy will require flexibility and thinking outside of the box which can only occur if the objective is owned by all agencies involved. This suggests that coordination by a lead agency and co-ownership by line agencies will require a delicate balance and will be a decisive factor for successful implementation of the goals of the Hanoi 3R Declaration.

The Chinese National Development and Reform Commission (NDRC), which is responsible for the national development planning process, is a good example for strong leadership and coordination of line agencies. The privileged role of the NDRC means a highly structured and coordinated process of policy development, policy implementation and evaluation over the five year plan. Other countries such as Indonesia and the Philippines have a greater division of labour and responsibilities are devolved to a large number of government agencies. This has resulted in a lack of coordination between different government ministries and has led to a legislative framework which often duplicates effort or even results in contradicting policies.

While a strong coordinating authority is beneficial to the implementation of 3R policies the level of co-ownership of the 3R principles of line ministries is an important issue. It may well be that line agencies feel a lack of responsibility and involvement, which hampers implementation through those agencies. Coordination and co-ownership are two important principles that need to be secured at the same time.

- **Cross-departmental collaboration will be necessary to provide coherent policy settings across policy domains**

Resource efficiency and waste minimization present a complex policy issue involving many areas of sectoral policy that need to work together to achieve the objectives of the 3Rs. To enable collaboration among government agencies, countries will need to strengthen their capacity for cross-departmental cooperation at various levels including high-level decision-making and also lower level day to day operative arrangements between government agencies. This will involve strengthening horizontal communication within and among departments, greater transparency in the communication of departmental strategies among public servants in different departments, and enhanced information sharing. Such collaboration could be facilitated by a coordinating authority with an appropriate mandate and sufficient resourcing.

There are hardly any examples of successful whole of government approaches to support the success of implementation of the 3Rs in Asia and the Pacific. Government departments and agencies are used to coordinate at the top level either through a coordinating lead agency in one of the ministries or a coordinating body which directly reports to the prime minister. What is missing is horizontal, cross-departmental collaboration at all levels to be able to deal with the complexity of the issues involved in progressing the 3Rs and to allow for experimentation and thinking outside of the box to occur in government departments. This may include a need for governments to identify new ways of interacting with businesses and the community at large.

- **Improving policy implementation in regions and cities will be important to achieve practical 3R outcomes**

Many countries in Asia and the Pacific have identified the 3Rs as important overarching policy objectives to align economic and environmental goals. This has resulted in policies, laws and regulations that aim to guide production and consumption processes that are resource efficient and minimize waste. What is often lacking, however, is the capacity for policy implementation the sub-national level where 3R policies are implemented. Successful implementation of the Hanoi Declaration will require additional guidelines for local authorities, urban councils and communities on how to use the high-level policy guidance in their day to day decision-making. Resourcing and capacity-building are important success factors for policy implementation at the regional level. They also

require awareness-raising and information sharing with sub-national representatives to assist them to overcome existing barriers to implementation by providing clear incentives that motivate local decision makers to act in accordance with regulations issued from a central point.

Good examples of regional and local initiatives include the establishment of eco-industrial zones and eco-cities and eco-towns that have occurred in Japan, in parts of China, and Australia to mention a few examples. The level of corporation among industries and between industries and local policymakers that can be achieved in such initiatives very often raises the knowledge base and level of understanding of the 3Rs and their objectives of all parties. This may then have positive flow on effects for the community at large.

- **Harmonization of development and 3R objectives and funding for 3Rs**

Policymaking in many countries in Asia and the Pacific needs to address the dual objectives of economic growth and improving material standards of living and reducing poverty, while at the same time ensuring environmentally sustainable development. Delivering to these important economic objectives will mean a growing demand for natural resources to fuel economic activity, to build new infrastructure, and to service the needs of growing cities. As a consequence the quantity and composition of waste flows will also change towards larger amounts of waste and an increase in the proportion of hazardous waste. Harmonizing the objectives of environment and development will be of utmost importance. Countries would benefit from a broader discussion about the quality of growth, and the merits of investing in resource efficiency and waste minimization. This would need to inform priority settings in Treasury and Finance departments that match the ambition of the 3Rs to enable the implementation of 3R programmes and activities. There is significant potential for efficiency improvements, especially in fast growing cities in developing Asia. Investment into housing, transport, food and energy offers potential for up to 80% improvements in material and energy efficiency and would help reduce waste flows accordingly. There is a huge window of opportunity for resource efficiency and waste minimization in urban and infrastructure planning.

It is important to note that broad public support for the 3R objectives by the business community and general public can only be achieved if development and environment goals are well aligned and equally understood. The national development plans of China and India are good examples of such an alignment. In China, objectives for sustainable consumption and production and the greening of the economy are integrated in the national development plan and reflected in the plan's targets. The national development plan of India, which has as its main objective to achieve stronger economic growth, also stresses the importance of sound management and use of natural resources with a specific focus on water and land.

The national development plan of Malaysia aspires to sustainable production practices to decouple economic growth from environmental degradation and in a similar fashion, the national development plan of Viet Nam has objectives and targets for pollution control, waste management, wastewater treatment and the implementation of environmental standards. It is important to say that traditional economic development objectives such as economic growth, employment growth and poverty alleviation continue to be the main focus of national development plans in developing countries in Asia and the Pacific. These objectives are, however, increasingly seen in the context of environmental objectives.

- **Measuring progress of the 3Rs**

The set of economic indicators that informs national government plans in many countries in Asia and the Pacific does not address 3R outcomes properly. Countries need to invest in capability to measure progress of 3R programmes and policies and to monitor and evaluate policy effectiveness and efficiency. This may include a set of high-level 3R indicators. Such indicators would need to be based on a system of economic, environmental and social accounts that work together well to measure progress in resource efficiency and waste minimization. They need to be harmonized with other indicator approaches for green economy, sustainable consumption and production, and sustainable development goals.

As mentioned earlier, the SEEA framework supports establishing environmental satellite accounts to the system of national accounts for all relevant natural resources including materials (biomass, fossil fuels, metals, minerals, and construction materials), energy, emissions, waste, land and water use. The SEEA system supports stock and flow accounts and helps structure the information by economic activities. The availability of sectoral information and data for main economic activities such as agriculture, forestry, manufacturing, transport, the construction sector, and the service sector are very important to support targeted policies, programmes, objectives and targets.

- **Getting the policy mix right**

Harnessing 3R opportunities will need to be guided by well designed policy frameworks. This will include economic, regulatory and information based policies. In some areas incremental policies will drive efficiency gains in current systems. In some instances, such as for example in the energy sector, new systems of provision will need to be established. This requires innovation that may only occur with the help of transformational policies. A number of countries have started to explore the merits and have invested in transformational policies including environmental budget and tax reform, taxes and trading schemes for carbon and natural resources, changes in subsidy regimes, and payment for ecosystem services. These economic instruments create a very different

set of incentives in favour of the 3R objectives and may set countries and businesses on a new, green, economic development trajectory. These new economic incentives would need to be supported by legal and planning arrangements that reinforce the newer incentives and drive innovation in construction and housing, transport and mobility, and water and energy supply systems.

The awareness of the importance of the 3Rs and the readiness to implement 3R policies in government and businesses as well as in other sectors of society needs to grow and will need to be facilitated by 3R champions from the policy and business communities. Most importantly, policy settings need to encourage and support 3R initiatives in the business community to unleash the creativity and innovation of industries for resource efficient production and waste minimization.

Many countries in Asia and the Pacific have started to trial policies that put a price on carbon and help reduce carbon emissions in a cost-effective and efficient manner. In China, such policies are tested for a number of economic zones on the eastern seaboard of the country. In other countries the issue of carbon and resource pricing has entered the policy dialogue more recently. Quite a number of countries, on the other hand, provide generous subsidies for natural resources, either to primary industries or to consumers such as for example via fuel price subsidies.

- **Building a regional and national innovation culture**

Innovation will be crucial for developing the technologies, practices, and logistics around the 3Rs to enhance resource efficiency and waste minimization in production and consumption. This will involve experimentation in industries and businesses including SMEs. Innovation will need to go beyond industry and needs to encompass all sectors of society. Most importantly, education and training systems will need to equip existing workers and new workers with the skills that are required for the 3Rs. Innovation cannot just rely on training institutions but will need to build on information sharing using new communication media to exchange new practices and skills. Asia and the Pacific are well placed for an innovation revolution. Asia is home to a large and young population, has excellent schools, universities and training institutions, and will be able to rely on a large and highly qualified workforce in the future. The objectives of the 3Rs, however, will need to be reflected in school and university curricula to drive the required education outcomes. Investing in knowledge-sharing and building a regional and national innovation culture will be the single most important elements of successful implementation of the 3R Declaration.

The cleaner production centres that have been established in many countries in Asia and the Pacific, and support projects for the 3Rs, are one important element of an emerging innovation culture. It is well known that improvements in resource efficiency and waste

reduction of up to 80% are possible based on today's technologies¹⁷. Innovation and experimentation needs to be embraced in Asia and the Pacific at all levels of society to enable the next wave of economic growth to be built upon sustainability and the 3Rs.

The innovation revolution will need to build on a school curriculum that favours teamwork and is focused on identifying information and finding solutions for complex problems. New approaches in education and training need to include schools, universities, and training centres. A focus on lifelong learning and dedicated programmes in government and businesses to ensure the further education of their staff and workers will be required to equip countries in Asia and the Pacific with the capabilities and level of resilience that will be needed in the decades to come.

- **Identifying win-win situations**

Resource efficiency and waste minimization achieved through the 3Rs have a number of environmental benefits. They also lead to substantial cost savings for businesses and urban and local councils because of reduced factor costs for natural resources and lower costs for waste management and waste treatment. There is a win-win situation for businesses and local authorities that comes from the successful implementation of the 3R policies.

Identifying win-win situations and trade-offs would profit from a strong economic assessment background in public policymaking such as, for example, is the case in Australia and New Zealand. Economic assessment however needs to go beyond traditional economic assessment and cost benefit analysis to being able to identify the social, economic and environmental gains that 3R policies offer. Integrated assessment, and integrated climate – economic – and environmental modelling capacity will need to be built in countries to support evidence based policymaking based on data, modelling and scenario analysis of policy alternatives.

Figure 6 provides an overview of those principles and characteristics that will support the implementation of the Hanoi 3R Declaration in Asia and the Pacific (2013–2023).

¹⁷ Von Weizsäcker et al. (2009). Factor 5: Transforming the Global Economy through 80% increase in resource productivity. London, Earthscan.



Figure 6 Main areas of capacity-building for 3R policy implementation

It will be important to identify timelines and sequencing for the establishment of support mechanisms for 3R policy implementation in Asia and the Pacific, which will be an important objective of the Fifth Regional 3R Forum in Asia and the Pacific (2014).

Sustainable 3R goals of the Hanoi Declaration (2013–2023)

The notion of governance refers to the processes, systems and controls that ensure the effective management of a state. Governance has obligations of fairness, transparency and accountability for the leaders of a government or of corporate entities. It is common sense that governments provide governance. When it comes to complex objectives such as the 3R goals more nuanced forms of cooperation between states, markets and communities appear advisable. The four major forms of collaboration identified in Figure 7 are public-private partnerships, private-social partnerships, co-management and multi-partner governance. Such hybrid forms of governance have emerged in the environmental domain because no single agent has the ability to properly address the multiple facets, interdependencies and skills of environmental problems. These forms of governance, which incorporate joint action of at least two agents, aim to capitalize on the strength of one partner to compensate for the weakness of the other. The involvement of market actors in the collaboration for achieving 3R objectives is aimed at addressing potential inefficiencies of state action. This is achieved by injecting competitive pressures and by enabling greater profitability in the implementation of the 3Rs.

Including community and local perspectives in 3R governance brings time- and place-specific information to the table to help solve complex and practical implementation issues. Inclusion of community perspectives raises legitimacy, which is often lacking with market-focused instruments, and raises compliance rates considerably. State actors

ensure that the often fragmented social action carried out by decentralized communities and market actors can be made more coherent and more authoritative.

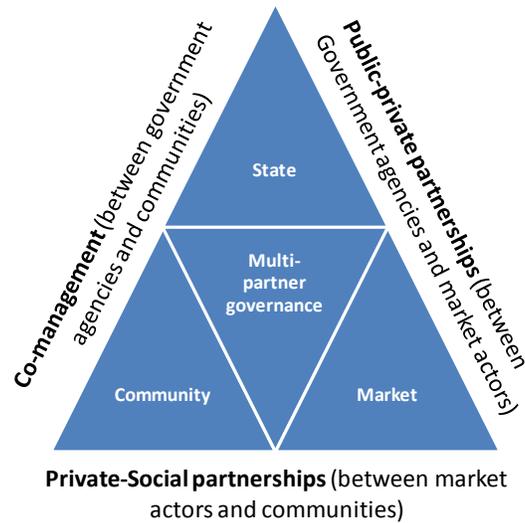


Figure 7 Multi-partner governance for advancing the 3Rs

Public-private partnerships, co-management and private-social partnerships all support the success of the implementation of the Hanoi 3R Declaration. Multi-partner governance, where achievable, goes beyond mere consultation and fundraising. It aims to integrate all stakeholders under one common goal of achieving resource efficiency and waste minimization. Countries could aim to identify such forums of inclusive governance to support government efforts in the implementation of the 3Rs.

3R goals for urban and industrial areas

Cities and industrial areas offer the greatest potential for resource efficiency and waste minimization. Very often, urban areas deliver significant contributions to national economic products. They house the main manufacturing activities, despite many cities earning most of their income in service sector activities. At the same time, cities have become centres of consumption and the reach of cities into the global resource base through supply chains has grown tremendously in many parts of the world. The growing affluence of urban populations in Asia and the Pacific contributes to increasing amounts of municipal solid waste, which includes a large fraction of recyclables and organic components.

While urban waste management is often seen as the entry point for the 3Rs in cities, large improvements in resource efficiency can be achieved through urban planning and infrastructure development. Energy-efficient housing, comfortable public transport systems, urban agriculture and renewable energy generation and water reutilization in cities will probably make the greatest difference for natural resource consumption in Asia

and the Pacific. Greening cities will mean less carbon emissions from housing and transport, high recycling rates because of the concentration of recyclables and the possibility of affordable collection systems, and reduced energy use. Implementing 3R policies in cities is, however, not a straightforward task. Modern cities have become so complex that urban governance often struggles to anticipate and keep pace with rapid change and the multifaceted interests of urban stakeholders. Many cities also lack the financial resources to invest in the necessary infrastructure for transport, public housing, waste management, and water and sewerage systems. Maintaining the existing urban infrastructure, let alone investing in new infrastructure, often does not occur in a timely fashion and hence does not keep up with urban growth.

It is important to align the national policy agenda of the 3Rs with urban policy. The 3R principles need to guide the urban planning process, and need to properly intersect with zoning regulations, building codes and requirements for public transport and utilities provision. In a situation of budget constraints cities will have to increasingly rely on private-public partnerships in the domains of waste management and recycling. If national policy settings favour investment into the 3Rs it will become easier and more manageable for cities to aspire and implement the objectives of resource efficiency and waste minimization. Countries could focus on the issue of aligning national and urban policy agendas for the 3Rs and could thereby reap the immense innovation potential that exists in cities.

Urban planning greatly influences industries' ability for recycling and industrial symbiosis. Clustering of industries in eco-industrial parks is a first step to encourage industry networks where the waste flow of one industry becomes an input to another industry. Accreditation processes for green industries, green supply chains and green products further encourage businesses to invest in resource efficiency and waste minimization.

Goals established under the Hanoi Declaration that are particularly relevant to urban and industrial areas include:

a) 3Rs in municipal solid waste

Goal 1: Significant **reduction** in the quantity of **municipal solid waste** generated, by instituting policies, programmes, and projects at national and local levels, encouraging both producers and consumers to reduce the waste through greening production, greening lifestyle, and sustainable consumption.

Goal 2: Full-scale utilization of the **organic component of municipal waste, including food waste**, as a valuable resource, thereby achieving multiple benefits such as the reduction of waste flows to final disposal sites, reduction of GHG emission, improvement in resource efficiency, energy recovery, and employment creation.

Goal 3: Achieve significant **increase in recycling rate** of recyclables (e.g., plastic, paper, metal, etc.), by introducing policies and measures, and by setting up financial mechanisms and institutional frameworks involving relevant stakeholders (e.g., producers, consumers, recycling industry, users of recycled materials, etc.) and development of modern recycling industry.

Goal 4: Build **sustainable cities/green cities** by encouraging “**zero waste**” through sound policies, strategies, institutional mechanisms, and multi-stakeholder partnerships (giving specific importance to private sector involvement) with a primary goal of **waste minimization**.

b) 3Rs in industrial waste

Goal 5: Encourage the **private sector**, including small- and medium-sized enterprises (SMEs) to implement measures to increase **resource efficiency and productivity**, creation of decent work and to improve environmentally-friendly practices through applying environmental standards, clean technologies, and cleaner production.

Goal 6: Promote the **greening of the value chain** by encouraging industries and associated suppliers and vendors in socially responsible and inclusive ways.

Goal 7: Promote **industrial symbiosis** (i.e., recycling of waste from one industry as a resource for another), by providing relevant incentives and support.

Goal 8: Build **local capacity** of both current and future practitioners, to enable the private sector (including SMEs) to obtain the necessary knowledge and technical skills to foster green industry and create decent, productive work.

Goal 9: Develop proper **classification and inventory of hazardous waste** as a prerequisite towards sound management of such waste.

Examples of ways in which particular countries and cities are implementing 3R goals identified in the Hanoi Declaration include:

- Bangkok Metropolitan Administration, **Thailand**, is training volunteers to spread environmental protection messages. In 2012, there were 628 community leaders who had become environment protection volunteers. They have responsibility for releasing information about solid waste management to the public (relevant to Goal 1)
- Pilot projects are under way for 3R facilities in Gianyar and Malang, and for *tempat pembuangan akhir* (landfill) facilities in Kendari, Bitung and Malang, in **Indonesia** (relevant to Goal 2)

- Twenty-eight of the sixty-three provinces in **Viet Nam** have composting plants (relevant to Goal 2)
- In **Singapore**, spent grains and soya waste from manufacturing processes are currently recycled into animal feed. On-site food waste recycling machine have been adopted by some waste generators with funding support from the government. About 40% of horticultural waste and 10% of food waste are recycled. All remaining organic waste is sent to waste to energy plants for energy recovery (relevant to Goal 2)
- Under the *Pilisaru* (National Solid Waste Management) project, waste separation and composting plants have been set up in various parts of **Sri Lanka** (relevant to Goal 2)
- In **Bangladesh**, a 3R demonstration project in four communities in Dhaka and two communities in Chittagong has been initiated. The main purposes of the project are to create awareness on source segregation and recycling of waste, and to reduce emissions of greenhouse gases from waste. To address 100 tons of waste of 50,000 families, 70,000 bins of three different colours (green = organic, yellow = recyclable inorganic and red = hazardous) for Dhaka and 50,000 for Chittagong have been distributed. One hundred and eighty tricycle vans for Dhaka and one hundred for Chittagong, each with three separate compartments, have been made to collect the three types of waste (relevant to Goals 2 and 3)
- Kathmandu City, **Nepal** has established a Community Mobilization Unit (CMU) to help promote 3R activities such as compost production (selling compost bins), and providing training for communities, local residents, school/campus students and journalists on composting, rooftop gardens, vermi-composting and cardboard composting. The CMU is also promoting 3R activities by establishing community recycling centres and encouraging people, including school children, to reducing waste at source and recycle and reuse materials (relevant to Goals 2 and 3)
- In Singapore, various e-waste take-back programmes have been initiated by retailers and suppliers such as Starhub, Panasonic, Canon, Dell, HP, Toshiba, Nokia and Motorola to collect used computers, printers, ink and toner cartridges and telecommunications products for recycling (relevant to Goal 3)
- Waste banks being developed in Surabaya City and Palembang City, **Indonesia** (relevant to Goal 4)
- Iskandar Malaysia (formerly known as Iskandar Development Region), in Johor, **Malaysia**, is using the Internet portal <http://sustainableiskandar.com.my/> to promote sustainability activities and projects in Johor Bahru (relevant to Goal 4)
- Da Nang, **Viet Nam** is currently involved in the Sustainable City Development Project (SCDP), funded by the World Bank. The key objective of the project is to facilitate the sustainable development of Da Nang through improving its urban environment and using energy effectively. The project is scheduled to be

- implemented between 2013 and 2019; sanitation and road construction works are already under way (relevant to Goal 4)
- Pilot projects introduced in **Thailand** to encourage best practices on municipal waste management. These now cover 33 of the 76 provinces in Thailand and a further 16 provinces are planned for coverage in 2014 (relevant to Goal 4)
 - Phitsanulok City Municipality in **Thailand** has been involved in a Solid Waste Management Programme (with GIZ of Germany) since 1999. The programme has involved the public in waste reduction activities, achieving waste reduction through separation at source, and the municipality uses mechanical-biological waste treatment (MBT) to reduce environmental impacts of the remaining waste (relevant to Goal 4)
 - Pilot projects such as Adopt-an-Estero (water body) and Project-Bayong (Water Lily Project), in the **Philippines**, boost livelihoods while promoting environmental sustainability (relevant to Goal 5)
 - In **Sri Lanka**, National Green Awards are presented annually to private and public sector institutions achieving environment benefits (relevant to Goal 5)
 - The Department of Industrial Works in **Thailand** is promoting the use of industrial waste, and reducing the amount of waste to landfill, in factories (relevant to Goal 5)
 - National Eco-labelling Programme-Green Choice (www.pcepsdi.org.ph) implemented in the **Philippines** (relevant to Goal 6)
 - In **Sri Lanka**, some major importers of electric and electronic equipment provide discounts to purchasers of new items if they hand over their used equipment (relevant to Goal 6)
 - Companies undertaking waste recycling activities that are high value added and use high technology (e.g. recycling of agricultural waste or agricultural by-products, recycling of chemicals and the production of reconstituted wood-based panel boards or products) are eligible for income tax exemptions in **Malaysia** (relevant to Goal 7)
 - Some industrial symbiosis initiatives have been examined in the food processing industry in **Viet Nam**, such as those in Bien Hoa 1 Industrial Zone in Dong Nai Province, Tan Chau-Singapore Company, Tay Ninh Province and the Tra Co Tapioca Processing Village, Dong Nai Province, where tapioca wastewater is being partly and successfully reused in fish culture (relevant to Goal 7)
 - Training activities in cleaner production, and waste audits, have been carried out in a number of industrial facilities in **Viet Nam** (relevant to Goal 8)
 - **Malaysia** has fully implemented a hazardous waste classification system called E-SWIS (Electronic Scheduled Waste Information System) (relevant to Goal 9).

3R goals in rural areas

The potential for 3Rs in rural areas has often been underestimated or overlooked by the policy community. Many economies in Asia and the Pacific have a large and viable agriculture and forestry sector and there are numerous co-benefits that can be achieved including food security, energy generation from biomass, carbon sequestration through land-use and vegetation planning and biodiversity conservation. Local decisions about land-use depend on the profitability of the land and the ability of the landowner to invest in a certain form of use. Payments for carbon sequestration, ecosystem services and biodiversity would markedly change the incentives for landholders and enable substantial co-benefits both in agriculture and forestry. Governments will need to consider establishing policy frameworks and payment mechanisms that reward landholders who achieve substantial co-benefits through their land management and cultivation practices.

There is also great potential for saving resources and reducing waste by reducing the losses that occur along the full supply chain in many countries. While agricultural production can often occur with lower inputs of fertilizer and pesticides there is also potential to reduce losses once agricultural products have left the farm gate. Improvements in distribution systems, in cooling facilities and also reducing household waste of food products may improve utilization rates by 30 to 50% in some countries.

Goals established under the Hanoi Declaration that are particularly relevant to rural areas include:

Goal 10: Reduce losses in the overall food supply chain (production, post harvesting and storage, processing and packaging, distribution), leading to reduction of waste while increasing the quantity and improving the quality of products reaching consumers.

Goal 11: Promote full-scale use of agricultural biomass waste and livestock waste through reuse and/or recycle measures as appropriate, to achieve a number of co-benefits including GHG emission reduction, energy security, sustainable livelihoods in rural areas and poverty reduction, among others.

Examples of ways in which particular countries are implementing 3R goals identified in the Hanoi Declaration include:

- **India** is implementing pilot plants for biomass gasification at various industrial clusters. Additional capacity-building is required re: collection and utilization of biomass waste (relevant to Goal 11)
- The Land Bank of the **Philippines** offers a loan package with technical assistance focused on methane recovery from waste management projects, encouraging more projects involving animal manure and other solid waste (relevant to Goal 11)

- Incentives available in **Thailand** for the use of biomass in electricity plants (relevant to Goal 11)
- The Biogas Program for the Animal Husbandry Sector of **Viet Nam** has been implemented. By the end of 2012, the project had supported construction of over 124,000 biogas tanks, provided training for 953 provincial and district technicians, 1,505 biogas mason teams, and organized 140,000 promotion workshops and training sessions for biogas users (relevant to Goal 11)
- The first thermal power plant project using rice husks in **Viet Nam**, one of twenty power plants in six Mekong Delta localities, is being constructed in the town of Long My, Hau Giang Province, Viet Nam (relevant to Goal 11)
- In **Cambodia**, rice husk material is used to produce biomass energy, and agricultural and animal waste is being used to produce biogas (relevant to Goal 11)
- Policies and public awareness campaigns in **Thailand** to reduce plastic use in national parks and retail stores (relevant to Goal 12).

3R goals for new and emerging wastes

The emergence of a large number of middle class consumers in Asian cities has meant that the composition of residential waste flows has markedly changed over the last two decades. E-waste from personal computers, mobile phones, and TV screens require environmentally-sound management and waste management systems and many countries in Asia and the Pacific have not kept up with the increasing amounts of new waste flows. E-waste needs to be examined at all stages of the waste management process including collection, storage, and transportation, dismantling, recycling, treatment and final disposal.

There is a large informal recycling sector in many Asian and Pacific developing countries where e-waste is treated often without any recognition of the health and safety risks faced by the informal workforce involved. This is a sector that requires government regulation, and new economic incentives that help establish a recycling industry as part of the formal economy to ensure optimal recovery rates of precious materials under workplace conditions that aspire to good outcomes for the health and safety of the workforce.

This may well become a domain where SMEs service local waste flows. In any case, recycling businesses will depend on collection systems that may best be organized via government programmes with co-investment by businesses operating in the electronics industry. The principle of extended producer responsibility that would encourage businesses to work with government to fulfil their responsibilities for collecting, recycling and disposing of the waste streams caused by their businesses.

Similar considerations are important for plastics, glass, aluminium, batteries, tyres and other such substances that warrant resource recovery through recycling. Some countries in Asia such as Japan and Korea offer good examples of how the separation of waste streams, collection systems and recycling facilities can work together for the common good. The success stories in separating waste streams to facilitate recycling are often based on large scale behavioural change that has been initiated and supported through government programmes. The notion of the 3Rs needs to become part of the curriculum of education and training systems in Asian developing countries, to allow the 3Rs to become an important aspect of everyday life.

Goals established under the Hanoi Declaration that are particularly relevant to new and emerging wastes include:

Goal 12: Strengthen regional, national, and local efforts to address the issue of **waste, in particular plastics** in the marine and coastal environment.

Goal 13: Ensure **environmentally-sound management of e-waste** at all stages, including collection, storage, transportation, recovery, recycling, treatment, and disposal with appropriate consideration for working conditions, including **health and safety aspects** of those involved.

Goal 14: Effective enforcement of established mechanisms for preventing illegal and inappropriate export and import of waste, including transit trade, especially of hazardous waste and e-waste.

Goal 15: Progressive implementation of “**extended producer responsibility (EPR)**” by encouraging producers, importers, and retailers and other relevant stakeholders to fulfil their responsibilities for collecting, recycling, and disposal of new and emerging waste streams, in particular e-waste.

Goal 16: **Promote the 3R concept** in health care waste management.

Examples of ways in which particular countries and cities are implementing 3R goals identified in the Hanoi Declaration include:

- A pilot plant for conversion of plastic into petrol and diesel has been set up at Annamalai University, Chidambaram (Tamil Nadu State) and is likely to be replicated in other parts of **India** (relevant to Goal 12)
- Pilot project on Cu Lao Cham Island, Quang Nam Province, **Viet Nam**, where no more plastic bags used. Since 2009, Hoi An City has implemented a ‘Say no to plastic bags’ campaign there, where instead of using plastic bags when shopping, local people have switched into using baskets provided (nearly 3,000 free plastic baskets provided to households on Cu Lao Cham island) (relevant to Goal 12).

3R goals for crosscutting issues

The Hanoi 3R Declaration looks at waste flows from a whole life cycle perspective from resource extraction, transformation, manufacturing, distribution and use, to final disposal. There are significant overlaps of different government and United Nations programmes in regard to resource efficiency, sustainable consumption and production and green economy. Strategies such as improving the eco-efficiency of production, green infrastructure, green and socially responsible government procurement, and responsible consumption at the household level are overlapping. The main contribution of the 3Rs lies in linking waste flows and emissions (the end of the cycle) to the overall supply chains of natural resources.

There are numerous institutional and governance challenges that will need to be overcome in Asia and the Pacific to institute and successfully implement the objectives of the Hanoi 3R Declaration and to yield the social and economic benefits of resource efficiency and waste minimization.

Policymaking and policy implementation need to consider all relevant steps in the policy cycle to enhance the chances of success. There need to be a high level of awareness of the necessity of the 3Rs in the policy and business community and among the general public. This will ensure broad support for the policy stances around the 3Rs in countries and will facilitate policy implementation at all levels of jurisdiction.

The choice of policy instruments and the right policy mix that suits the social and economic context and particulars in every country is of equal importance. Policymakers typically can choose from five common types of policy instruments which may be employed to achieve 3R objectives. These include

- policy through advocacy – educating or persuading, using information available to government
- policy through network – cultivating and leveraging relationships within and across government and with external partnership bodies to develop and implement desired goals and behaviours
- policy through money – using spending and taxing powers to shape activity beyond government
- policy through direct government action – delivering services through public agencies
- policy through law – legislation, regulation and official authority

Advocacy argues the case for resource efficiency and waste minimization but does not force a result. Advocacy draws government into working closely with other stakeholders or interest groups. Such consultation has become an important feature of policy formation.

With regard to some aspects of the 3Rs, governments in Asia and the Pacific may agree not to impose laws in return for sectoral agreements around shared objectives such as self-regulation of businesses and SMEs.

Policy can use networking to deal with external constituencies. The networks that may be utilized for achieving 3R objectives can range from tightly integrated policy communities through to loose associations of parties interested in achieving 3R outcomes. Networks function vertically as well as horizontally within governmental and intergovernmental settings and will include social actors beyond government such as business leaders, NGOs or members of the general public. Making use of networks, governments may become policy facilitators in achieving 3R objectives rather than playing a dominant role in service delivery or policy enactment.

Employing economic instruments is one of the dominant approaches to achieving policy objectives. Governments in Asia and the Pacific have multiple options for applying economic instruments, which include fiscal decisions, taxation policy and establishing government funded programmes to influence individual behaviour of businesses and households through financial incentives and disincentives. Governments may use tax revenues to fund industry development, such as training programmes to support skills that underpin the 3Rs.

Governments may choose to provide certain services in support of 3R goals. This includes activities such as running waste management and waste separation facilities, establishing waste collection systems or running a local landfill. It is sometimes contested whether such services should be provided by government or by private businesses.

Legislation is the traditional instrument of government policy and may guarantee that policy intent can be translated into action. While laws establish a framework for government action much of the detail is contained in regulations. All these different policy instruments have a role to play in implementing the 3Rs, and in transforming production and consumption in Asia and the Pacific towards resource efficiency and waste minimization. It will be important to find the right policy mix which is adapted to the economic and social context in different countries. A set of simple questions may guide the choice of policy instruments.

- Appropriateness – is this a reasonable way of proceeding in this policy area?
- Efficiency – will the instrument be cost-effective?
- Effectiveness – can the instrument achieve the desired outcome?
- Equity – are the likely consequences fair?
- Suitability – will there be conflicts with existing processes or policies?
- Workability – is the instrument simple and robust and can it be easily implemented?

There is a role for regional collaboration as well as for technical support for the choice of policy instruments. Countries may consider achieving a good mix between incremental and transformational policies to ensure that efficiency gains realized (the low hanging fruit) and that innovation and change in systems of provision is incentivized through the policy mix.

Goals established under the Hanoi Declaration that are particularly relevant to crosscutting issues include:

Goal 17: Improve **resource efficiency and resource productivity** by greening jobs nation-wide in all economic and development sectors.

Goal 18: Maximize co-benefits from waste management technologies for local air, water, oceans, and soil pollution and global climate change.

Goal 19: Enhance **national and local knowledge base and research network on the 3Rs and resource efficiency**, through facilitating effective and dynamic linkages among all stakeholders, including governments, municipalities, the private sector, and scientific communities.

Goal 20: Strengthen multi-stakeholder partnerships among governments, civil society, and the private sector in raising public awareness and advancing the 3Rs, sustainable consumption and production, and resource efficiency, leading to the behavioural change of the citizens and change in production patterns.

Goal 21: **Integrate the 3Rs** in formal education at primary, secondary, and tertiary levels as well as non-formal education such as community learning and development, in accordance with Education for Sustainable Development.

Goal 22: **Integrate the 3R concept** in relevant policies and programmes, of key ministries and agencies such as Ministry of Environment, Ministry of Agriculture, Forestry and Fisheries, Ministry of Industry, Ministry of Trade and Commerce, Ministry of Energy, Ministry of Water Resources, Ministry of Transport, Ministry of Health, Ministry of Construction, Ministry of Finance, Ministry of Labour, Ministry of Land and Urban Development, Ministry of Education, and other relevant ministries towards transitioning to a resource-efficient and zero waste society.

Goal 23: Promote **green and socially responsible procurement** at all levels, thereby creating and expanding 3R industries and markets for environmentally-friendly goods and products.

Goal 24: **Phase out harmful subsidies that favour unsustainable use of resources (raw materials and water) and energy**, and channel the freed funds in support of implementing the 3Rs and efforts to improve resource/energy efficiency.

Goal 25: **Protect public health and ecosystems, including fresh water and marine resources** by **eliminating illegal** activities of open dumping, including dumping in the oceans, and controlling open burning in both urban and rural areas.

Goal 26: Facilitate the international circulation of re-usable and recyclable resources as well as remanufactured products as mutually agreed by countries and in accordance with international and national laws, especially the *Basel Convention*, which contributes to the reduction of negative environmental impacts and the effective management of resources.

Goal 27: Promote data collection, compilation and sharing, public announcement and application of statistics on wastes and the 3Rs, to understand the state of waste management and resource efficiency.

Goal 28: Promote heat recovery (waste to energy), in case wastes are not re-usable or recyclable and proper and sustainable management is secured.

Goal 29: Promote overall regional cooperation and multi-stakeholder partnerships based on different levels of linkages such as government-to-government, municipality-to-municipality, industry-to-industry, (research) institute-to-institute, and NGO-to-NGO. Encourage technology transfer and technical and financial supports for 3Rs from developed countries to less developed countries.

Goal 30: Pay special attention to issues and challenges faced by developing countries including small island developing states (SIDS) in achieving sustainable development.

Goal 31: Promote 3R + “Return” concept which stands for Reduce, Reuse, Recycle and “Return” where recycling is difficult due to the absence of available recycling industries and limited scale of markets in SIDS, especially in the Pacific Region.

Goal 32: Complete elimination of illegal engagement of children in the **informal waste sector** and gradually **improve** the working conditions and livelihood security, including **mandatory provision of health insurance**, for all workers.

Goal 33: Promote 3Rs taking into account gender considerations.

Examples of ways in which particular countries and cities are implementing 3R goals identified in the Hanoi Declaration include:

- Various training workshops on cleaner production for numerous industrial facilities conducted in provinces and cities across **Viet Nam** (relevant to Goal 19)
- Multi-stakeholder partnerships exist or are being developed with various environmental NGOs, banks, businesses, ministries, etc. in **Malaysia**. Challenges include budget constraints and public apathy (relevant to Goal 20)
- In **Indonesia**, the *Adiwiyata* (environmental education) Programme is gradually being introduced in primary and secondary schools (relevant to Goal 21)

- Recycling clubs and recycling banks being implemented in schools in **Malaysia** (relevant to Goal 21)
- In **Singapore**, the School Recycling Corner Programme has been implemented in all schools and involves the setting up of a recycling corner in the school where recycling bins for paper, cans and plastic bottles as well as educational materials such as posters and booklets, are made available to the students. A Preschool 3R Awareness Kit has been developed to help teachers plan activities to pique preschoolers' interest in the 3Rs and to reinforce their 3R awareness (relevant to Goal 21)
- **Thailand** produces an annual report on pollution, and has studied waste generation, however the cost of data-collection and analysis is an ongoing challenge (relevant to Goal 27)
- The **Philippines** is part of the Global Methane Initiative project, via its Department of Science and Technology (DOST) (www.dost.gov.ph) (www.globalmethane.org) (relevant to Goal 28)
- Pilot projects on waste to energy in selected municipalities in **Thailand**, funded by the Ministry of Energy (relevant to Goal 28)
- Waste incineration plant (for electricity production) currently under construction in Nam Son, **Viet Nam** (relevant to Goal 28)
- Green junk shop programme in **Thailand** to promote informal waste sector knowledge and encourage family businesses to comply with related laws (relevant to Goal 32)
- The **Philippines** is building 3R concepts into its Gender and Development Communications programmes (relevant to Goal 33).

Part 3 Small island developing states (SIDS)

Small island developing states share similar issues with developing countries in mainland Asia with regard to implementation of the 3Rs. Their economies are rapidly modernizing and they face fast urban growth, which has led to growing requirements for natural resources and increased waste flows. They also face a set of challenges of their own, including limited local resource bases, high transport costs because of the distance to main trade routes, and limited capacity for waste landfills. In such a context resource efficiency and waste minimization are of even greater importance and need to be addressed as a priority by public policy to allow the SIDS to prosper in the future.

Many small island development states face critical problems with regard to waste management. Common problems include waste management receiving insufficient government priority and political support for action, and a lack of funding for waste management. There is also a lack of long-term planning or business planning and as a

result poor landfill siting, design, planning and management of landfills. SIDS face a general challenge around the lack of skilled personnel and low levels of awareness of the problems caused by poor waste management. On top of land-use limitations to the establishment of landfill sites, the SIDS face poor handling of clinical waste, insufficient recycling and reuse rates of waste, including limited reuse of organic wastes, septic sludge, sewage sludge and effluent.

A failure to adequately address these problems will lead to escalating environmental and health problems for Pacific Islanders, and serious consequences for economic development which is largely based on tourism, export agriculture and small 'clean' industries.

At present, most of the waste in SIDS is land filled. In the absence of reliable waste generation information and data it is estimated that solid waste generation rates in SIDS range from 0.75 to 2.8 kg per capita, with organics comprising close to 50% of the waste stream. Other identifiable components include plastics, paper, metal, textiles and glass, all of which have the potential to be diverted and recycled. Given the small volumes of recyclables and limited opportunities for recycling as well as limited markets for recycled materials, much of that waste is disposed of via land filling. Considering a waste management hierarchy under the 3Rs the strategies for waste minimization in SIDS would include waste prevention, reduction, recycling, recovery and disposal of the remaining waste flows.¹⁸ This suggests that SIDS would need to address the dual objective of resource efficiency and waste reduction simultaneously.

SIDS will need to focus on local resource utilization, to reuse and recycle resources as much as possible and to allow for co-benefits of waste management and energy generation. Important challenges for improved eco-efficiency and waste management include capacity needs in government agencies and the local business community to improve policy frameworks, access to recycling technologies and waste management practices that keep pace with international development in the areas of resource efficiency and waste minimization and are at the same time appropriate to local conditions and economy. Capacity development activities could be coupled with the implementation of pilot projects that employ the regional workforce and are suited to local conditions. New waste streams such as e-waste and plastics are related to a growing urban middle class and their consumption patterns but are also caused, to a large extent, by the tourism industry. SIDS could explore the possibility of establishing a number of regional waste centres that deal with waste streams that cannot easily be managed locally.

To enhance resource efficiency and reduce dependency on imports of natural resources, local resources and local skills need to be utilized in the building and manufacturing

¹⁸ UNEP, UN DESA and FAO (2012). SIDS-Focused Green Economy: An Analysis of Challenges and Opportunities.

sector of SIDS. Reutilization of biomass and agricultural waste as well as biotic waste from households and tourism businesses for energy generation, allowing for cascading use of biomass, needs to become a policy priority. Cooperation between agencies for agriculture and energy and resources will be instrumental in designing policies that enable the establishment of a knowledge base and technical infrastructure, as well as for developing business cases for the adoption of newer technologies and practices.

Recycling of construction waste will help reduce the pressure on primary construction materials such as sand and gravel which are required in ever greater amounts for modern houses and infrastructure. Improving the skill base of the local construction industry to use alternative materials and practices that allow for improvements in energy efficiency of buildings will be a crucial element of the 3Rs in SIDS.

Essentially, what is required in SIDS are national Integrated Solid Waste Management (ISWM) policies, strategies and action plans. These would present clear targets and indicators, and based on this information base waste management objectives and resource efficiency goals could be mainstreamed into national development planning. This would best be implemented through an ISWM programme¹⁹ that would allow linking a number of public policy domains including public health, environmental protection, and economic development within one framework and would help create policy instruments that are mutually supportive to the diverse public policy goals of development, environment and human health.

One of the main issues in SIDS is the lack of economies of scale when it comes to investment in eco-efficiency, green economy and sustainable waste management. In such situations knowledge-sharing and the exchange of technology and practices among SIDS would be very beneficial. In addition, the SIDS would need to extend their networks to the broader Asia-Pacific community to establish partnerships with businesses and government agencies in mainland Asia and the Pacific, which would greatly assist the SIDS to achieve their 3R goals.

Examples of ways in which particular SIDS are implementing 3R goals identified in the Hanoi Declaration include:

- **Fiji** – a pilot project in waste minimization and recycling was piloted at two municipal councils between 2008 and 2011. As a result of the successful implementation of the 3R pilot project, the total recycling rate increased from 8.1% to 10.3% in Lautoka City and from 2.8% to 18.3% in Nadi Town by October 2011. Concurrently, waste disposal volumes from 2008 to 2011 decreased by 7.8% in Lautoka City and 38.6% in Nadi Town. Implementation

¹⁹ UNEP (2011). Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication – A Synthesis for Policy Makers, www.unep.org/greeneconomy.

was challenging as Fiji currently has an absence of specific policies or legislation on 3R, and a limited recycling industry. Based on the successes of the 3R pilot project, the Department of Environment (in consultation with key stakeholders) has developed a draft national 3R policy to promote the 3Rs across the nation (relevant to Goal 1)

- **Palau** – Koror State Composting Facility has significantly reduced the amount of green waste and food waste going into the national landfill. Challenges in implementation have included procurement of equipment, and the need to train personnel (relevant to Goal 2)
- **Cook Islands** – the Cook Islands exports recyclable waste such as crushed vehicles, waste oil, and old computer hardware. This is challenging as exporting waste is not sufficiently profitable to cover operators’ expenses (relevant to Goal 8)
- **Kiribati** – system already in place where recyclable wastes such as aluminium cans, PET bottles and acid lead batteries are collected such and exported them overseas for recycling. There is also a recycling system in place for used oil and cooper metals. As a goal for 2014, Kiribati plans to expand the scope of recyclable wastes for export to include end-of-life vehicles, and to explore others such as e-waste (relevant to Goal 31).

Part 4 The way forward

The regional dialogue on resource efficiency and waste minimization facilitated by the Regional 3R Forum for Asia and the Pacific has gained strong support through the outcomes of the Rio +20 – *The Future We Want*²⁰. The regional dialogue has brought together government representatives, practitioners and academics focusing on environmental sustainability and the fundamental role the 3Rs have for advancing the sustainable management of natural resources and waste. The regional dialogue needs to extend into other policy domains that intersect with 3R objectives, especially with government agencies responsible for the economy, finance, trade and social affairs, to strengthen mainstreaming of 3R goals and objectives into the national policy agenda.

There is a need for a national dialogue to advance framing the issues of resource efficiency and waste minimization within countries. The level of awareness of the importance of resource efficiency and waste minimization for economic and development planning in countries among the general policy community and the wider public is still limited. Economic development objectives are understandably high on the public policy agenda and issues related to the 3Rs often have a lower priority or are overlooked all

²⁰ United Nations (2012). ‘The Future We Want’. Outcome document adopted at Rio+20.

together. Increasing the general level of awareness is very important to establishing the necessary support for 3R initiatives at all levels of society, to underpin successful policy implementation.

In order to increase the knowledge base of government, countries in Asia and the Pacific may consider establishing a scientific and civil society advisory group to provide information and support policy framing. Such an advisory group would be made up of eminent scientists from the country and by representatives of the business community and civil society groups. It would function as a think tank to link government with the newest scientific information within countries and internationally. It would also help to keep government policy aligned with business and civil society considerations. Such a panel would provide advice to government and address issues and questions that would be identified by government agencies involved in progressing 3R objectives.

It will be important to establish strong linkages with other regional initiatives such as the ten year framework programmes for sustainable consumption and production, green growth and green economy initiatives at United Nations and national levels, international efforts to establish satellite accounts for natural resource use, emissions, and waste flows under the system of integrated economic environmental accounts (SEEA). In doing so, countries will avoid duplication of efforts and make sure that government agencies align their policy initiatives for the common goal of environmental sustainability and achieving sustainable development goals (SDGs) more generally. There is a growing sense that SDG objectives are underpinned by the timely availability of affordable natural resources and the integrity of ecosystems to provide services to society as a source of resources and sink for emissions and beyond.

The UNCRD could play an important role for aligning regional sustainable development with the objectives of the 3Rs. Building on the experiences from the Regional 3R Forum in Asia and the Pacific, UNCRD, in close collaboration with other United Nations agencies, could provide technical advice and capacity-building support to government agencies in Asian developing countries and for small island developing states. This could occur in targeted regional capacity-building workshops that would service several aspects of 3R policy implementation including institutional capacity, technologies, infrastructure and responsible consumption through governments and households.

UNCRD, together with other United Nations agencies, could also play an important role to help build the knowledge base, data and indicators for measuring progress of the 3Rs at regional and national levels. Data on waste flows and resource use are often lacking at the national level and institutional capacity to develop indicator frameworks and prepare data sets is low. There are several attempts in the broader United Nations to establish satellite accounts for natural resource use, emissions and waste. While indicators for resource efficiency and sustainable consumption and production are now available

through the UNEP, data on waste flows are urgently needed. If such data become available countries will be in a position to identify targets for progress on the 3Rs that are at the same time ambitious and achievable.

The new information base should be accompanied by information about institutional capacity. It would be advisable to perform a policy needs assessment in Asia and the Pacific through the Regional 3R Forum, which would serve as a baseline for investment in policy capacity, policy instruments and indicators to evaluate policy effectiveness and efficiency in countries.

It would be advisable if governments in Asia and Pacific were to acknowledge important linkages of the 3Rs with other policy domains including climate mitigation and adaptation, energy and water security, urban air pollution, and supply security of critical natural resources. Climate impacts, especially, are increasing in frequency and severity and knowledge of their consequences for waste flows is lacking. Storms, coastal and inland flooding and bushfires have not just economic and social costs but also affect the material and energy balance of a country because of the large scale need for clean up and replacement of infrastructure and buildings which substantially will add to waste flows within a country. The 3Rs and the principles of reduce, reuse and recycle have great potential to underpin sustainable environmental development in Asia and the Pacific because of the practicality of approaches, the regional importance and linkages with regional on the ground processes and the benefit 3R implementation brings in social and economic terms. Asia and the Pacific have led the world in addressing the 3Rs but more needs to be done with regard to implementing the goals of the Hanoi 3R Declaration (2013–2023) in practical policy in countries. Wealth from waste is not just a political slogan but will contribute in practice to socioeconomic and human development of the region in the Asia-Pacific century.

Afterword

This discussion paper was written to support the Fifth Regional 3R Forum in Asia and the Pacific, which focused on the implementation of the Hanoi 3R Declaration. Co-organized by the Ministry of Environment and the Ministry of Public Works of Government of Indonesia, the Ministry of the Environment of Japan, and the United Nations Centre for Regional Development (UNCRD), the Fifth Regional 3R Forum was held in Surabaya, Indonesia in February 2014. Under the overall theme of “Multilayer Partnerships and Coalition as the Basis for 3Rs Promotion in Asia and the Pacific”, the Forum addressed various forms of partnerships and coalition for implementation of the Hanoi 3R Declaration (2013–2013).

The Forum was attended by approximately 500 participants, comprising government representatives from thirty-three Asia-Pacific countries, Subsidiary Expert Group Members of the Regional 3R Forum in Asia, international resource persons, representatives from various United Nations and international organizations, scientific and research organizations, non-governmental organizations (NGOs), representatives from the private and business sector, and local observers and professionals on waste management from Indonesia.

As outcomes of the Forum, participants adopted the Chair's Summary and the Surabaya Declaration on Promotion of Multilayer Partnerships and Collaboration for the Expansion of Reduce, Reuse and Recycle (3Rs) in Asia and the Pacific. Key points agreed to by the participants at the meeting include:

- **Reiterating** the importance of renewing commitments towards effective implementation of 3R policies through various forms of partnerships and collaboration in achieving a resource efficient society and a green economy;
- **Recognizing** the critical challenges (institutional capacity, financing and technology needs) the Asia-Pacific region is faced with in integrating resource efficiency and 3Rs in overall policy, planning and development, given the fact that many countries have become net importers of raw materials (fossil fuel, metals, timber, and other natural resources) with rapidly increasing volume and changing characteristics of urban and industrial waste, rising population and rapid urbanization along with increasing consumption and per capita waste generation that pose serious challenges for the people and the sustainability of the region;
- **Noting** the recommendations in the Rio+20 Outcomes Document – *The Future We Want*²¹, thereby the call of the Heads of States and Governments at Rio+20 for the development and enforcement of comprehensive national and local waste management policies, strategies, laws and regulations, and new and innovative public-private partnerships among industry, governments, academia and other non-governmental stakeholders, aiming to enhance capacity and technology for environmentally sound chemicals and waste management, including waste prevention;
- **Recalling** the objectives and goal of a 10-year framework of programmes on sustainable consumption and production patterns in which the 10-year framework should affirm a common vision that promotes a whole of life cycle approach including resource efficiency and sustainable use of resources, as well as science-based and traditional knowledge-based approaches, cradle to grave, extended producer responsibility and the 3R concept and other related methodologies, as appropriate;

²¹ United Nations (2012). 'The Future We Want'. Outcome document adopted at Rio+20.

- **Reaffirming** the recommendation made by United Nations Conference on Sustainable Development (Rio+20) in June 2012, where countries agreed to adopt the 10-Year Framework of Programmes on Sustainable Consumption and Production (10YFP);
- **Reaffirming** resource recirculation in accordance with mutual respect to environmental concerns of each country;
- **Taking into account** the outcome of the Fourth Regional 3R Forum in Asia held in Hanoi, Viet Nam in 2013 and the Hanoi 3R Declaration – Sustainable 3R Goals for Asia and the Pacific (2013–2023) that provides an important basis and framework for Asia-Pacific countries to urgently voluntarily develop and implement 3R policies and programmes;
- **Recognizing** the issues and challenges faced by and specific capacity needs of small island developing states (SIDS) in implementing the 3Rs especially emphasizing the importance of the “Return” concept in terms of the process for “Recycling” in achieving sustainable development in view of their unique and particular vulnerabilities, including their small size, remoteness, narrow resource and import base, and exposure to global environmental challenges and external economic shocks, including a large range of impacts from climate change and potentially more frequent and intense natural disasters, and the increasing impacts of tourism activities, and thereby the need for increasing international and regional cooperation among Pacific Island Countries (PICs) and between PICs and other countries;
- **Recognizing** the complex and daunting nature of waste management challenges faced by local authorities and municipalities in today’s world in view of the diversification of waste streams region-wide, the growing presence of chemicals and hazardous and toxic elements, including e-wastes, in the general waste stream, the increasing presence of waste, in particular plastics and disaster waste in coastal and marine environment that increasingly demand science-based decision-making and solutions within multilayer partnerships and collaboration;
- **Recognizing** the specific challenges and needs of mountainous countries with regard to environmentally sound management of waste generated from the tourism sector;
- **Underscoring** the fact that moving towards a resource efficient and sound material cycle based society will require considerable and sustainable investment and resource mobilization, including technological interventions, institutional capacity-building, and development of 3R infrastructure, programmes and projects (eco-industrial zones, science parks, eco-cities, waste recovery facilities, waste-to-energy schemes, greening small and medium enterprise operations, green products and eco-labelling schemes, biomass to composts and energy in rural areas, etc.), which is inherently a multi-stakeholder process calling for

multilayer partnerships and collaboration within and between communities, businesses, industries, all levels of government, scientific and research institutions, international organizations, development banks, academia and the United Nations system;

- **Recognizing** the significance of resource efficiency and 3Rs in the post-2015 development era, and thereby the important role private, industry and business sectors can play in providing 3R and green business based solutions, as Corporate Social Responsibility and Extended Producer Responsibility, to many sustainability challenges;
- **Reaffirming** that enhancing connectivity among Asia-Pacific countries would benefit all Asia-Pacific countries through promotion of multilayer collaborative efforts, and the need to strengthen cooperation towards effective implementation of the 3Rs through various forms of partnerships and collaboration in achieving a resource efficient society.

Partnerships and collaboration opportunities discussed include country-country cooperation, south-south cooperation, city-city and inter-municipal cooperation, multi-sector partnerships and collaboration in policymaking and promotion of sustainable business models, industry-industry cooperation, government-NGO/CSO cooperation, a regional cooperative framework among SIDS/PICs, and a multilayer partnership in the area of disaster waste management.

The full Surabaya Declaration can be downloaded from:

www.uncrd.or.jp/content/documents/1322Surabaya-Declaration_Eng.pdf

while the Chair's Summary document is available at:

www.uncrd.or.jp/content/documents/13175-3R_Chair-Summary.pdf