PECoP-Asia
Policy Design and Evaluation to Ensure Sustainable Consumption and Production Patterns in Asian Region

# Policy Report for Reconfiguring Consumption and Production in Asia and the Pacific

## 12 Opportunities for Accelerated Achievement of SDGs

PECoP-Asia

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**Foreword**

This policy report was prepared by the members of a research project “Policy Design and Evaluation to Ensure Sustainable Consumption and Production Patterns in Asian Region” (PECoP-Asia; see Page 26 for details) in collaboration with Asia-Pacific Roundtable on Sustainable Consumption and Production (APRSCP). This report aims to activate the discussion of policies on sustainable consumption and production (SCP) in Asia and the Pacific, and regional multistakeholder policy dialogues for accelerating achievement of the Sustainable Development Goals (SDGs), particularly focusing on Goal 12.

This report put forward the idea that delivery of the SDGs in the region shall largely depends on taking advantage of emerging forces including new business models, drivers of wealth, wellbeing and human development, urbanisation, disruptive technologies and digitisation. It also reflects academic views and on-going research outcomes of the PECoP-Asia project. All of the 12 opportunities presented in this report indicate promising entry points for SCP policy development and implementation in the era of the Paris Agreement and the SDGs in Asia and the Pacific.

1 July 2018

On behalf of the PECoP-Asia project

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## 1. Context of SCP in Asia and the Pacific: Light and shadow of consumption and production

Economic growth over the past few decades has brought affluence to people around the world and reduced poverty. The extreme poverty rate has dropped considerably in most developing regions in the last two decades, with reduction rates between 46% and 94% in Asia (UN, 2015). However, significant negative impacts on the environment and societies have surfaced. Global resource consumption and environmental loads (greenhouse gases (GHG), discharge of waste, etc.) have increased to support a wealthier consumer lifestyle and economic disparities between regions and countries are rising. These are expected to increase and expand even further in the future.

Today, the Asia-Pacific region is the world's cradle of production in the world today. Economic growth is remarkable (Fig. 1 on left), with consumption and accompanying environmental impacts expanding at a rapid pace. Between 2000 and 2017, the material footprint in the Asia-Pacific region increased at the largest and fastest pace in the world (Fig. 2), and GHG emissions in the Asia-Pacific region were also remarkable (Fig. 3). Emissions of waste and pollutants are becoming more serious in many countries (e.g., the level of PM2.5, an air pollutant, exceeds WHO standards as shown in Fig. 4), and preventing environmental pollution has become an urgent task. Per capita income is still low (Fig. 1 on right), and environmental impacts in the Asia-Pacific region will continue to increase at the fastest pace in the world for now, with the region's share in global environmental impacts expected to rise.

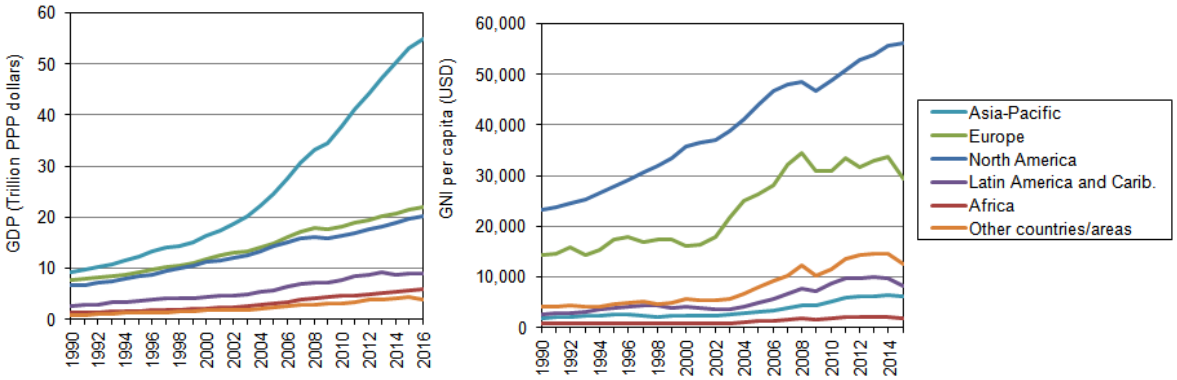



Fig. 1. GDP by region (left) and per capita income around the world (right) (Data retrieved from ESCAP (2017))

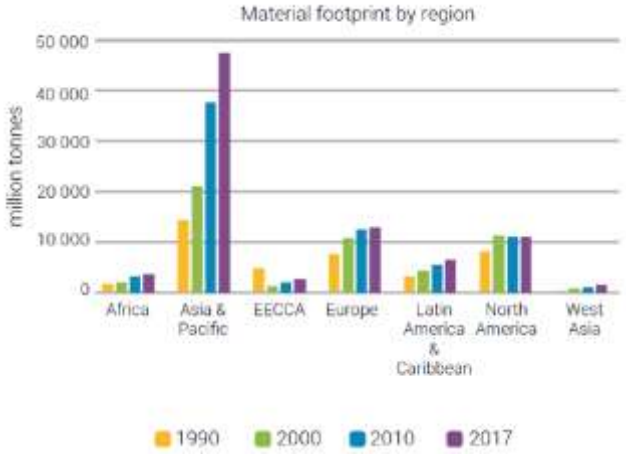



Fig. 2. Changes in material footprints by region around the world
(Reproduced from IRP (2017) Assessing Global Resource Use: A systems approach to resource efficiency and pollution reduction)

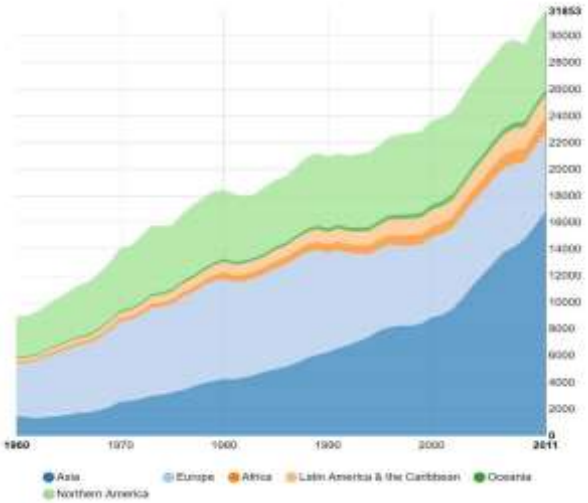



Fig. 3. Global $CO_2$ emissions between 1960-2011. Asia is represented by the blue section on the bottom. (Reproduced from Friedrich and Damassa (2014) The History of Carbon Dioxide Emissions. World Research Institute.)

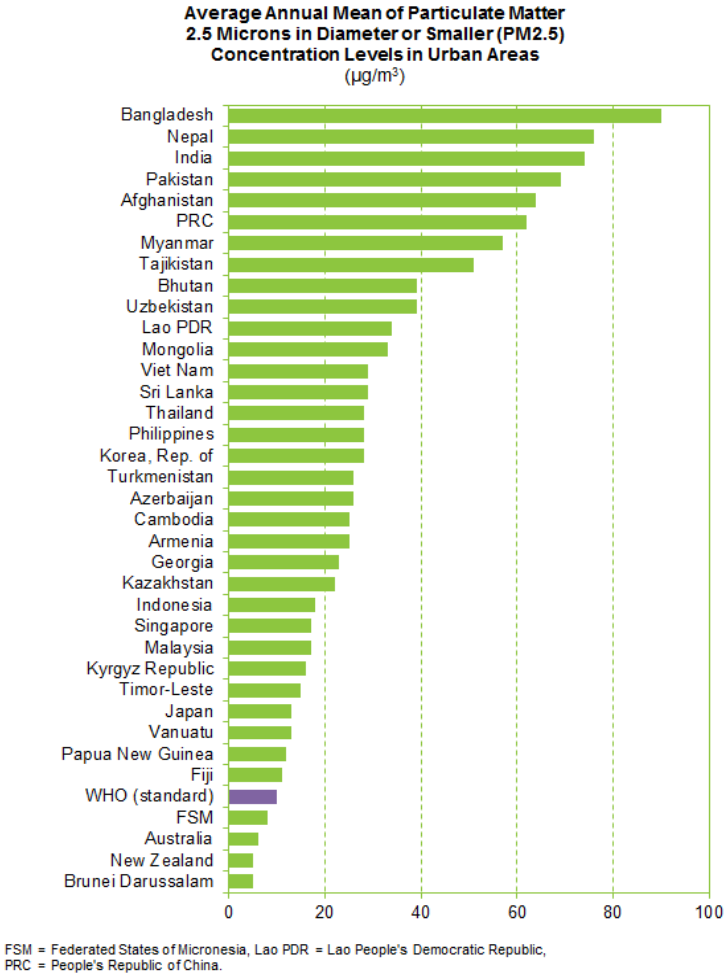
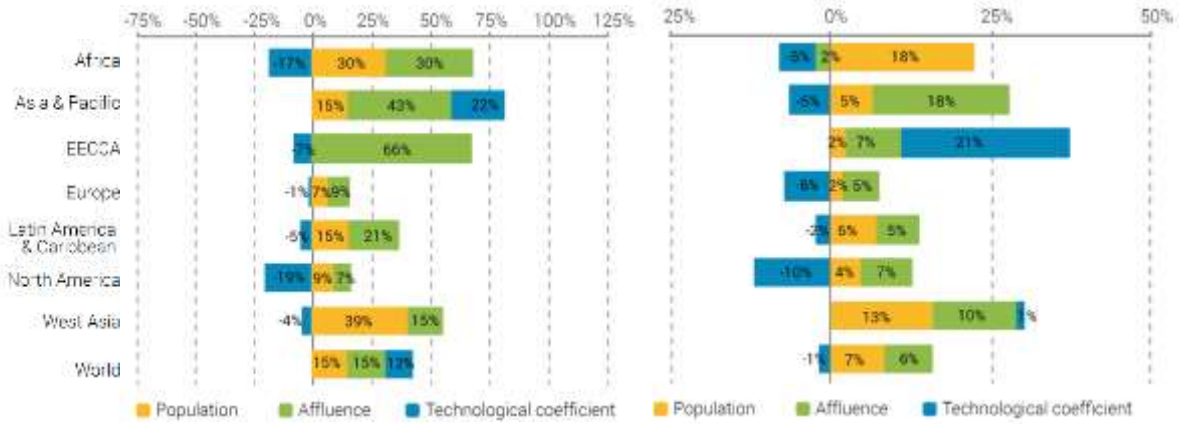



Fig. 4. State of particulate matter (PM2.5) pollution in major cities in Asia (Reproduced from ADB, Key Indicators for Asia and the Pacific, 2016)

What is causing the increase in environmental impacts? Taking resource consumption as an example, Fig. 5 shows the consumption of resources in each region around the world from 2000 to 2010 and 2015 to 2015 decomposed into three factors: population, affluence (GDP per capita), and technology (representing resource consumption per GDP and resource efficiency). In the Asia-Pacific region, rising affluence has made the largest contribution to increases in resource consumption during these periods. Population growth rates have declined and the effects of elevated resource consumption resulting from population increases are smaller. Resource efficiency deteriorated from 2000 to 2010, but improved somewhat between 2010 and 2015, which helped curtail resource consumption. However, it has not reached a level in which it has eliminated the effects of population growth and the rising levels of affluence.




a) 2000-2010 b) 2010-2015

Fig. 5. Factors for the increase in resource consumption around the world from 2000 to 2015 (Reproduced from IRP (2017) Assessing Global Resource Use: A systems approach to resource efficiency and pollution reduction)

One direction for the future is the expectation that the conversion to high-value-added industries and industries with high levels of resource productivity will continue. With a focus on intellectual capital, the foundation for these industries, or patent stock in this case, it is clear that the number of patents worldwide almost doubled from 14 million to 30 million over the past 19 years from 1992 to 2010 (Yagi & Managi, 2017). Compared with the rate of increase in developed countries (approximately twice as high as in OECD member countries), rates in other countries are remarkable (about 7.5 times in 57 non-OECD member countries), with the proportion of developed countries in the entire world decreasing from 97% to 88%. The application of intellectual capital in developing countries is expected to increase in the future.

In addition, future changes in technology are notable, such as digitization, including AI (Artificial Intelligence), VR (Virtual Reality)/AR (Augmented Reality), 3D printing, IoT (Internet of Things), and Bigdata, automatic operations for these applications, and precision medicine. Although these technologies may lead to a reduction in environmental impacts as a result of improved efficiency, there is also a danger that they will result in an increase in environmental loads due to increased consumption in new forms.

By contrast, rapid economic growth has exaggerated economic disparities between urban and rural areas. More developed countries in Asia have higher shares of older rural residents and the urban-rural gap in services, such as electricity, can be wide, particularly in less developed countries (UNDP, 2016). Attention must be paid to these types of unstable

elements among Asia-Pacific societies. In addition, along with the growth of agribusiness, relocation of industries to rural areas, development of local cities, and increase in the number of migrant workers, it is possible for households even in rural areas to enjoy a consumer lifestyle that is not much different from those of urban residents, making a living using products from domestic cities and foreign markets (Vandergeest et al., 2011; Rigg et al., 2012). As such, the driver to maintain "self-sufficient"-type farm villages in these areas is weakening.

From a social aspect, the eradication of poverty, as stated in Goal 1 of the SDGs, is an essential task, especially in the Asia-Pacific region. To that end, it is vital to develop an educational system that enables people to enter the labour market after receiving a comprehensive education (Aoyagi & Yoshida, 2017). Education is also expected to contribute to increasing consumer literacy in today's advanced and complex consumer society. The rate of aging in the Asia-Pacific region is also predicted to rise rapidly in the future. In other words, countries in the Asia-Pacific region must prepare for unprecedented changes in social structures, including a shift from a demographic bonus to demographic onus. Various public policies must be considered, keeping in mind such drastic structural changes, including the potential for weakening safety nets.

Using only the roads taken by developed countries as reference will result in a failure to stay current with global trends. There are two significant differences with the paths taken by developed countries: (1) (latent) changes in consumer lifestyles and values and (2) changes in production patterns based on technological changes as represented by digitization.

With product retention and quality of life (QoL) expected to be satisfied with changes in consumer lifestyles and values, there are movements to withdraw from lifestyles of mass consumption, such as minimalism and voluntary simplifiers that have appeared in developed countries (e.g., Rich et al. (2017) studies the relationship between consumption patterns and degree of happiness for Australians.) Even in emerging economies in Asia and the Pacific, it will be necessary to consider the possibility of simultaneously developing such consumption patterns.

Regarding changes in production patterns based on technological changes, production paradigms have changed significantly from the production of goods to the production of services, which has encouraged a shift in consumer values from value in exchange to value in contents represented in the ownership of goods, and simultaneously seen the shift in values promote changes in production paradigms (relationship with positive feedback is working.) Technological innovation is making this change possible. Situations where anyone with a smartphone can easily use services are being generated as a result of digitization using smartphones and IoT. For example, as an alternative to taxis, bicycle sharing in China and the use of dispatch services in Southeast Asia are popular. While such interactions between production and consumption have the potential to reduce environmental loads, there is also a danger of moving towards a resource and energy-intensive society.

To address these challenges, the shift to sustainable consumption and production patterns (SCP) is an urgent agenda in the Asia-Pacific region. In the meantime, it provides an opportunity for the region to show the model-paths of building sustainable societies to the rest of the world. Countries in the Asia-Pacific region have already introduced many policies to accelerate the transition to SCP in the areas including, but are not limited to, cleaner production, waste management, consumer information, etc. However, against the backdrop of the rapid industrialisation resulting in the urbanisation and the expansion of the middle-class, those existing policy measures contributing mainly to the efficiency of the production and consumption, will not be enough to address the above-mentioned challenges.

To further accelerate the transitions, countries in the Asia-Pacific region can take advantage of the emerging trends that followed the development of SDGs (particularly Goal 12) and the Paris Agreement can be utilised. For example, global movements towards

decarbonization triggered by the Paris Agreement can be a “game changer” for directing the policies as well as investments towards SCP. Technological innovation in relation to digitisation and renewable technologies boosted service-oriented mode of consumption and production, providing opportunities for creating sustainable ways to meeting demands with less material and energy consumption.

These emerging trends will make it easier to foster the transition of the society and the economy beyond the scope of the existing policies for efficiency. In particular, these trends show the potential pathways for changing the relationship between producers and consumers that have become distanced in the course of the conventional patterns of economic development. Furthermore, these trends will create the opportunities for stakeholders to engage with each other in different manners to promote the socio-technical transitions to enable sustainable living. Therefore, countries in the Asia-Pacific region have unprecedented opportunities to bring about changes beyond the scope of the conventional SCP domain such as efficient resource use, cleaner production, design for the environment, the 3Rs (Reduce, Reuse, and Recycle), and raising consumer awareness.

This policy report will firstly present four strategic directions of SCP policies of which policy makers should keep in mind. Then, it presents 12 opportunities to mainstream SCP in Asia and the Pacific.

## 2. Four Strategic Directions of SCP Policy

In order to respond to the environmental, economic, and social problems mentioned in the previous chapter and to achieve the SDGs all over the world, it is necessary not only to symptomatically treat the “symptoms” of individual issues, but also to transform human activities fundamentally and change our governance (Kanie and Biermann, 2017). Changing consumption and production patterns to sustainable patterns is indispensable for the prosperity of humankind, and the promotion of SCP in the Asia-Pacific region, which is home to more than half of the world’s population, can be said to be a high-priority issue for the world.

It is vital to establish production and consumption patterns that decouple socioeconomic development and increases in environmental loads from the real sense of securing people’s wellbeing and happiness. Figure 6 shows the concept of SCP that describes the vertical direction of socioeconomic development and shrinks horizontally-expanding environmental loads into global environmental capacity. As stated in Chapter 1, attention must also be paid to unstable societal factors, making it necessary to develop a system of production and consumption that appropriately combines supply and circulation systems in a way that simultaneously promotes the regional economy and employment.

The chapter proposes four strategic directions which SCP policies shall pursue. Firstly, policy focus of SCP has been expanding from environmental agenda such as pollution control to socio-economic agenda of reducing non-renewable resource use and increasing wellbeing of people. In other words, SCP needs to address wellbeing of the society as a whole. Secondly, closer integration of consumption and production can provide new business opportunities and development as well as increased utility of consumers. Circulation, sharing and digitization (use of information and communication technology) are the key opportunities to this end. Thirdly, transition to SCP can be pursued as a socio-technical transition, based on holistic changes in social practices, technology use in daily life, associated with development of infrastructure and institutional settings both at international/national policy-level and at local/community level. Fourthly, bottom up approaches are necessary to enhance effectiveness and acceptance of SCP policies across the region.

These directions are in line with future mid- to long-term directions in the “Asia Pacific Regional Roadmap for Sustainable Consumption and Production” (see UN Environment and APRSCP (2017) for the latest version) and are recommendations for SCP policy directions to achieve the goals of SDG 12 with a target year of 2030.


Fig. 6. Reduction of environmental loads and achievement of wellbeing through SCP

## 2.1. SCP Policies are expanding from the environmental policy domain to the socio-economic technology domain

SCP policies must include contents suited to the situation of each country. Many countries in Asia and the Pacific region have strengthened SCP policies, covering the issues of cleaner production, renewable energy, waste management, consumer information, etc. These policies cover the conventional targets among the range of the SCP policies that has expanded for the last four decades. SCP policies also changed institutional and regulatory structures to some extent as reflected in SCP National Action Plans, providing the platform for inter-ministerial coordination and partnerships with the private sector and other stakeholders.

Figure 7 illustrates policy goals and the growth of menus according to the expansion of policy issues. SCP policies originally focused on the pollution prevention shown in Column 1 and aimed at decoupling direct environmental pollution and economic growth (c.f. UNEP 2011). Then it included efficiency approach shown in Column 2 for separating environmental loads and economic growth associated with the use of energy and resources, such as greenhouse gases and waste.

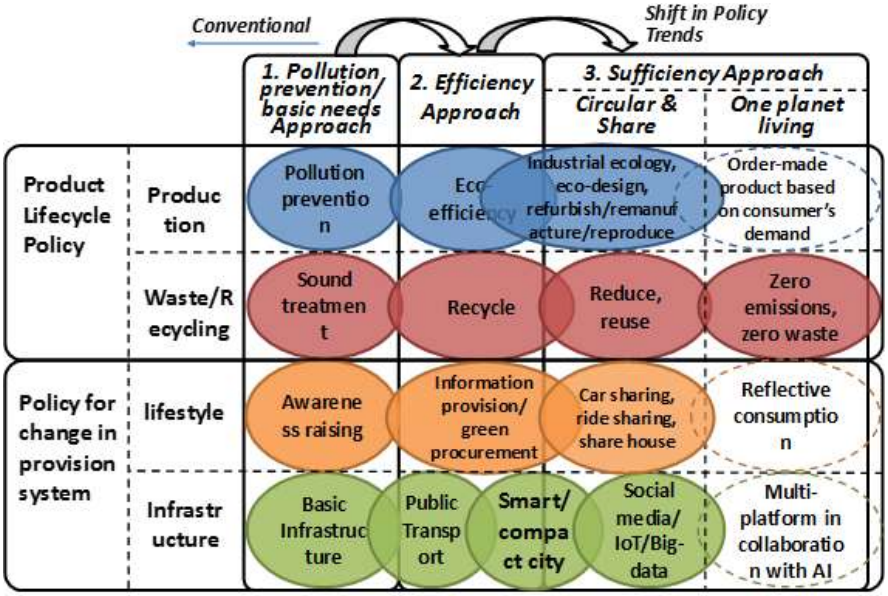



Fig. 7. Expanding focus and menu of SCP policies (Hotta and Koide 2017)

On the other hand, alternative approaches beyond pollution prevention and efficiency have gained wider attention, as a result of the SDGs and the Paris Agreement that fostered the momentum toward decarbonization. As shown in Column 3, circular economy (European Commission, 2015) and sharing economy contribute to the decoupling between the consumption of non-renewable, natural resources and the welfare and wellbeing of society as a whole. have become popular, These trends, hereafter referred to as “Sufficiency Approach”, are the entry points further leading to the more innovative shift toward the one-planet living.

It is very important to emphasize here that SCP is not anymore limited to environmental policy domain such as pollution control, waste management and recycling, cleaner production, eco-labelling, or consumers’ awareness but expanded to socio-economic-technology policy domain such as infrastructure building, welfare, business development,

local development, and innovation.

In the meantime, societies in Asia and the Pacific region are witnessing the emergence of innovative business cases based on digitization, contributing to the substantial reduction of resource and energy use in the production process, as well as alternative models of meeting demands of the people. Societies in Asia can take advantage of these trends to strengthen the interactions between production and consumption and drive the socio-technical transitions so that more wellbeing are delivered with less use of resources.

A policy mix to achieve specific policy goals does not have to be uniform, but be able to maximize the effects of SCP policies effectively through flexible and strategic combinations depending on the industrial, consumption, and urban structures of each country. Generally, developed countries have responded to changes from Column 1 to Columns 2 and 3 in stages, but in developing countries that are growing rapidly it is conceivable that they may need to deal with moving to Column 2 or 3 while achieving Column 1 simultaneously.

[Column] Policy Visualization Tool

As shown in Fig. 7, SCP policies include a variety of areas and various approaches. Therefore, simply implementing them individually will not maximize policy effects. For this reason, in order to understand the phenomena from a comprehensive perspective and connect this to effective implementation, tools should be prepared to visualize the entire situation. Through visualization, it is possible to discover that framing gaps are not occurring for recognized events and to understand the nexus structure between events. Policy dialogue is expected to be smooth in promoting these efforts. Although anything can act as a visualization tool, the following requirements should be satisfied: (1) that it is clear how much is included in the event being discussed, (2) that it contributes to policy dialogue and learning, and (3) that it is easy to understand. For information on specific visualization tools, see Marletto et al. (2016) who indicates socio-technical maps and Sibbet (2010) who gives a general explanation of visualization. The figure is an example of mapping various changes at the macro/meso-/micro level to examine measures for increases in energy demand due to cooling and creates a package plan for countermeasures based on this.

[Related SDGs: 12.1, 12.a, 17.19]

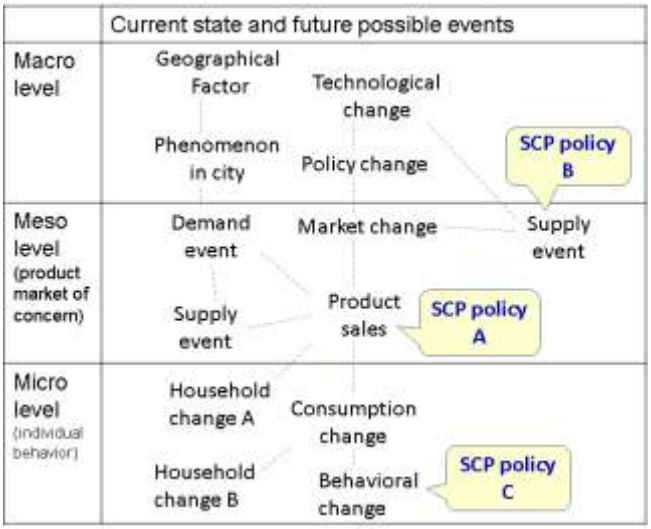



Fig. C1. Example of mapping changes at the macro/meso/micro level surrounding consumption and production (based on Tasaki (2017))

## 2.2. Strengthening linkages between consumption and production is a key, emerging, movement

The conventional pattern of economic development is driven by mass production and consumption. Value chains have expanded over the world through specialization and subdivision. Consequentially, the distance between consumers and producers have become wider. In these circumstances, improvement of efficiency at each point will not be enough to achieve sustainable consumption and production. Conventional policies have tried to alleviate the problems caused by the increasing distances between consumers and producers through providing the former with better information such as environmental labelling, certification systems, and utilisation of footprint indicators (e.g., carbon footprints and resource footprints) and connecting consumer information such as their values and lifestyles to design of products and services, consumer education, and corporate environmental management.

Additionally, alternative approaches have been introduced recently, namely to change the relationship between consumption and production. Figure 8 shows five entry points to link consumption and production (See five dialogue balloons. Hereinafter, referred to as consumption and production linkages, “CP linkages” in short). If the structure of consumption and production consists of the four elements of processing and manufacturing (including natural resource extraction)—provision—(final) consumption—circulation, there are three directions (blue, green, red in figure) to strengthen CP linkages between final consumption and the other three elements, and two directions (purple and yellow in figure) to strengthen CP linkages within each consumption and production stage. These signs of changes are not necessarily driven by environmental policy.

First entry point (green) is “feed-back of consumption to design and production” which enables proper quantity production, on-demand production, localised/customized production. Second entry point (red) is “circularity” which enables circular production, remanufacturing, recycling, life extension, considering lifecycle management of products/parts/materials. Third entry point (blue) is “product use without ownership/sharing” which enables product service systems, function, lease and servicising. Forth entry point (purple) is “linkage within consumption” which enables C2C sharing and C2C reuse. Fifth entry point (yellow) is “industrial symbiosis” which exchange and utilise material, by-product, waste, water, and energy between industries in such a very efficient way as natural system.

These five entry points are becoming realistically available by digital application to products and services as well as change in mind-set of consumers from ownership to utilisation of functions. In Asian countries where rapid growth of the industry is continuing, the industrial symbiosis will be very effective. It is also important to take advantage of the rise of sharing and servicising in the urban areas. In the near future, CP linkages are expected to advance in ways as never before. More seamless connection of the manufacturing, provision, consumption, and circulation of products/services and sharing, monitoring and accumulation of Bigdata enable the diversification of usage patterns of product functions beyond ownership, raising people’s utility and wellbeing.

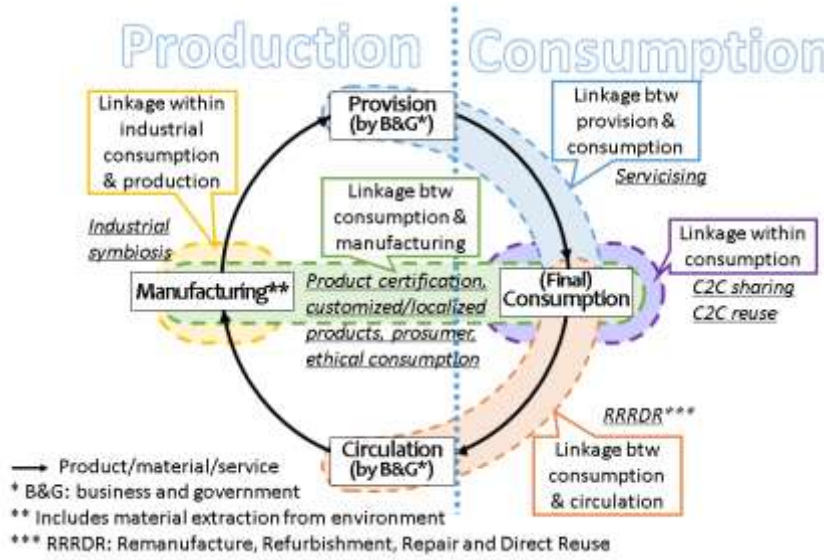



Fig. 8. Five types of linkages between consumption and production

However, a consequence of CP linkages might be that new demand will increase rapidly and resource and energy will be consumed to a large extent. Therefore, it is important for SCP policies to encourage CP linkages do not increase resource/energy use and to guide economic development towards such achievement. The current state of production paradigms and consumer values varies from country to country, but these changes are occurring simultaneously worldwide. As will be mentioned in Section 2.3, even though the opportunities for CP linkages are rather open to emerging economies and developing countries, they could be locked in to existing consumption and production systems that have been established by current developed countries. SCP initiatives related to CP linkages must be imaginative and action-oriented and that are not a type that trails after developed countries.

## 2.3. Transition to SCP is a socio-technical regime shift requiring successive changes in social practices, technology use in daily life, and associated infrastructure

Consumption and production patterns are framed by and embedded in existing regimes, such as tax and education, and infrastructure, such as logistics and energy provision systems, and maintained/updated by the accumulation of daily practices of people and organizations (Spaargaren, 2011; Shove, 2016; Spurling et al., 2013). Awareness raising of consumers can sometimes influence their behaviour for the time being; however, behavioural changes will not take root unless they are associated with the changes in the wider contexts of their day-to-day living, including moving, eating, caring families, working, learning, taking rest, and so on.

Therefore, it is necessary to change social mechanisms and modes of using technology to create and provide services with which people come into contact on a daily basis (Fig. 9). In addition to the strengthening of the linkages between consumption and production as described in Section 2.2, changes in infrastructures and institutional settings are effective in supporting individuals as well as organizations to adopt more sustainable practices. Some examples include, but are not limited to, provisions of sustainable options for mobility and energy, encouragement of resources- and energy-saving practices in workplaces, community-based initiatives to build capacity of the families for 3Rs (reduce, reuse and recycling), etc. At the same time, emerging innovations, such as new business models and

mobile technologies, can also create new pathways for societies to fulfil the demands of the people while reducing the negative impacts of economic activities.

Innovations are already taking place in many corners of the societies in Asia and the Pacific. To take full advantage of them, the engagement of stakeholders from different sectors will be desired, including national and local governments, business, civil societies, as well as academics and educators.

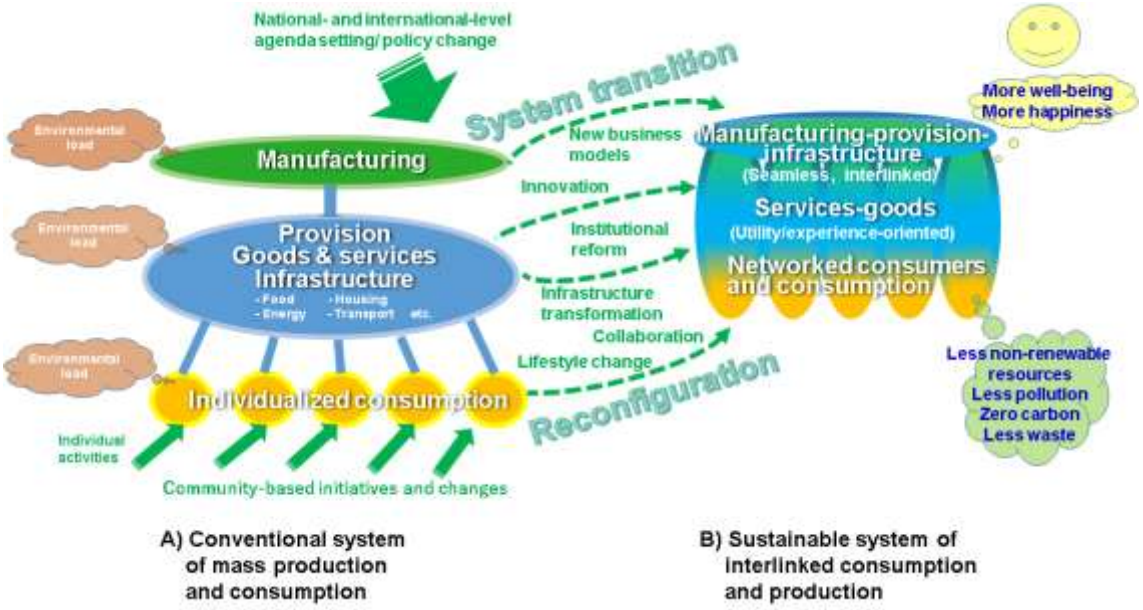



Fig. 9. Conceptual diagram of transition of social systems towards SCP

2.4 Bottom-up approaches are necessary to enhance effectiveness and acceptance of SCP Policies across the region.

The shift and successive changes emphasised in Section 2.3 should be triggered by both changes in national/international-level agenda setting and its policy implementation and changes in community-based initiatives. Such transitions are incubated in “arenas” where multistakeholder partnership is formulated and various buds of co-creation grow in collaboration beyond the boundaries of conventional stakeholders.

Transition to SCP at the local level is possible by identifying and nurturing bottom-up initiatives. It should be linked to solutions of local concerns of people. There exist huge gaps between international/national agendas (long-term and mid-term goals) and local concerns. To address this gap, it is more effective to build linkages between different local initiatives, including through a promotion of localised networks focusing on logistics, information, financial, and material resources utilising advanced information and communication technologies, as opposed to simply upscaling successful initiatives.

In Asia-Pacific countries, innovative local initiatives, such as the 3Rs (Reduce, Reuse, and Recycle), renewable energy, and sharing economies, are being successively created. However, in this background is the active collaboration of local communities, civil society, businesses, and the government, where information and experiences are frequently shared, linking resources such as fund and technology with ideas. For stronger policy supports, these bottom-up approaches reflecting local concerns should be encouraged to align more with the SDGs in support with national governments, international agencies and experts.

## 3. Emerging Opportunities for SCP

This chapter discusses 12 opportunities for SCP based on the strategic considerations raised above.

Several encouraging results are shown regarding the means to support the wellbeing of the society and individuals, as are shown in the first two opportunities. Firstly, there are growing knowledge that consumption of experience matters more than consumption of goods for the happiness of people. Secondly, there are growing recognition on genuine wealth of society is not limited to economic prosperity but wellbeing of the society as a whole.

Following these two opportunities, five opportunities are identified in relation to strengthening of CP linkages towards more service-oriented modes of consumption and production. Further, five opportunities are identified in relation to changes in social practices, technology use and associated infrastructure.

### 3.1 Consumption of experience matters more than consumption of goods for the happiness of people over the long run. (Opportunity 1)

According to the results of an analysis on a questionnaire survey of individuals conducted by the PECoP-ASIA project, the consumption of goods may only increase the level of happiness to a certain level, while experiential consumption has been found to possibly continue to increase the level of happiness as consumption increases (experience-related, consumption with deep connections between people). In addition, it is suggested that people who value connections with others and people who place an emphasis on future generations may be able to maintain a relatively higher level of happiness through consumption for a better quality of life. For items, such as furniture, if people inherit fewer items like in Northern Europe and have a strong attachment with a connection to other people, they can maintain a feeling of happiness while decreasing consumption. There is room to consider mechanisms in which people can feel more related to others than they currently do, such as sharing. It is necessary to disseminate the idea of “consumption with an awareness of connections between people” for people to maintain a level of happiness even in cases where future consumption is reduced. This is in line with the traditional way of life in Asia and the Pacific, that aspire for a better life.

[Related SDGs: SDG12.8]

### 3.2 Measurement of society’s genuine wealth has become important for policymaking (Opportunity 2)

In societies in the future, the perceptions of social change will be transformed, which means that a new evaluation axis will be needed. From an economic perspective, new indicators are being proposed based on a discussion called Beyond GDP that captures wealth as stock (inclusive wealth, new capital wealth indicators), rather than capturing wealth as flow. These indicators convert different types of capital, such as infrastructure, human resources, and the natural environment, which also appear in the SDGs, into monetary units and comprehensively measure them, with attention paid to the accumulation of capital as stock (Dasgupta et al., 2015; Managi, 2016). There are also trends that measure the subjective conditions of people, such as the degree of happiness and anxiety (Tasaki et al., 2010) and it is necessary for indicators to be developed to understand social and developmental images that people want. In addition to developing indicators, the use of these policies must also be promoted.

These indicators incorporate environmental and social accounts, which mainstream the values of biodiversity and ecosystem services as well as social capital (active partnership of stakeholders in society) in development planning and national economic accounts. Different types of intangible capital, such as infrastructure, human resources, and the natural environment are to be taken into account, with a view towards promoting intergenerational wellbeing.

[Related SDGs: 17.19, 12.6, 8.4]

[Column] Measuring trade-offs and interlinkages by indicators

It is necessary to be aware that trade-offs and interlinkages (also referred to as "nexus") between indicators are not taken into consideration here, since there are a number of indicators used to measure a single event. Specific techniques to use indicators, such as how to combine indicators measuring single events, or the development and use of indicators to measure trade-offs are needed.

In order to understand whether SCP policies are progressing effectively from the national level to the municipal and corporate level and secure effective policy implementation, it is necessary to pay attention to *vertical interlinkages* and develop monitoring indicators for SCP at each hierarchical level. While referring to the groups of indicators for the SDGs being promoted by the United Nations Statistics Division, indicators systems should be developed that accurately take into account the direction of SCP. In doing so, it is possible to develop indicator systems that (1) are capable of expressing the decoupling of negative impacts, such as environmental load and resource consumption, and wellbeing caused by social economic development in indicators, (2) have indicators related to environmental capacity, such as carbon, material, and ecological footprints, (3) can be compared with other countries, companies, municipalities, and individual projects, and (4) are flexible with items to be measured so as to conform to development situations and the severity of problems to be solved in the target region/time, based on existing SCP indicators (e.g., Watson et al., 2010) and sustainable development indicators (e.g., a review of 1790 indicators, Tasaki et al., 2010). For (3) a relative evaluation should be conducted with physical quantities and indicators in monetary units that have been economically evaluated (Tsurumi and Managi, 2017).

As an example in (4), although it is meaningless to measure reductions in the consumption of resources in developing countries that have not yet achieved a minimum standard of living, indicators that place focus on perspectives, such as global warming, resource consumption, and vulnerability/resilience, can also be applied in developed and emerging economies that have "graduated" from a state of extreme poverty and famine. Wellbeing in (1) is expected to shift is expected from a stage of using GDP as an indicator focusing on economic growth, to a stage of using indicators that consider degrees of happiness and satisfaction.

[Related SDGs: 12.6, 12.8, 17.19]

3.3 Emerging trends encourage environmental policies and corporate actions such as the Paris Agreement and ESG investment. (Opportunity 3)

There are emerging trends that encourage the development of environmental policies, such as the development of the Paris Agreement and ESG (Environment, Social, Governance) investment. A result of the Paris Agreement is the necessity to accelerate global movements towards decarbonization. Active participation by developing countries,

especially emerging economies, is inevitable and the recognition that taking up environmental measures will increase competitiveness in the market is expanding. In this way, the aptly-named “game changer” phenomenon is already occurring and there is potential for it to accelerate these movements in the future. A growing number of companies are involved in advancing SCP, the SDGs and ESG with increasing popularity across the globe. In order to ensure such actions are effective, it is important to create KPIs (Key Performance Indicators) and incorporate them into PDCA (Plan-Do-Check- Act) cycles, as well as disclose such actions accordingly

[Related SDGs: 12.2, 12.5, 12.b, 13.1-3, 7.2-3, 7.a, 9.4]

3.4 The concepts of circular economy and sustainable value chain have become widely recognized as important. (Opportunity 4)

The concept of circular economy involves material selection that makes little or no distinction between primary materials and secondary (recycled) materials. Moreover, it promotes improvements in the quality of secondary materials, components and products by means such as RRRDR (Remanufacturing, Refurbishment, Repair and Direct Reuse) as well as through industrial symbiosis. Value chain management seeks to enhance product designs to better suit consumer lifestyles while enhancing overall environmental efficiency across the lifecycle.

Basic policies for *product lifecycle design* are as follows.

- Material selection and product design based on the concept of “circular economy”
  There are no differences in primary materials and recycled materials. Both require seamless material quality standards and seamless material selection and procurement mechanisms in product design.
- Product design in response to changes in values and changes in usage
  Product design must correspond to changes, such as temporary use and product sharing. For example, equipment for key lock systems through information terminals and equipment for guidance systems for product use methods for users unfamiliar with products.
- Design balancing uniform production and individualized consumption
  Balanced design for both efficient production (mass production, uniformity) that drastically improves lifecycle efficiency focused on production and inverse manufacturing, and personalization dedicated to the individual needs of consumers.

*RRRDR* refers to a cycle in which higher resource value and economic value are retained, in addition to promoting material recycling. For this purpose, it is necessary to coordinate the consumption stage and resource recycling stage so that used products are directed to the appropriate route according to the state of the product at the consumption stage. There are also various types of RRRDR in Asia and the Pacific, ranging from advanced, manufacturer-led remanufacturing to highly labour-intensive refurbishment and repair, which shows the importance of the perspective of taking advantage of existing infrastructure. RRRDR also has an effect of avoiding environmental pollution problems resulting from waste, such as e-waste issues. It is necessary to take promotional measures to remove institutional, technical, and market obstacles to promoting RRRDR.

Promoting *industrial symbiosis* is also one of keys for circular economy. In Asia-Pacific countries, there is a sufficient margin for recycling through inter-industrial symbiosis for

steel slag, aluminum dross, and waste, and impacts on the environment and humans can be reduced by linking waste with water treatment plants, manufacturing of roadbed materials, soil treatment facilities, and power plants. Additional effects may be generated if permission is given for the transboundary movement of waste through mitigation measures and special measures, such as the Basel Convention. Policies related to inter-industry symbiosis extend to incentives and regulatory systems, or other policies. Financial incentives can be programs to address fiscal needs, measures to attract direct or foreign investment, and the provision of land and infrastructure. Subsidy systems and tax incentives may also be an incentive for industrial symbiosis.

For circular economy, *material sorting* plays an important role. It is necessary to maintain current labour-intensive way of material sorting and shift them into more environmentally and socially sustainable manner or to develop sophisticated sorting technologies. It is necessary to consider ways to use human resources and infrastructure in the informal sector and reorganize formal systems, since there is a possibility to affect poverty and labour. Attention must be focused here as well because recycling systems that are oriented to mechanization and advanced sorting may generate additional GHGs. Therefore, it is desirable to have active policy support from government agencies, rather than leaving this completely up to the autonomy of companies. Companies in Asia and the Pacific often do not have much room to afford these actions and cannot allocate resources to additional management activities. Therefore, it is expected that government agencies will establish policy frameworks for basic resource productivity management and offer policy support for circular economy.

Supporting further advancement of these market trends proves to be a promising approach for SCP policy.

[Related SDGs: 12.2, 12.5, 12.b, 9.4]

### 3.5 Guideline on designing and tailoring information to promote behavioural shifts is evolving. (Opportunity 5)

Simple information provision alone has limited power to change consumer behaviours (e.g., SWITCH-Asia, 2014). Recent developments in behavioural economics, etc. have emphasised new and various ways to provide information and influence consumer choice. Such insights including tailoring environmental information to guide consumer's decisions can be utilised in SCP policies to make them more effective.

It is necessary to devise ways to provide more effective environmental information. Specifically, as shown in Fig. 10, it is important to display and provide environmental information in consideration of the flow of information collected by consumers, such as the source of information (means) that is most important to consumers, contents of information that are of interest, and degree of relevance of the information for each decision-making stage, from the recognition of the necessity of product purchases to the actual purchase of the product itself.

[Related SDGs: 12.6, 12.8, 4.7]

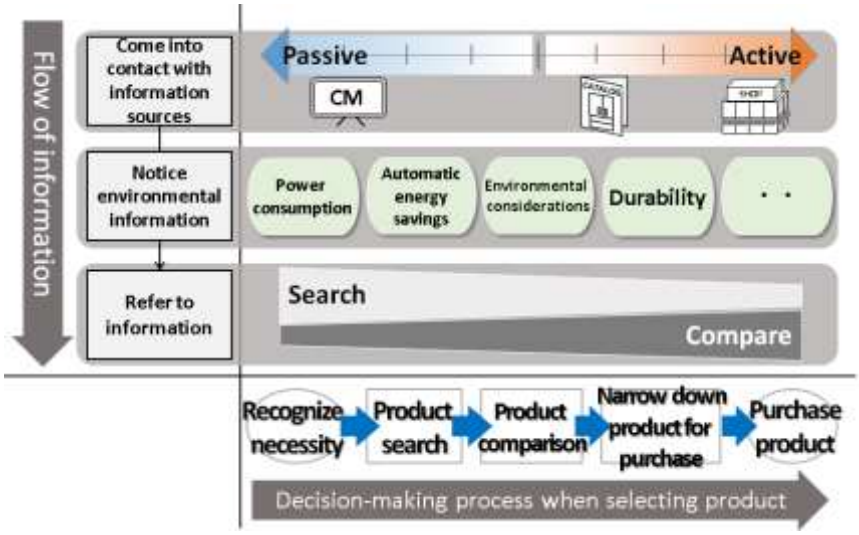



Fig. 10. Framework for the display of environmental information with a focus on decision-making stages and information sources

3.6 Product design addressing people's needs in their local context drives consumer markets. (Opportunity 6)

A disproportionate focus on product quality can lead to an overconsumption of resources as well as further diminish consumer satisfaction through putative function fatigue. Product design should seek to improve human sufficiency by not only adding new features but also streamlining and simplification. Such design should cohere throughout the entire product lifecycle without undue emphasis on the optimisation of production processes. Localised product design is an entry point for SCP to achieve appropriate quality at a reasonable price, prevent resource overconsumption, and employ local resources.

The fulfilment of people's needs is one of the most important concepts for achieving SCP. The means to fulfil basic needs in the Asia-Pacific region and the functions and structures that embody those means vary according to geographical and cultural conditions. The production side should not simply provide a number of product functions; it is also necessary for the production side to provide product functions that meet the basic needs of consumers at an affordable price. It is also important to keep in mind the idea of appropriate technology (Hazeltine and Bull, 1999) to bring increases in resource and energy consumption caused by the introduction of the technology itself down to the bare minimum. In other words, it is necessary to develop or select technology that meets the consumer needs in each country, and not just blindly introduce high-functioning and low-priced technology.

In local-oriented designs that correspond to regional diversity, the following two perspectives are important: (1) perspective of what should be cut from functions and structures of products in developed countries (concept of subtraction) or what should be recognized as the minimum necessary requirements (concept of addition), and (2) the perspective of improving sufficiency throughout the entire life, not the optimization of individual products. The desired quality and quality features of individual products perceived as common sometimes differ greatly depending on the region. If it is possible to gain an accurate understanding of the commonly requested quality and reflect this in the product design, it will be possible to achieve appropriate quality at a reasonable price and contribute to the maintenance and improvement of resource efficiency by preventing excessive quality. Support techniques and tools must be developed for core local-oriented designs.

If local companies can be deeply engaged in the design, production, and maintenance of products and parts that are strongly related to local demand, they can contribute to the development of local technical staff and create employment. However, good quality products and parts may be procured from other areas from the viewpoint of resource efficiency depending on the type of product/part. Therefore, local-oriented product design, production, and circulation must be considered as the best mix of intra-regional and extra-regional systems.

[Related SDGs: 4.4, 8.2, 9.2, 9.2b, 12.a]

3.7 Digitisation technologies have emerged as powerful force for changing society. (Opportunity 7)

In cases where a “Business-as-Usual Scenario” is applied, where emerging economies in the Asia-Pacific region follow along the path of economic growth taken by developed countries, consumption of resources and energy is expected to rise with an increase in the number of products owned, making the realization of SCP increasingly difficult.).

On the other hand, in regions where the spread of products and development of social infrastructures are ongoing, there is potential to achieve leapfrog development (cf. Fong 2009). For instance, the IoT (Internet of Things) and AI (Artificial Intelligence) both comprise promising technologies that effectively link digital opportunities to SCP efforts. Integration of such technologies with renewable energy and appropriate technology, and making data accessible to users formulate new systems for SCP practices in line with the four strategic directions of SCP policy. In addition, such technologies can expand stakeholders’ capacities for changing ways to measure and mainstream SCP implementation.

[Related SDGs: 9.c, 9.b]

3.8 Sharing economy can be an entry point linking consumption and production. (Opportunity 8)

With the widespread use of mobile terminals, electronic payment systems, and IoT, it has become easy for consumers who want others to use unemployed capital and consumers who want to use them. In SCP policies, cases in which consumers become providers of product services must be incorporated and encouraged to be in a more sustainable form. There are more customs of sharing in Asian countries compared with Europe and the United States (Belk, 2010). In Southeast Asia, the percentage of people who are aware of sharing and who have used sharing is higher than that in Europe and the United States. The penetration of the sharing economy may increase resource efficiency in the form of increased availability of products. However, whether the environmental load will decrease as a result of sharing depends on the lifecycle characteristics of the products to be shared. Promoting sharing activities and understanding the conditions that such activities can reduce environmental loads are important areas of SCP policy and CP transformation

[Related SDGs: 12.2, 12.5, 12.b, 9.4]

3.9 Urban planning and infrastructure development is crucial to people’s sustainable lifestyles. (Opportunity 9)

In many cities in emerging economies in Asia, the development and improvement of infrastructure, such as public transportation, sewerage, and waste disposal, are far from

sufficient, generating problems, such as traffic congestion, air pollution, and water pollution. Even if such infrastructure exists, maintenance and operations may not be performed properly. Further improvement and development of infrastructure is therefore needed to ensure societal wellbeing. At the same time, it is necessary to properly combine various infrastructure and technologies. For example, in areas where it is economically difficult to expand sewerage systems, methods such as the introduction of distributed energy systems and decentralized wastewater treatment facilities can be considered.

Consequently, it is necessary to build efficient and innovative infrastructure. Existing gaps in infrastructure provide opportunities for building low-carbon, resource efficient and inclusive energy, transportation, and housing systems. Ultimately, effective urban planning can guide a transition to SCP as a social practice aligned with current trends, including decarbonization and the use of digital technology

[Related SDGs: 11.2, 11.3, 9.1, 9.4]

3.10 Implicit rules and customs influence people's behaviors. (Opportunity 10)

Tacit rules and customs can inhibit people from practicing more sustainable behaviours. Changing behaviours in a socially acceptable manner is an ongoing direction for SCP policy. One example is the Cool-Biz campaign of Japan, which encourages lighter dress to alleviate the discomfort associated with hotter temperatures brought about from efforts to reduce the energy consumption of air conditioning in offices, trains, and other public spaces. This policy has been guided by multistakeholder partnerships, including railroad companies, apparel industries, retail stores, as well as corporate managers, among others, to be effective.

[Related SDGs: 4.7, 12.8]

3.11 SCP-related indigenous/local wisdoms such as "mottainai (regret for wastefulness)" and "sufficiency economy" already exist. (Opportunity 11)

People may not know the word SCP but recognise the orientations of SCP policies in their daily lives. Conveying key messages of SCP policies in line with such indigenous and local wisdom and embedding them into SCP policies can improve policy effectiveness. New codes of practice for sustainable lifestyles and businesses should reflect people's needs and cultural background. Promoting SCP can be benefited from traditional Asian value of lifestyte with shared social responsibility and environmental stewardship. MFCA (Material Flow Cost Accounting) can be seen as one way to reflect "mottainai" in corporate management processes.

[Related SDGs: 12.6, 8.4]

3.12 Enhancing regional/local multistakeholder collaboration and partnerships is key to success. (Opportunity 12)

Multistakeholder engagement processes and facilitation mechanisms for good governance are vital for implementation of policies and enhance ownership of action (For creating partnership, see a guideline of UNU-IAS & UNESCAP (2018), for example). There has been significant progress in promoting and implementing SCP in the region through stakeholder involvement, through a continuous effort for knowledge sharing and private-public partnerships. Existing regional policy platforms such as APRSCP, SWITCH-Asia SCP

Facility, business entities, expert network such as PECoP-Asia are valuable channels for driving networking efforts between different SCP-related initiatives

[Related SDGs: 17.16-17]

[Column] Material Flow Cost Accounting as a way to reflect “mottainai”

Companies in developing countries in Asia and the Pacific (if large corporations and their subsidiaries are excluded) lack economic strength and find it impossible to promote costly measures only for the purpose of environmental conservation. A realistic and effective approach is to aim at the simultaneous achievement of the effective use of resources and improvement of productivity, with international focus on material flow cost accounting (MFCA) as a support tool for companies. However, the current MFCA stipulated in ISO14051 is too complicated for many SMEs in Asia and the PAsific, which means that it may be difficult to introduce. MFCA does not aim at accurate cost calculations but is aimed to promote a directional approach to improve resource productivity and can be effectively utilised even if the calculation results are not precise. For this reason, it is recommended for companies in developing countries in Asia and the Pacific to introduce simple methods, such as material balance schedules, which capture the relationship between the input and output of resources of an entire factory by weight and amount. In addition, the gradual and detailed introduction of methods and management/operations are often more effective than the introduction of the full version of MFCA from the very beginning. The material balance schedule can also be used as basic information for making company-wide resource management activities visible.

## 4. Other essential elements to ensure the abovementioned opportunities contributing to SDG 12

### 4. 1 Education and Human Resource Development

Contents incorporated for education and human resources development in the SCP sector must be different that those in environmental education that are close to nature where one can learn about environmental conservation, consumer education in which passive consumption is positioned in production, and knowledge on the current issues described in Chapter 1. Specifically, it is necessary to include an understanding of transitions in SCP policies, positioning of consumer behaviour and corporate activities with an overall view of the relationship between production and consumption, and encouragement of changes in individual actions, as well as collaborative collective behaviours and socioeconomic systems. Necessary competency is also important in terms of sustainable competency, i.e. systems thinking, anticipatory competence, normative competence, strategic competence, and interpersonal competence (Wiek et al., 2011). It is desirable that double-looped learning occurs in which the practice of consumer and production behaviour and participation in SCP promotional activities is carried out to reconstruct people's thoughts and frameworks.

### 4.2 Harmonization of standards

The inability of consumers to access information on degradation of the natural environment and environmental pollution at production sites, child labour and exploitation of labour, or the state of initiatives on environmental and social problems may actually encourage these problems. As supply chains become more global, there are cases where it is easy to lose touch with production and consumption sites, which makes the use of environmental labelling and certification systems even more important. It is desirable to spread the use of BtoC labelling for energy-saving performance, such as electric products and vehicles, and the production of sustainable palm oil, as well as BtoB labelling for building owners on the environmental performance of commercial buildings. It is not enough for each country to introduce its own unique labelling and certification system. Unless the methods of display and certification are unified and there is cooperation in the mutual recognition of systems between countries, these efforts must be implemented, as the globalized economy will be unable to deal with these systems. In order to make labelling and certification systems into even more effective tools, it is important to provide economic incentives and incorporate them into procurement systems.

### 4.3 Sustainable materials management for reducing environmental impacts and material footprints

In the pollution prevention approach described in Section 2.1, there are many cases in which urgent responses to the occurrence of serious environmental pollution are met with individual regulations. However, in some advanced countries that have reached a stage of preventing pollution, there has been a shift to comprehensive management of hazardous substances and Sustainable Material Management (SMM) and a transition to legal systems to contribute to material-cycle economies. In individual laws, target substances and life stages of managed substances are often restricted, which has hindered the management of substances with similar hazards and the management of hazardous substances across multiple life stages. If management is lacking, necessary management costs are externalized and incentives to reduce harmful substances are weakened. There are also developed countries where lock-ins by existing systems prevent a transition to a comprehensive management system.

For these reasons, emerging economies and developing countries in Asia and the Pacific, in particular, that can aim to leapfrog in institutional aspects should consider linkages with

multiple legal systems and (re)design overall management of hazardous substances from a systematic perspective.

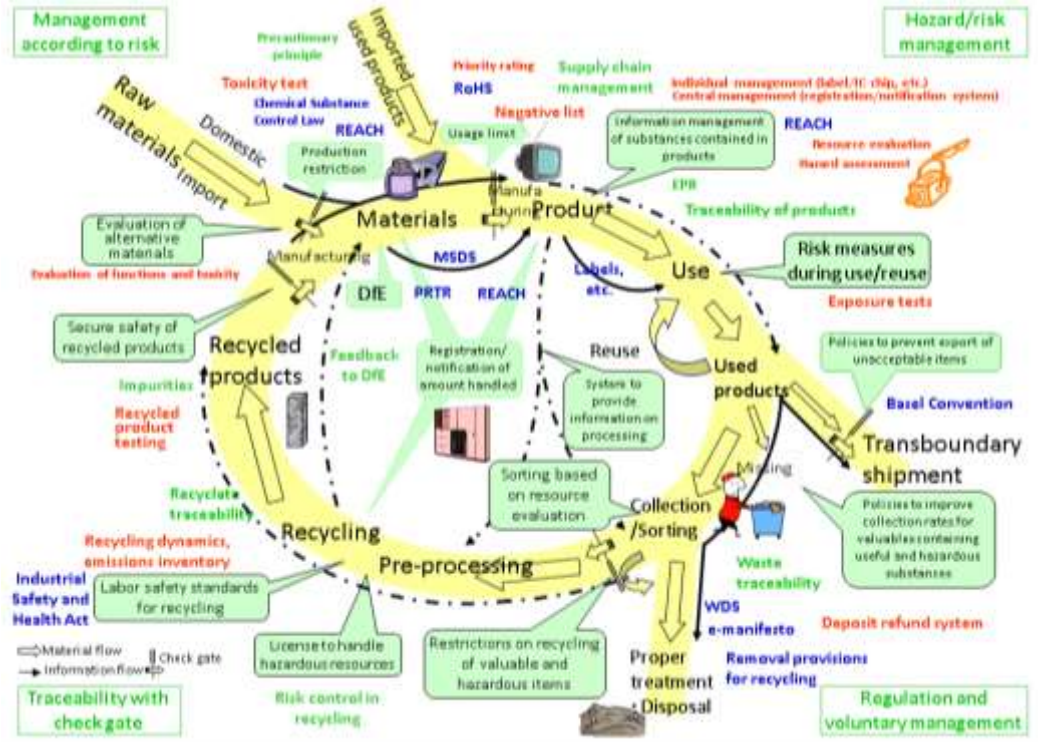



Fig. 11. Integrated management of materials and hazardous substances beyond a single life stage (translated and updated from NIES (2010))

4.4 Beyond the boundary of each country—reducing material footprints globally

In order to reduce the environmental load on the global environment under a globalized economy, it is necessary for both consumer and producer countries to take actions appropriate to their respective positions. In developed countries and emerging economies, it is important to reduce the environmental load (footprint) of the entire global value chain that supports production and consumption in that country as a matter of course to reduce direct pollutant emissions and resource consumption in their own countries (In the field of global warming, calculations for the former are called Scope 1 and calculations for the latter are called Scope 3. In the area of resource consumption, natural resource input and consumption (Direct Material Input: DMI, Direct Material Consumption: DMC) are used as indicators for the former, while primary resource input and consumption (Raw Material Input: RMI, Raw material consumption: RMC) are used as indicators for the latter. In the EU's Circular Economy Strategy, RMC has been adopted as one indicator for resource productivity, reflecting the fact that there is a high volume of resources imported that are in a form being contained in products in Europe.) In an international assessment of health damage from PM2.5 (Zhang et al., 2017), it has been found that there is more damage to health in other countries, including China, in consumption, as compared with damages to health occurring other areas in Europe. If the producer country avoids the occurrence of pollution in its own country and the consumer country plays a role in reducing the environmental load of the entire value chain, there will be more effective reductions of pollutant emissions and resource consumption on a global scale. Under these roles, each country must make an effort to ensure that pollutant emissions and resource consumption on the planet do not exceed planetary boundaries.

## 5. Next step: SCP policy development and implementation

The promotion of SCP in Asia and the Pacific, which is home to more than half of the world's population, is a high-priority issue, and if successful, can make a significant contribution to the world and the prosperity of humankind. This policy report contains an explanation of the backgrounds needed for SCP in Asia and the Pacific, and presents four directions for future SCP policies and 12 specific opportunities. All of the 12 opportunities presented in this report indicate promising entry points for SCP policy development and implementation in the era of the Paris Agreement and the SDGs in Asia and the Pacific.

The 12 opportunities shall be supported through two means. Firstly, it should be linked to implementation process of the SDGs at local, national, and international levels. Such implementation obviously promotes the achievement of Goal 12. In order to obtain outcomes tackling a wide range of SCP targets, it will be necessary to comprehensively address efforts, not only to implement initiatives in individual sectors in a silo manner. As the SDGs cover a wide range of issues with 17 goals and 169 targets and are recognized and accepted as historical, international goals to be achieved by governments and various stakeholders, if the SDGs are effectively utilised with enhanced public private partnerships and systems thinking is fully introduced to go beyond solving individual issues, the comprehensive implementation of SCP shall be able to be more effectively carried out than ever before. Thus, inter-ministerial coordination as well as stakeholder consultation process is a key for SCP.

Secondly, it is necessary to have facilitation mechanisms at regional level. Existing regional policy platforms such as APRSCP, SCP regional facilitation mechanisms such as SWITCH-Asia SCP facility, business entity, expert networks such as PECoP-Asia as well as leading national and local governments can put forth an effort to network different initiatives at regional level. Enhancing facilitation mechanisms shall play important roles for accelerated the achievement of the SDGs.

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# Policy Design and Evaluation to Ensure Sustainable Consumption and Production Patterns in Asian Region

(Period I: FY2016-2018)
(Period II: FY2019-2020)
Budget in FY2016: JPY 161,485,000

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<5-16>

The Rio+20 Conference in 2012 confirmed that Sustainable Consumption and Production (SCP) is a cornerstone of sustainable development. At the United Nations Sustainable Development Summit in 2015, a set of 17 Sustainable Development Goals (SDGs) was adopted, with SCP as an important goal (Goal 12).

To achieve SCP within the planetary boundaries, various stakeholder practices will be essential. In addition to an efficiency approach where energy- and resource-efficient products are promoted, we have to design and implement a new sufficiency policy by indicating an appropriate structure of consumption and production and by changing consumers' lifestyles.

Our Strategic Research Project (S-16) consists of four research themes and will present policy packages for achieving SCP by means of various stakeholders' practices, considering characteristics of individual nations or regions including their economy and lifestyles. We will evaluate the effect of policy packages by employing economic model analysis and life cycle analysis. The outcome of this project will contribute to policy planning's achievement of SCP in Asia, including Japan, and to policy dialogues with Asian countries.

Theme 1: Measures to Reduce Green House Gas Emissions and to Promote Resource Circulation by Intensifying Relations between Consumption and Production

After investigating producer roles in manufacturing and resource circulation and those of consumers with life cycle thinking, we will propose possible measures to intensify the relations between consumption and production.

Theme 2: Transition Measures for Asian Consumption and Production Patterns Based on Activities and Dynamics of Diverse Stakeholders

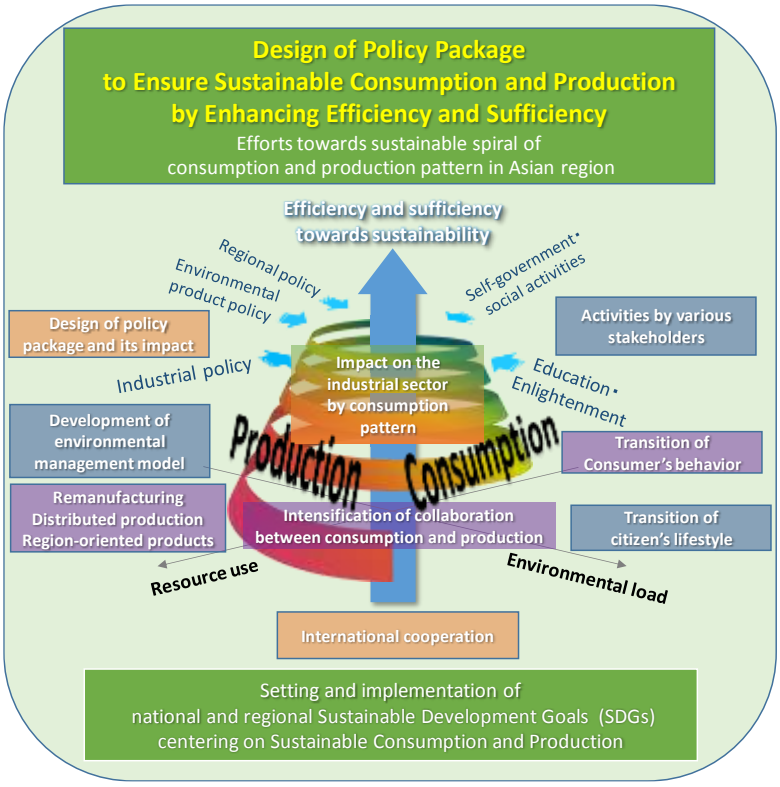
After in-depth fact finding on various stakeholders' activities relating to consumption and production, we will propose directions and actions for transition of consumption and production patterns. Citizens, business entities, and communities will be focused on in particular.

Theme 3: Policy Shift towards a Sufficiency Approach Aiming to Satisfy Needs under Environmental and Resource Constraints in Asia.

Utilizing economic model analysis and a series of field surveys, we will set mid- and long-term goals based on the planetary boundaries and propose policy packages contributing to promotion of energy- and resource-saving lifestyles and transitions in the forms of consumption and needs.

Theme 4: Governing Sustainable Consumption and Production in terms of Goal 12 of the Sustainable Development Goals (SDGs)

SCP is considered to be at the heart of the environmental SDGs. Under this theme we will investigate governance for Goal 12 and related SDGs, thereby drawing general insights into and proposals for governance for the SDGs. An integrated approach is indispensable, because governing implementation of Goal 12 is related to implementation of other goals, such as Goal 7 on energy.



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PECoP-Asia Research Project website:
http://www.susdesign.t.u-tokyo.ac.jp/s-16/