Discussion paper issued without formal editing

FOR PARTICIPANTS ONLY
20 February 2019
ENGLISH ONLY

UNITED NATIONS
CENTRE FOR REGIONAL DEVELOPMENT

In collaboration with

Ministry of the Natural Resources and Environment (MONRE), Thailand and Ministry of the Environment, Government of Japan

NINTH REGIONAL 3R FORUM IN ASIA AND THE PACIFIC,
4-6 MARCH 2019, BANGKOK, THAILAND

Realising the potential of 3R and resource efficiency through Sufficiency Economy Philosophy (SEP) ~ Implication for SDGs

(Background Paper for Plenary Session 1 of the Programme)

Final Draft

This background paper has been prepared Prof. Karl Vrancken, for the Ninth Regional 3R Forum in Asia and the Pacific. The views expressed herein are those of the author only and do not necessarily reflect the views of the United Nations.

Realising the potential of 3R and resource efficiency through Sufficiency Economy Philosophy (SEP) ~ Implication for SDGs

Prof. Dr. Karl Vrancken,
Research manager sustainable materials, VITO (Belgium)
Dept. of bio-Engineering, Univerity of Antwerp (Belgium)

Background document for 9th Regional 3R Forum for Asia and Pacific
4-6 March 2019, Bangkok, Thailand

Sufficiency Economy Philosphy, Sustainability and SDG's

Sufficiency Economy Philosophy (SEP)[1] was introduced in 1974 by His Majesty the late King Bhumibol Adulyadej. SEP is an approach for sustainable development which promotes moderation, reasonableness and prudence as development framework based on knowledge and virtue. The Philosophy attaches great importance to human development at all levels and emphasizes the need to strengthen community's capacity to ensure a balanced way of life and resilience, with full respect for the environment.

SEP shares ultimate common principles and objectives with SDGs, seeking to eradicate poverty and reduce inequality as a means to achieve sustainable development, and strike the right mindset towards the balance among three dimensions of sustainable development.

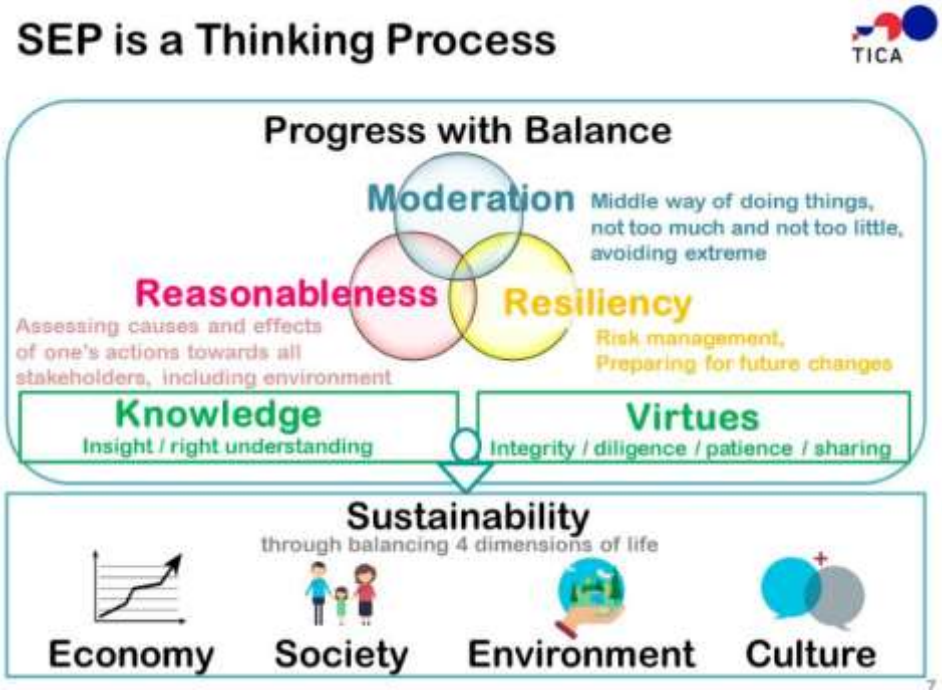

Figure 1: Sufficiency Economy Philosophy Principles, as presented by thai international Cooperation agency (TICA)

[1] http://www.tica.thaigov.net/main/en/information

The SEP looks at sustainability from a balancing perspective, and refers to the balancing of 4 dimensions of life: economy, society, environment, culture.

At a European level, the European Environment Agency (EEA) provides guidance and evaluation of the status of environmental quality and sustainable development. The EEA presents sustainability from an ecosystems perspective (Figure 2). Sustainability consists of balancing the socio-economic systems within a broader ecosystems framework. Resources and ecosystem services are extracted from the ecosystem, whereas waste and emissions are delivered to it. The balance of the socio-economic systems needs to allow to meet social needs and to provide value.

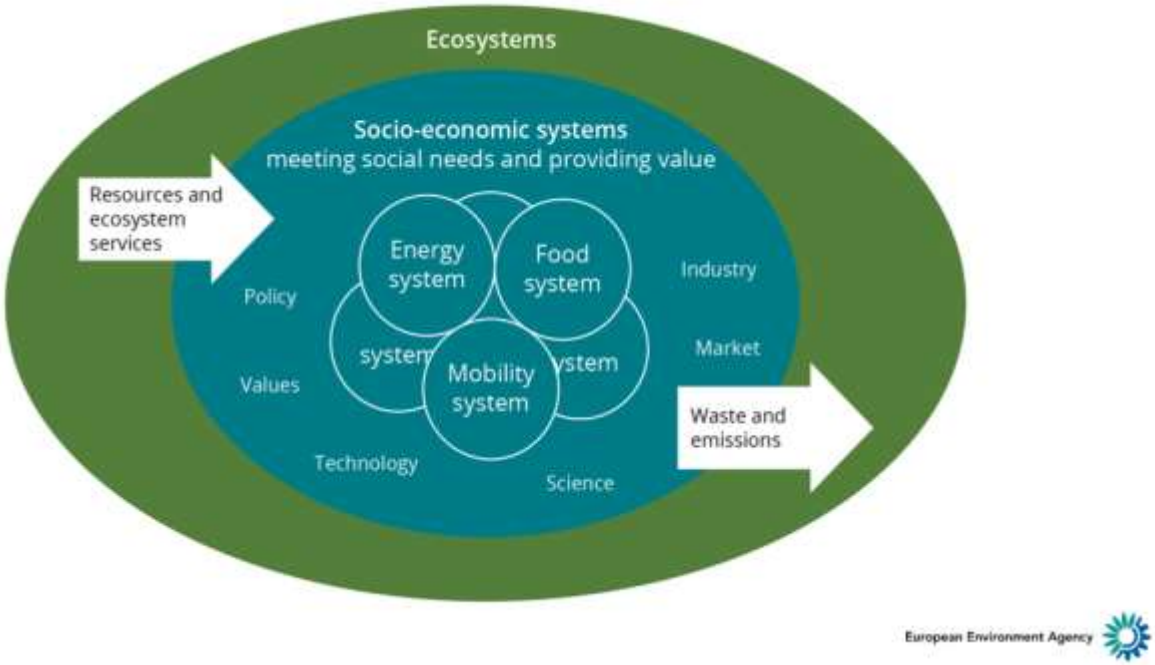

Figure 2: Ecosystem approach to sustainable development (European Environment Agency)

This viewpoint is reflected in the Vision 2050 of the European 7th Environment Action Plan (7thEAP)[2]:

In 2050, we live well, within the planet's ecological limits.
Our prosperity and healthy environment stem from an innovative, ***circular economy*** *where nothing is wasted and where natural resources are managed sustainably, and* ***biodiversity*** *is protected, valued and restored in ways that enhance our society's* ***resilience****. Our* ***low-carbon*** *growth has long been decoupled from resource use, setting the pace for a global safe and sustainable society.'*

At a world-wide scale sustainable development has been translated into the SDG's. An interesting approach to this family of 17 SDGs, which is in line with the ecosystems approach, is to classify them according to their level of impact, into goals related to Economy, Society and Biosphere (Figure 3), as presented by the Stockholm Resilience Institute.

[2] http://ec.europa.eu/environment/action-programme/

Figure 3: Classification of SDG's (Stockholm Resilience Institute)

Sustainability and Materials Management

In view of sustainable materials management, the main target SDG's are within the economic perspective, and more specifically SDG9 and SDG 12.

SDG 12 calls to *ensure sustainable consumption and production patterns*. Progress is indicated by e.g. *material footprint and domestic materials consumption, food loss, recycling rates and hazardous waste production, sustainable public procurement actions*. All these indicators are directly affected by the implementation of circular economy or 3R policies. CE and 3R go beyond the efficient collection and recycling of waste. They aim at the introduction of a sustainable lifestyle, in which producers and consumers move away from the linear make-use-dispose model and introduce sharing, leasing, repair and remanufacturing concepts.

SDG9 aims to *build resilient infrastructure, promote sustainable industrialization and foster innovation. Sub-target 9.4 aims to upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities*. This calls for a smart introduction of technologies and a deliberate choice of industrial development.

Furthermore, the implementation of 3R and Circular Economy will have positive spill-over effects for :
SDG 6: clean water and sanitation
SGG 7: affordable and clean energy
SDG 8: decent work and economic growth
SDG 11: sustainable cities and communities
SDG 13: Climate action

3R and Circular Economy

A **circular economy** is 'the economic system in which resources are kept at the highest possible level of functionality at all times'. A systemic approach to material management within this economy is critical to its success. The circular economy has the ambition to minimise material usage per unit of functionality and to manage materials in the system in such a way that losses are minimised. On a product level, CE strives to repair, re-use and remanufacture before materials are recycled. Whereas Circular Economy is a central term in the EU and Chinese policy, Japan refers to the material cycle society. In many other countries e.g. in Asia material policy is typically based on 3R: re-use, reduce, recycle. The circular economy adds upstream measures (e.g. in product design) to this 3R principle.

3R and Circular Economy find a close relationship in the representation of Circular Economy as proposed by Bocken (Figure 4). It is a system of Closing, Slowing and Narrowing resources flows. These axes can be related as follows:

- Reduce – Narrowing Loops
- Reuse – Slowing Loops
- Recycle – Closing Loops

It is important to notice that the aspect of narrowing loops includes dematerialisation of flows, i.e. the replacement of products by services and introduction of alternative approaches to delivering societal functions. Both the circular economy and the 3R principle should therefore be considered to go beyond closing material loops, and also address the 'inner circles' of the economy, which prolongue the lifetime of products and dematerialse societal functions.

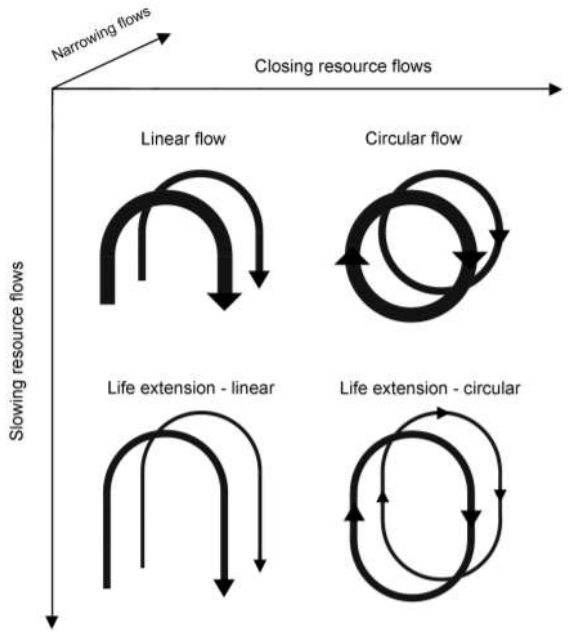

Figure 4: categorisation of linear and circular approaches for reducing resource use (Bocken et.al.)[3]

[3] Bocken et.al., 2015, Product design and business model strategies for a circular economy, (https://www.rescoms.eu/assets/downloads/Business-models-and-design-for-a-closed-loop-FINAL.pdf) accessed 17 Februay 2019

Circular Economy from a business perspective

In essence, a circular economy represents a fundamental alternative to the linear take-make-consume-dispose economic model that currently predominates.[4] The Ellen MacArthur Foundation defines a circular economy as one that is restorative, and one which aims to maintain the utility of products, components and materials and retain their value[5]. It thus minimises the need for new inputs of materials and energy, while reducing environmental pressures linked to resource extraction, emissions and waste. This goes beyond just waste, requiring that natural resources are managed efficiently and sustainably throughout their life cycles. A circular economy thus provides opportunities to create well-being, growth and jobs, while reducing environmental pressures. The concept can, in principle, be applied to all kinds of natural resources, including biotic and abiotic materials, water and land.

Eco-design, repair, reuse, refurbishment, remanufacture, product sharing, waste prevention and waste recycling are all important in a circular economy. At the same time, material losses through landfill and incineration will be reduced, although these may continue to play a much-reduced role in safely removing hazardous substances from the biosphere and recovering energy from non-recyclable waste. Several concepts and visualisations of a circular economy exist; Figure 5 shows a simplified model. The main idea is that waste generation and material inputs are minimised through eco-design, recycling and reusing of products. This will create economic and environmental co-benefits, as the dependency on extraction and imports declines in parallel with a reduction in the emissions to the environment caused, for example, by extraction and processing of materials, incineration and landfill.

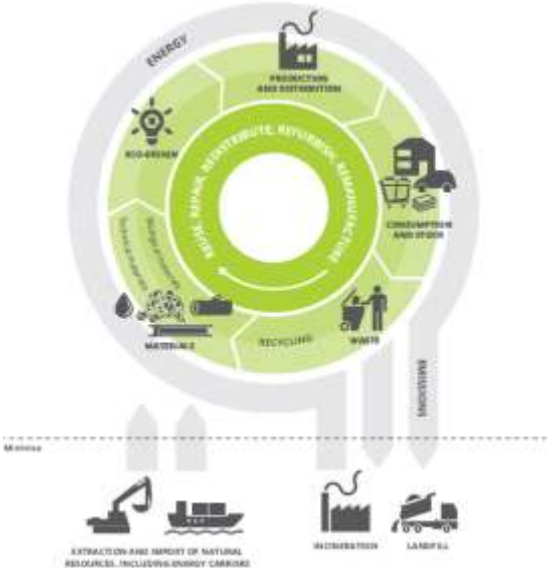

Figure 5: A simplified model of the circular economy for materials and energy (EEA)

The circular economy generates new opportunities and needs for business. These can be grouped according to 4 archetypes[6] that each represent a specific business focus as the main entry point for developing a circular business model:

- relationship with **customer**: providing a service instead of a product,
- **product or process**: circular product or process design,
- relationship with the **value network**: building circular value networks,
- sustainable **identity**: circularity as a unique selling proposition.

In most cases a company will combine elements of each archetype in its business approach.

Challenges for Circular Economy

To achieve SDG 9 and SDG 12, a transition to a new societal framework is required, powered by a circular economy approach that is enabled by digital technologies. This will, among others, lead to an optimization

[4] EEA, 2016, Circular economy in Europe – Developing the knowledge base, European Environment Agency.

[5] EMF, 2015, 'Circular economy overview' (http://www. ellenmacarthurfoundation.org/circular-economy/ overview/concept) accessed 17 February 2019.

[6] EIT RawMaterials, 2017, Circulator (http://www.circulator.eu) accessed 17 February 2019.

of material use per unit of output and reduce waste and pollution. The complete value chain needs to be revisited and customers need to be provided with services rather than throw-away products. Industry 4.0 provides the technological driver for circular innovation, while the circular economy is the driver to transition to a sustainable industrial and societal framework.
We can't have a circular economy without the 4th industrial revolution, nor can we have a socially useful and sustainable 4th industrial revolution without advancing the circular economy.

It will also be of great importance to look at Circular Economy and 3R from an international, and interconnected regional perspective. The Global Science Technology and Innovation Conferences (GSTIC)[7] contributes actively to this development. G-STIC 2018 saw representatives from the University of Oxford, World Resources Forum (WRF), Regional 3R Forum in Asia and the Pacific, the International Solid Waste Association (ISWA), the European Commission, and G-STIC expressing their willingness to step up the collaboration in the field of technological innovation needed for the transition to a circular economy. This increased collaboration will include (1) providing an open exchange platform to stimulate collaboration, (2) learning from each other.

An international dialogue is necessary to ensure that a circular economy does not create a group of closed local economies, but rather becomes a global system of various economies collaborating. We need to strengthen the contacts between digital and circular economy experts. We must showcase the opportunities of blockchain, internet of things, artificial intelligence, big data, product identification, collaborative platforms,… and develop common approaches.

Resource efficiency policies and Circular Economy in the Europe[8]

The implementation of circular economy and resource efficiency policies in Europe, is evaluated by the European Topic Centre on Waste and Materials in a Green Economy (ETC-WMGE) of the EEA. The analysis resulted in an insightful report in 2015, titled More From Less. In 2019, an updated version (Even More From Less) will be published.

A high number of national policy initiatives on the circular economy have been initiated since 2015, the year in which the EU Circular Economy Action Plan was adopted. Twenty countries reported having started various policy initiatives on the circular economy, and in 2015 nine of those have already adopted a circular economy policy strategy, an action plan or roadmap.

The most recurrent drivers for European countries to introduce resource efficiency and circular economy policies were the desire to increase competitiveness and to secure the supply of raw materials and energy as well as to reduce dependence on imports on the one hand (economic interests), and the need to reduce pressures on the environment on the other (environmental concerns). Only nine countries specifically pointed to the need to reduce greenhouse gas emissions as a driver of material resource efficiency.

Energy and resource efficiency are still largely disconnected from a programmatic point of view. This might warrant more attention in future, as there are many potential synergies between the two, in line with the Seventh Environment Action Programme (7EAP) objective to 'turn the Union into a resource‑efficient … low-carbon economy' and to link the action on circular economy to the challenges of climate change.

[7] GSTIC, 2018, Circular Economy (https://2018.gstic.org/themes/circular-economy), accessed 17 February 2019
[8] EEA, 2016, More From Less, European Environment Agency report 10/2016

Indicators

The EU Resource Efficiency Scoreboard is considered by most Eurpean countries as a common source of indicators. The model brings together a number of relevant indicators in one place, in a scoreboard approach.

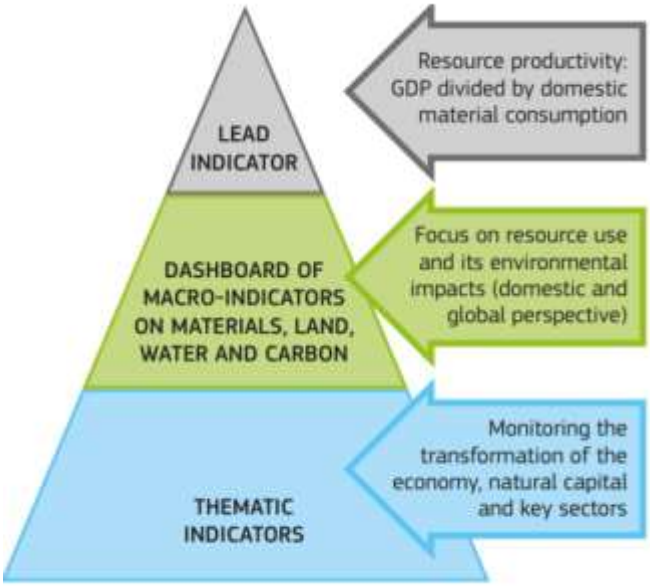

Figure 6: Resource Efficiency Scoreboard (European Commission)

There is a shortage of indicators to inform material resource efficiency policies that go beyond energy and waste. Indicators such as Domestic Materials Consumption (DMC), used by most countries, are sufficient to monitor macroeconomic trends, but it was noted by some countries that they are too aggregated to steer material resource efficiency policies. There are some examples of sector-oriented indicators, typically measuring the ratio between a particular environmental parameter and the gross added value of a given sector.

The use of these indicators, brings us back to the SDGs. For each of the SDGs a list of indicators has been developed. The indicator list for SDG 12 Sustainable consumption and production is given below. The macro-economic indicators DMC (per capita and per GDP) and material footprint appear under 12.2; waste and recycling-related indicators are given in 12.4 & 12.5. Besides these clearly materials-related indicators, the SDG looks from a broader perspective, by including elements on education, international collaboration, subsidies, support to developing countries and sustainable tourism.

Goal 12. Ensure sustainable consumption and production patterns

12.1 Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries	12.1.1 Number of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies
12.2 By 2030, achieve the sustainable management and efficient use of natural resources	12.2.1 Material footprint, material footprint per capita, and material footprint per GDP 12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP
12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses	12.3.1 Global food loss index
12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment	12.4.1 Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement 12.4.2 Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment
12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	12.5.1 National recycling rate, tons of material recycled
12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle	12.6.1 Number of companies publishing sustainability reports
12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities	12.7.1 Number of countries implementing sustainable public procurement policies and action plans
12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature	12.8.1 Extent to which (i) global citizenship education and (ii) education for sustainable development (including climate change education) are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment
12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production	12.a.1 Amount of support to developing countries on research and development for sustainable consumption and production and environmentally sound technologies
12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products	12.b.1 Number of sustainable tourism strategies or policies and implemented action plans with agreed monitoring and evaluation tools
12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities	12.c.1 Amount of fossil-fuel subsidies per unit of GDP (production and consumption) and as a proportion of total national expenditure on fossil fuels

Conclusions

In view of the sustainability agenda and the SDGs, a variety of policy initiatives are taken in different regions around the world. The Sufficiency Economy Philisophy of Thailand couples the need for a balanced life and well-being to the development of a sustainable society. At a European level, sustainability is approached from an ecosystems perspectives, stressing the need to develop societal needs within the limits of the planetary boundaries.

The introduction of a more systemic and sustaibaility perspective into waste management has led to a shift to materials policy. Whereas this was initiated as 3R (Reduce, Reuse, Recycle) in many Asian countries, we see that the concept of circular economy gains attention, not only in Europe but around the world. Both the circular economy and the 3R principle should therefore be considered to go beyond closing material loops, and also address the 'inner circles' of the economy, which prolongue the lifetime of products and dematerialse societal functions.

An international dialogue is necessary to ensure that a circular economy does not create a group of closed local economies, but rather becomes a global system of various economies collaborating. There is a lot of experience to be shared between North and South, East and West.

Policy and governance initiatives are followed up and evaluated by the European Environment Agenct (EEA). Recent analysis shows that authorities are mainly driven by economic arguments. The further integration of energy aspects and CO_2 emissions into resource efficiency thinking will allow to link circular economy policies more into the climate change debate.

Indicators to measure resource efficiency and circularity are under development. The fact that mainly macro-economic indicators are used, makes it difficult to set clear short-term policy targets. When developing indicators, there is a need to work with a scoreboard or set, allowing to evaluate progress across the full system perspective.